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# Table of Contents

## From the Editor’s Desk:

- From the Desk of the Former President.  
  **Taisir Subhi Yamin**  ................................................................. 07

## Articles:

- The Role of Parents and Teachers in the Development of Scientific Talent: Lessons from Early Childhood and Adolescent Education of Nobel Laureates.  
  **Larisa Shavinina**  .................................................................. 11

- Detecting High Leadership Potential and Promoting Talent: An Example of an Evidence-Based Approach in a French Blue-Chip Company.  
  **Ida Gennari-El Hicheri; Xavier Caroff; Pauline Paroche; Elise Chemolle; Todd Lubart**  .... 25

- Research on Personality and Affective Dispositions of Gifted Children: The Israeli Scene.  
  **Moshe Zeidner; Inbal Shani-Zinovich**  ........................................ 35

- A Multidimensional Model for the Identification of Dual-Exceptional Learners.  
  **Anies Al-Hroub**  ..................................................................... 51

- Developing a Teacher Administered Anxiety Rating Scale Suitable for Five to Seven-Year-Old Children.  
  **Joseph Goulet**  ..................................................................... 71

- “Mathematics in the Workplace”: A Pilot Enrichment Programme for Mathematically Talented Primary Students in Hong Kong.  
  **Anderson C. K. KWAN; Mantak YUEN**  ................................... 85

- How do Parents and Teachers of Gifted Students Perceive Group Work in Classrooms?  
  **Katie S. Saunders-Stewart; Cheryl L. Walker; Bruce M. Shore**  ........................................ 99

- You Turn up the First Day and they Expect You to Come Back! Gifted Students’ Perspectives on School and Being Smart.  
  **Selena Gallagher; Susen Smith; Peter Merrotsy**  ...................... 111

- Factors Influencing Talent Development: Stories of Four Hong Kong Elite Sportspersons.  
  **Regina Chan; Mantak Yuen**  .................................................. 123

- School Transition and Mathematically Gifted Students.  
  **Brenda Bicknell; Tracy Riley**  ................................................ 135

- Creativity, Giftedness and Education.  
  **Maud Besançon**  ..................................................................... 149

- Labour Disputes of Gifted Employees.  
  **Ido van der Waal; Noks Nauta; Rebecca Lindhout**  .................. 163

- The Effect of Journal Writing on Mathematics Achievement among High-Ability Students in Singapore.  
  **Tracy Tan; Rhoda Myra Garces-Bacsal**  .................................... 173
The Influence of Family Relationships on Creativity in the Workplace.
Józef Szopiński; Tomasz Szopiński ................................................................. 185

Services Provided to Military Dependents Who Are Mentally Gifted in the US Department of Defense (DoDEA) Schools.
Stephen J. Bugaj .................................................................................................. 197

Issues of Identification of Giftedness in Turkey.
Füsun Şahin .......................................................................................................... 207

Gender Differences on the Concept of Wisdom: An International Comparison.
Liz Hollingworth; Pedro Sanchez-Escobedo; Liena Graudina;
Jurga Misiuniene; Kyubin Park ........................................................................... 219

Confucian Values in Vietnamese Gifted Adolescents and their Non-Gifted Peers.
Thi Minh Phuong Nguyen; Putai Jin; Miraca U. M. Gross ................................... 227

The German Project Called „Triangelpartnerschaften“ (triangle partnerships):
Can Music Bridge the Intergenerational Gap?
Christian Werner; Sandra K. Linke ..................................................................... 239

Coping with the Qualities of Giftedness.
Peter Overzier; Noks Nauta ................................................................................ 249

Communication Skills among Gifted Students in Jordan.
Yacoub Fareed Alfarah .......................................................................................... 255

Students Attitudes towards the Web Based Instruction.
Nahla M. Khatib .................................................................................................. 263

Book Review

The Creativity Revolution: Reinvent Your Creativity Self to Shape the Future and Prosper.
Sara Kapadia ....................................................................................................... 271

Submission Guidelines
Welcome to Volume (28(1&2), 2013) of Gifted and Talented International. The 20\textsuperscript{th} Biennial World Conference: Celebrating Giftedness and Creativity which took place in Louisville, Kentucky – USA (August 10-14, 2013) 2013 was a success. Year 2013 was also the International Year of Giftedness and Creativity (IYGC).

At the conclusion of my term (2009-2013) as the President of the World Council for Gifted and Talented Children (WCGTC), I found myself reflecting on how it all came about and my vision for the organization. First my vision: It was to build on our well-earned reputation as a global, professional, leading organization, dedicated to discussing, analysing, creating, and advancing solutions to the challenges facing the development of gifted education. In particular, I looked for (a) the empowerment of the gifted, creative, and talented through leadership and international supportive management and partnership; (b) advanced team-working processes; (c) functional well-organized multidisciplinary resources; (d) cross-cultural networking and bridging; (e) capacity building; and (f) efficient, up to date, and comprehensive knowledge dissemination. I believe the WCGTC must continue to expand and extend its activities and resources and I want to wish the new President and committee members all the best in this regard.

As former President and presently as Editor-in-Chief of Gifted and Talented International, I am willing to continue working for this organization, to employ my expertise and dedicate myself to making the opportunity a success. In 1997, I was honoured to be selected for the Fulbright Award and I know being a Fulbrighter continues to have a strong positive impact on my career and life. In 2013, I was awarded the Harry Passow Award for Leadership in Gifted Education. The experience associated with both awards will enrich my contribution to the organization and its activities. Both the Fulbright programme and the WCGTC were established to increase mutual understanding between the people of different countries.

The Fulbright programme is one of the most prestigious award programmes worldwide, operating in 144 countries and with 52 commissions. It is a very competitive fellowship and a great opportunity for personal growth and professional development.

In 1997, I became the first Fulbright scholar brought to the gifted education programme at the University of Connecticut (UConn). During this experience, I had the opportunity to work with Joe Renzulli and other highly qualified staff and students at the National Research Center on the Gifted and Talented (NRC/ GT). In addition, I had the opportunity to work with James John Gallagher, and other scholars in this field of knowledge. This experience made...
me deeply appreciative of the saying that the world is a small ‘global village’ and highly aware that high quality gifted education must be a global priority.

During my stay at UConn, I welcomed the opportunity to develop the first prototype for the “computerized multiple criteria identification process”. Everyday our world gets smaller as the internet and telecommunications improve. Therefore, technological innovations (e.g., Renzulli Learning System) will be powerful influences. For example, e-mail communication provides opportunities to interact with people from around the world and in many different fields of interest. Activities that have long been encouraged in schools, such as writing to authors or experts, become easier for both the students and those they are trying to contact. Furthermore, e-mail and other communication innovations, such as distance learning can make possible new opportunities for mentorship programmes.

Deeply concerned over the non-violent approach through education in its broadest sense, I joined the International Association of Educators for World Peace (IAEWP). The IAEWP urges the creation of a new breed of scientists, philosophers, parents, students, educators, and especially leaders who are inspired with the vision of restoring world peace. It was founded in Norway in 1970 by a group of educators who are socially conscious and shared the same vision and concern over the increasingly violent culture worldwide. The IAEWP now has chapters in over 100 countries, with consultative status at many United Nations agencies and since 1987 is a designated Peace Messenger of the United Nations.

In my capacity as a member of the advisory board and the vice president for West Asia, I am working with Prof. Dr. Charles Mercieca (President, IAEWP) and other colleagues to promote projects and activities needed to light the pathway to world peace. In this context, we are willing to work with the new administration to: promote international understanding and world peace through education; protect the environment against all forms of pollution; safeguard the Universal Declaration of Human Rights; promote nuclear disarmament and demilitarization; and to plan ventures in international cooperation that would emphasize technology as it can benefit the entire human race and as an alternative to war (www.iaewp.org).

My involvement in the International Centre for Innovation in Education (ICIE) has been and remains important as we move forward. Under the direction of the ICIE’s team and advisory board, we have been involved in financing, editing and publishing Gifted and Talented International (GTI) since 2005. In addition, the ICIE is involved in a number of projects that were designed for countries in the Middle East and Europe. For example, we have:

- Introduced the Renzulli Learning System and employed this system in: Jordan, Turkey, United Arab Emirates, Yemen, Netherlands, and France. Four liaison offices were established in these regions to promote this system. Access to this system opened the floodgates to advance students’ understanding and is already resulting in higher levels of productivity;
- Established the first national centre for the gifted and talented in Yemen;
Developed enrichment activities for a number of schools in Turkey;
Organized 11 international conference on “Excellence and Innovation in Education”;
Published the International Journal for Talent Development and Creativity (IJTDC);
Designed and implemented capacity building programmes; and conducted workshops;
Conducted a number of research studies; and,
Participated, as a member of an international consortium, in evaluation studies and
projects aimed at developing gifted programmes.

In all these endeavours, it has been my distinct pleasure and privilege to work with so
many competent and highly committed scholars from all over the world, many of whom
remain my closest friends. I have valued teamwork, dialogue, honesty, integrity, cooperation,
and collaboration as a part of our continuous efforts to improve and honour the vision. I
treasure the trust placed in our team, as founders of the ICIE and other international
organization, developing projects, running programmes, building a strong network, and
preparing children for their vital role as productive world citizens.

Recently, we are involved in a number of projects, including: “Capacity Building for
Excellence in Education”; “Developing Productive Thinking Skills”; “Evaluation of Potential
Creativity in Different Cultures”; “The Digital Resource Centre for the Gifted and Talented”;
and “YOUcultures: Lifelong Learning Programme”.

With respect to this volume of Gifted and Talented International (2013, Volume
28(1&2)): I hope the contents are found interesting, fascinating, useful, and informative. In
my view, this special volume serves as a stimulating forum for sharing creative thoughts as it
offers an opportunity to consider some significant issues in our field of interest while
developing a more comprehensive understanding. This volume comprises (22) interesting
articles and one book review, all of which broaden our view of this field and its assumptions.
This volume appears five months after the 20th World Conference.

To conclude: I am grateful to the originators of this material, for their diligence and
insight with which they so richly benefit this journal. All have contributed substantially to
this issue, and, accordingly they deserve recognition for their contributions, and not least,
their patience throughout the production, review, and editorial process.
The Role of Parents and Teachers in the Development of Scientific Talent: Lessons from Early Childhood and Adolescent Education of Nobel Laureates

Larisa Shavinina
Université du Québec en Outaouais, Canada

Abstract
This article presents some of the main results from the project about early childhood and adolescent education of Nobel laureates in science: the exceptional roles of parents and of teachers in developing scientific talent. Winning a Nobel Prize represents the pinnacle of accomplishment possible in one’s field of expertise. Despite the ever-increasing role of science in society and the importance of Nobel laureates in contemporary science, it should be acknowledged that their childhood and adolescent education has never been studied. The discovery of principles involved in the educational development of Nobel laureates will allow educators to accordingly improve, develop, modify and transcend areas in the current curriculum in an attempt to cultivate scientific talent, of Nobel calibre, in future generations.

Keywords: Scientific talent, Nobel laureates in science, early childhood and adolescent education.

Introduction
I consider early childhood events as most essential to a man's scientific and philosophical development. (Konrad Lorenz)

Nobel laureates during their childhood encompassed a wide range of abilities, including the gifted, gifted underachievers, and children without any special talents. Their divergent trajectories of talent development ultimately led to the same result: amazing scientific innovations—great discoveries, which testified to the outstanding minds of those who made them. Eventually, all the trajectories led to the same point: zenith in science. A question is how and why this happened, and what lessons can be derived for the education of today’s children.

The findings reported in this article resulted from the author’s research project, A Study of Early Childhood and Adolescent Education of Nobel Laureates and the Implications for Gifted and General Education: Developing Scientific Talent of Nobel Caliber that started in 2008. The project was sponsored by the Social Sciences and Humanities Research Council (SSHRC) of Canada. More than 12,000 pages of documents regarding early childhood and adolescent education of Nobel laureates in science were found from all the existing printed sources (i.e., mainly (auto) biographies and articles) published in all languages. Nobody could predict such a wealth of data at the beginning of the project. This article is thus based on the analysis of these documents about their early childhood and adolescent education.

The four main findings of the project relate to the important roles of parents, teachers, special events (e.g., the Great Depression in the case of Nobel Prize winners in economy or war in the case of early laureates), and proximity-related issues (e.g., proximity of nature in the case of Nobel laureates...
in physiology or medicine, laboratories in the case of Nobel Prize winners in chemistry, and public libraries and museums in the case of almost all laureates) in developing scientific talent of Nobel caliber. Specifically, this article will focus on the part played by parents and teachers in cultivating such a talent. They are described in the second and third sections, respectively. The first section presents a brief literature review of the role of the micro-social environment in developing children’s talents. The concluding section summarizes the findings and discusses their implications for gifted education.

For the purpose of this article and due to space constrains, examples are taken only from the Nobel laureates in physics and physiology or medicine. For the same reason supporting quotes (with one exception) are taken from their autobiographies available on the Nobel Foundation website at http://www.nobelprize.org/nobel_prizes

What does literature tell us about the role of micro-social factors in the development of high ability?

Research demonstrates micro-social factors contribute significantly to the development of exceptional talents. Scholars have found that many children showing signs of giftedness in their childhood do not necessarily manifest an outstanding level of achievement and performance in school and adult life (Howe, 1990, 1993; Tannenbaum, 1986). One explanation for this discrepancy between promise and fulfillment can be family milieu and educational opportunity (Lewis & Michalson, 1985). Families provide opportunities for the mental growth of their children, and thus play an essential role in talent development. All human achievements are considered to be interaction between inner potential and the resources and opportunities provided by the surrounding environment (Gardner, 1993; Howe, 1990, 1993; McCurdy, 1992; Sternberg & Lubart, 1995). The educational level of parents and socio-economic status of the family also matter.

Specifically, researchers found that the family milieu plays a crucial role in providing good learning opportunities (Feldman, 1986, 1993). While parents of gifted children are almost always highly educated, the educational level of the mother is especially important. Often parents of talented children are their first teachers (Howe, 1990, 1993; McCurdy, 1992; Storfer, 1990). Parents maintain the optimal balance of freedom and pressure most favorably influencing a child’s motivation to learn (Lewis & Michalson, 1985). Gifted children receive a great deal of encouragement, guidance, and support from parents (Feldman, 1986, 1993; Gardner, 1993).

Family values and family climate also facilitate the development of high ability. For example, prodigies are generally born into families that recognize and value talent as it emerges (Feldman, 1986; Robinson & Clinkenbeard, 1998).

Family socio-economic status is another significant variable; it enables a wide diversity of educational and cultural experiences. Many gifted children come from the middle and upper socio-economic classes (Gardner, 1993; Howe, 1990; Lewis & Michalson, 1985).

Contact with role models and/or significant others (e.g., parents, relatives, teachers, and the like) is of great importance for the development of giftedness. Often the gifted have a few “significant others” or role models in their lives who influence mainly via formal education. They manifest the abilities and skills in some areas of talent, the values and attitudes associated with it, and the self-image required for successful performance (Cropley & Dehn, 1996; Simonton, 1978). The opportunity of personal interaction with great contemporaries or eminent models is very important for the fulfillment of an individual’s gifted potential.

Although it is well known that school influences the development of high ability in many ways, the existing literature will not be analysed in detail here. It is important to note, however, a major influence, namely formal education. Research underlines the key traditional role of school, i.e.,
knowledge acquisition (Cropley & Dehn, 1996; Simonton, 1978; Sternberg & Lubart, 1995), and how an individual’s knowledge base is critical in the development of giftedness (Chi & Greeno, 1987; Kholodnaya, 1997; Rabinowitz & Glaser, 1985; Schneider, 1993; Shavinina, 1997, 1999; Shavinina & Kholodnaya, 1996). In this light it is important to note that school may stimulate or inhibit developing talents.

What is the role of parents in developing scientific talent?

One of the main findings of the project on early childhood and adolescent education of Nobel laureates is that family played the most important role in the development of scientific talent. It mainly includes (1) encouraged, supporting parents, which valued education and loved to read, and/or (2) their professional occupations related to science, and/or (3) homes full of books and scientific toys/kits that allowed scientific experimentation at home. Early childhood and adolescent education of each Nobel Prize winner was characterized by at least one of these three factors.

Supporting and encouraging parents, who valued education and loved to read

Parents supported children’s interests in science and other subjects, as well as encouraged them to pursue those interests. As Wolfgang Ketterle, a winner of the 2001 Nobel Prize in physics, speaks of his parents who supported interests in science and other subjects, as well as encouraging him to pursue those interests. He writes:

My parents supported all our interests in music, sports and sciences. As they hadn't been exposed to many of these activities themselves, they did not steer us in certain directions, but rather observed our interests and then reinforced and supported them (Ketterle, 2001; http://www.nobelprize.org).

The word ‘our’, in this quotation, refers to Wolfgang Ketterle himself, his older brother and a younger sister.

Russell A. Hulse, who won the 1993 Nobel Prize in physics, praised his parents in a similar way:

My parents fostered and supported this interest, and I thank them very much for being my first and, by far, most uncritically supportive funding agency (1) (Hulse, 1993; http://www.nobelprize.org).

Providing a generally happy childhood, parents supported children in their other endeavors as well and demonstrated a great deal of interest in their pursuits. Christiane Nüsslein-Volhard, winner of the 1995 Nobel Prize in physiology or medicine, expressed this convincingly in her autobiography:

I had a happy childhood, with many stimulations and support from my parents who . . . made children's books and toys for us. We had much freedom and were encouraged by our parents to do interesting things. . . My father showed much interest in what we did, and thereby had a great influence in our performances. . . I tried to explain to him what we did in mathematics, and we discussed Goethe's scientific papers.


Likewise, Arvid Carlsson, winner of the 2000 Nobel Prize in physiology or medicine, described his family milieu as “a stable environment with loving and supportive parents” that characterized his happy life during childhood and youth (Carlsson, 2000; http://www.nobelprize.org).

Parents valued education, regardless of whether or not they were educated themselves. For instance, Rosalyn Yalow, winner of a 1977 Nobel Prize in physiology or medicine, wrote about her parents, “Neither had the advantage of a high school education but there was never a doubt that their two children would make it through college” (Yalow, 1977; http://www.nobelprize.org).
Likewise, Stanley Cohen, recipient of the 1986 Nobel Prize in physiology or medicine, praised his parents for developing his educational motivation:

My father was a tailor and my mother, a housewife. Though of limited education themselves, they instilled in me the values of intellectual achievement and the use of whatever talents I possessed (Cohen, 1986; http://www.nobelprize.org).

Because parents valued education, they encouraged children to do their best in school. The parents of Herbert Kroemer, Nobel Prize winner for physics in 2000, exemplified this perfectly:

Both came from simple skilled-craftsmen families. Neither had a high-school education, but there was never any doubt that they wanted to have their children obtain the best education they could afford. My mother, in particular, pushed relentlessly for top performance in school: simply doing well was not enough. . . Despite their insistence on excellence, my parents never pushed me in any particular academic direction; I was completely free to follow my inclinations, which ran towards math, physics, and chemistry. When I finally told my parents that I wanted to study physics, my father merely wondered what that is, and whether I could make a living with it (Kroemer, 2000; http://www.nobelprize.org).

Similarly, Horst L. Stormer, winner of the 1998 Nobel Prize in physics, pointed out in his autobiography:

There was never a doubt in my parents' mind that their sons would receive the best possible education. Although none of my forefathers graduated from high school, my parents regarded highly the merits of a good education as a tool for social advancement. In their value system knowledge always ranked above wealth. . . To enter "Gymnasium" at ten required the passing of a test. I was accepted and from then on commuted for eight years, five km each way, to the "Goethe Gymnasium" in the neighboring town (Stormer, 1998; http://www.nobelprize.org).

In a similar way, Claude Cohen-Tannoudji, 1997 Nobel Prize winner in physics, powerfully acknowledged parental impact on his intellectual growth:

My parents lived a modest life and their main concern was the education of their children. My father was a self-taught man but had a great intellectual curiosity, not only for biblical and talmudic texts, but also for philosophy, psychoanalysis and history. He passed on to me his taste for studies, for discussion, for debate, and he taught me what I regard as being the fundamental features of the Jewish tradition - studying, learning and sharing knowledge with others (Cohen-Tannoudji, 1997; http://www.nobelprize.org).

The 1997 Nobel Prize winner in physics, Steven Chu, talked about the education received from his family. He writes,

It was not merely emphasized, it was our raison d'être. Virtually all of our aunts and uncles had Ph.D.'s in science or engineering, and it was taken for granted that the next generation of Chu's were to follow the family tradition (Chu, 1997; http://www.nobelprize.org).

William D. Phillips, a winner of the 1997 Nobel Prize in physics, also stressed the exceptional role his parents played in his educational development:

I clearly remember the value my parents placed on reading and education. My parents read to us and encouraged us to read. As soon as I could read for myself, walking across town to the library became a regular activity. . . Although they had no particular knowledge or special interest in science, they supported mine. . . (Phillips, 1997; http://www.nobelprize.org)

The family milieu of George H. Hitchings (a 1988 Nobel Prize in physiology or medicine) had an equally great impact on him:

I enjoyed a warm and loving home environment. A high standard of ethics prevailed in our family, together with a thirst for knowledge and an urge to teach. In their schooling, my mother and father were limited. . . but they were avid readers, especially my father. It is clear to me in retrospect that he would have been a scientist had opportunities been more easily attainable (Hitchings, 1988; http://www.nobelprize.org)
Often it was mothers who, from an early age, instilled a passion for reading in their children. For example, Richard J. Roberts (the 1993 Nobel Prize in physiology or medicine) described himself as “a passionate reader, having been tutored very early by my mother. I avidly devoured all books on chemistry that I could find” (Roberts, 1993; http://www.nobelprize.org).

Even in the case of low-income families, parents strongly encouraged children to read and did whatever possible in order to find books for their kids. The case in point is Carl E. Wieman who won a 2001 Nobel Prize in physics. As he wrote in his autobiography,

Most of my childhood was spent in the woods of Oregon. . . Every Saturday my family would make a long expedition to the nearest town to do the weeks’ worth of shopping. A stop at the public library was always part of these trips. . . My parents must have made special arrangements for their children to use the library since we lived far outside the region it was supposed to serve. The librarians would also overlook the normal five-book limit and allow me to check out a large pile of books each week that I would then eagerly devour. . . At the time I was quite envious that my friends had televisions while we did not, but in retrospect I am very grateful that I spent this time reading instead of watching TV (Wieman, 2001; http://www.nobelprize.org).

The public library played an equally important role in childhood education of Isidor Rabi, who was from a poor family. The children’s books in the Carnegie Library - a local branch of the Brooklyn Public Library in New York, were fun to read. Rabi read them all. Books of science were organized by subject and he started at the beginning, with A for astronomy. Decades later, Rabi could say, ‘That was what determined my later life more than anything else — reading a little book on astronomy’ (quoted in Rigden, 1987, p. 22).

A public library was also a crucial facet of Rosalyn Yalow’s childhood: “I was an early reader, reading even before kindergarten, and since we did not have books in my home, my older brother, Alexander, was responsible for our trip every week to the Public Library to exchange books already read for new ones to be read” (Yalow, 1977; http://www.nobelprize.org).

In cases of economically well-endowed families, homes were often full of books. As a result, children liked to read a lot. John C. Mather, the 2006 Nobel Prize winner in physics, reveals why he had many opportunities to learn science, even in a very rural setting. He writes about his parents who “enjoyed reading aloud from various books, including biographies of Darwin and Galileo” (Mather, 2006; http://www.nobelprize.org). He speaks of his interest in everything that came his way and especially remembers his elementary school years when he would hide books behind his desk while the other students were learning in class. He writes:

We did have a Bookmobile, a traveling library from the County that visited the farms every couple of weeks, and I borrowed as much as I could. I started reading about optics, and I saved my allowance and ordered some lenses from Edmund Scientific and assembled small refractor telescopes (Mather, 2006; http://www.nobelprize.org).

Professional occupations of parents were related to science


George E. Palade, a winner of the 1974 Nobel Prize in physiology or medicine, excellently summarized the main impact of such a home milieu, “My father . . . was professor of philosophy and my mother . . . was a teacher. The family environment explains why I acquired early in life great respect for books, scholars and education” (Palade, 1974; http://www.nobelprize.org).
Hamilton O. Smith echoed this sentiment by saying: “At home, an atmosphere of intense intellectualism was maintained. My father was perpetually working and writing. At the same time, my mother struggled to establish herself as a writer… She, in particular, imbued us with a respect and desire for the creative life” (Smith, 1978; http://www.nobelprize.org).

Parents often sparked their kids’ interest in science by challenging them with scientific problems. For instance, Eric A. Cornell recalled:

Some nights… my father would come in and suggest to me a "problem" to think about… It did get me in the lifelong habit of thinking about technical issues at all sorts of random moments in my daily life, and not only (or even primarily) during scheduled "thinking time." Some of my father's bedtime problems I now recognize as classic physics brainteasers (Cornell, 2001; http://www.nobelprize.org).


Professional occupations of parents thus determined an early and deep interest of their children in science, books and other intellectual pursuits.

Scientific experimentation encouraged at home

Many Nobel Prize winners came from homes full of scientific kits/toys that allowed scientific experimentation at home. Legos with its building blocks, electricity kits, chemistry sets, electronic kits, TV sets and other similar toys sparked unusual levels of curiosity and interest in science and technology. Thus, recollecting his childhood years, Wolfgang Ketterle wrote in the autobiography:

My explorations of the technical world started with Legos, with which I was quite creative in constructing moving objects with the basic building blocks… I remember playing with electricity kits, doing repairs of household appliances, and using my father's power tools for woodworking projects. Explorations into chemistry were done in our basement… and my parents must have had quite a bit of confidence in my abilities when they allowed me to experiment with explosive mixtures… Other projects included taking old radios and a TV set apart and combining a portable radio and a vacuum tube audio amplifier to create stereo sound. I was interested in learning more about electronics, but I was disappointed that the electronic kits explained only how to put the parts together, not how they really worked (Ketterle, 2001; http://www.nobelprize.org)

In the same way William Phillips described how his home life contributed to his early interest in science:

Almost as far back as I can remember, I was interested in science. I assembled a collection of bottles of household substances as my "chemistry set" and examined almost anything I could find with the microscope my parents gave me… Science was only one of the passions of my childhood, along with fishing, baseball, bike riding and tree climbing. But as time went on, Erector sets, microscopes, and chemistry sets captured more of my attention than baseball bats, fishing rods, and football helmets (Phillips, 1997; http://www.nobelprize.org)

Many parents entertained children by using various scientific sets. A case in point is Hamilton O. Smith, who praised parents for fostering his intellectual pursuits: ‘My mother and father… entertained us with arithmetic problems and a small Gilbert chemistry set’ (Smith, 1978; http://www.nobelprize.org)

Eric A. Cornell used to build ‘model rockets.’ As he wrote many years later,
I didn't really enjoy the assembling the model kits very much... A more vivid memory for me was designing a model of my own. Besides the store-bought kits, the Estes Model Rocketry company in those days also sold by mail various sizes of cardboard tubing, balsa-wood sheets, nosecones, and gun-powder rocket engines. Estes also published a terrific little booklet full of quantitative design tips... My father showed me how... to calculate the center of mass of the assembly based on the masses and distribution of the component parts. I designed an over-sized, under-powered, clunky sort of rocket... On its maiden flight it lifted off the ground with all the ponderousness of a Saturn V, rising steady and true but rolling slightly about its long axis... as it gained altitude. The engine burn completed, and then the parachute popped and my creation drifted with the wind to land on the roof of a schoolhouse (Cornell, 2001; http://www.nobelprize.org).

Russell A. Hulse’s childhood home was also full of various sets and scientific toys. He wrote: Science was a defining part of my approach to life for as far back as I can remember... I ran through a seemingly endless series of interests involving chemistry sets, mechanical engineering construction sets, biology dissection kits, butterfly collecting, photography, telescopes, electronics and many other things over the years (Hulse, 1993; http://www.nobelprize.org).

Such sets and kits developed children’s interest in science. John C. Mather expressed it well: By the time I was in fourth grade... I was already pretty sure I liked scientific and engineering things, including electronics. For Christmas I got a one-tube radio kit, and then I saved my allowance for a 5-tube shortwave Heathkit radio that I put together so I could listen to exotic languages and broadcasts from far-away places (Mather, 2006; http://www.nobelprize.org).

Many Nobel laureates had home laboratories to do their experiments. “My brother and I spent many hours in our basement laboratory stocked with supplies purchased from our paper route earnings,” recollected Hamilton O. Smith (1978; http://www.nobelprize.org). Similar pursuits occupied a young John R. Vane (a 1982 Nobel Prize in physiology or medicine):

At the age of 12, my parents gave me a chemistry set for Christmas and experimentation soon became a consuming passion in my life. At first, I was able to use a Bunsen burner attached to my mother's gas stove, but the use of the kitchen as a laboratory came to an abrupt end when a minor explosion involving hydrogen sulphide spattered the newly painted decor and changed the colour from blue to dirty green! Shortly afterwards, my father... erected a wooden shed for me in the garden, fitted with bench, gas and water. This became my first real laboratory, and my chemical experimentation rapidly expanded into new fields (Vane, 1982; http://www.nobelprize.org).

Richard J. Roberts had a similar childhood experience that crystallized his desire to become a scientist:

I received a chemistry set as a present. I soon exhausted the experiments that came with the set and started reading about less mundane ones... My father, ever supportive of my endeavors, arranged for the construction of a large chemistry cabinet complete with Formica top, drawers, cupboards and shelves. This was to be my pride and joy for many years. Through my father, I met a local pharmacist who became a source of chemicals that were not in the toy stores. I soon discovered fireworks and other concoctions. Luckily, I survived those years with no serious injuries or burns. I knew I had to be a chemist (Roberts, 1993; http://www.nobelprize.org).

Living on a farm provided exceptionally good opportunities for experimentation. Godfrey N. Hounsfield’s (a 1979 Nobel Prize in physiology or medicine) childhood experience epitomizes it rather well:

At a very early age I became intrigued by all the mechanical and electrical gadgets which even then could be found on a farm; the threshing machines, the binders, the generators. But the period between my eleventh and eighteenth years remains the most vivid in my memory.
because this was the time of my first attempts at experimentation, which might never have been made had I lived in a city. In a village there are few distractions and no pressures to join in at a ball game or go to the cinema, and I was free to follow the trail of any interesting idea that came my way. I constructed electrical recording machines; I made hazardous investigations of the principles of flight, launching myself from the tops of haystacks with a home-made glider; I almost blew myself up during exciting experiments using water-filled tar barrels and acetylene to see how high they could be water-jet propelled. It may now be a trick of the memory but I am sure that on one occasion I managed to get one to an altitude of 1000 feet! (Hounsfield, 1979; http://www.nobelprize.org).

Clearly, family played an exceptionally important role in the development of scientific talent of Nobel caliber. It did so in three main ways, namely:

- Encouraging and supporting parents, for whom education and love to read were of paramount importance (even if they had little formal education themselves). They expected children to excel.
- Their professional occupations were related to science. and/or
- Homes were full of books and scientific toys/kits that allowed scientific experimentation at home.

The families thus greatly influenced early childhood and adolescent education of Nobel laureates in at least one of these ways. These findings support studies, which demonstrated a crucial role of family milieu in developing children’s talents (Feldman, 1986, 1993; Gardner, 1993; Howe, 1990, 1993; McCurdy, 1992; Storfer, 1990).

That special teacher

The findings demonstrate almost each Nobel Prize winner had at least one exceptional teacher in elementary or secondary school. These teachers are highly credited for sparking a potential of scientific talent in the Nobel laureates via actualizing children’s curiosity and inspiring them to learn more about science and other subjects of interest. As Eric A. Cornell put it:

Some of my classes in high school were pretty interesting and I benefited from having several very intelligent and inspiring teachers. Among these were John Samp, a physics teacher, and JoAnn Walther, an English teacher (Cornell, 2001; http://www.nobelprize.org).

Such teachers did a perfect job of developing students’ interest in science. ‘A great chemistry teacher. . . Mr. Mondzak, excited my interest in chemistry,’ wrote Rosalyn Yalow in her autobiography (Yalow, 1977; http://www.nobelprize.org).

What was so exceptional about teachers of Nobel laureates?

There are a few distinguishing characteristics of those teachers. First of all, they were teachers with love and curiosity for the subjects they were teaching. This love for the subjects was contagious and sparked imagination and interest of future Nobel laureates. Zhores I. Alferov, a winner of the 2000 Nobel Prize in physics, expressed this very well:

In the post-war particular situation I attended an only boy's school in the destroyed Minsk-city, and was lucky in having an excellent physics teacher there Yakov Borisovich Meltserson. He delivered lectures on physics for us, rather naughty boys, and we were sitting quiet and listened attentively. The teacher loved physics devotedly and had a gift of making our imagination work. His explanation of the cathode oscilloscope operation and talk on radar systems greatly impressed me. When finishing the school I took his advice which institution to choose for education (Alferov, 2000; http://www.nobelprize.org).

Likewise, Horst L. Stromer greatly appreciated his special teacher:
One of my teachers stood out, Mr. Nick. He taught math and physics. A new teacher, basically straight out of college, young, open, articulate, fun, he represented what teachers could be like. His love and curiosity for the subjects he was teaching was contagious. As 15 or 16 year-olds, we read sections of Feynman's Lecture Notes in Physics in a voluntary afternoon course he offered (Stormer, 1998; http://www.nobelprize.org).

Second, teachers of Nobel laureates were enthusiastic, inspiring, and challenging teachers with a playful spirit. “They might not have been the best teachers pedagogically, but their intellects and their visions inspired us. . .,” admitted Daniel C. Tsui (a 1998 Nobel Prize in physics) with respect to his teachers (Tsui, 1998; http://www.nobelprize.org). Similarly, Wolfgang Ketterle praised his great teacher:

There was one mathematics teacher, A. Strobel, who was inspirational. He challenged me with special problems, and tried to teach the class to approach mathematical problems in a playful rather than formal spirit (Ketterle, 2001; http://www.nobelprize.org).

Likewise, Carl E. Wieman wrote about his outstanding teacher:

Mr. Tobias did a great deal to kindle my interest in science with his enthusiasm and knowledge. I still remember his explanations (far better than any of the material from my college courses!) of the structure of atoms. . . (Wieman, 2001; http://www.nobelprize.org).

The impact of this remarkable teacher was so great that now Carl E. Wieman is leading a $12-million, five-year initiative at the University of British Columbia, Canada, to look for the best ways to teach science: His research interests have switched from the nature of matter to what is the matter with science and engineering at universities that causes so many students to drop them (Anderssen & McIlroy, 2009).

Carl Wieman has found that most introductory science courses actually reduce interest in science. ‘If it is presented as memorizing a bunch of facts, and removed from the real world, then you do not see physics as a tremendously exciting thing to spend your life on.’ On the other hand, giving students an invigorating challenge, such as figuring out how to generate and distribute wind power in a community, could be a good way to teach them the fundamentals about electricity: ‘Instead of memorizing basic laws and equations, you would start with a problem you want to solve.’ While Carl Wieman’s work is concentrated on university students, high school and middle school are probably even more important, he says: ‘If you have a bad high-school teacher, a bad high-school experience, and do not know people who support (science). . . you will decide on something else’ (Anderssen & McIlroy, 2009, p. F1).

Third, teachers of Nobel laureates were gifted, excellent teachers, especially when they introduced new subjects. As Steven Chu put it,

My physics teacher, Thomas Miner was particularly gifted. To this day, I remember how he introduced the subject of physics. He told us we were going to learn how to deal with very simple questions such as how a body falls due to the acceleration of gravity (Chu, 1997; http://www.nobelprize.org).

It was important for future Nobel laureates that their very first introduction to new subjects were made by unusual teachers.

Christiane Nüsslein-Volhard highly appreciated excellence of her teachers as well:

I enjoyed high school where I learned a lot from excellent teachers. . . School education was good and interesting, particularly German literature, mathematics and biology. We had very engaged teachers, mostly women. In the final class our biology teacher discussed many modern topics with us such as genetics, evolution, and animal behavior. I remember that I tried to develop a new theory about evolution, when we discussed Darwin at school. . . (Nüsslein-Volhard, 1995; http://www.nobelprize.org).
Fourth, teachers of Nobel laureates taught differently. They deviated in their teaching from the accepted norm of the day. The case in point is Steven Chu again, who wrote about his math teacher:

Geometry was the first exciting course I remember. Instead of memorizing facts, we were asked to think in clear, logical steps. Beginning from a few intuitive postulates, far reaching consequences could be derived, and I took immediately to the sport of proving theorems (Chu, 1997; http://www.nobelprize.org).

In the same way Tim Hunt (a 2001 Nobel Prize in physiology or medicine) praised his school education because of great teachers:

At the age of 14, I moved . . . to Magdalen College School, Oxford, where science played a much larger role in the curriculum. I loved Chemistry in particular, largely because the teacher, Colonel Simmons was much more concerned with principles than facts, although a thoroughly practical man himself. We were allowed considerable freedom, and on more than one occasion started fires from distilling volatile flammable solvents. One became adept at avoiding injury. Later on, biology . . . came to the fore when a young teacher called Terence Doherty took just three of us for Zoology. We dissected my brother's pet rabbit when it died, which was a treat after all the formalin-fixed dogfish (Hunt, 2001; http://www.nobelprize.org; italics added).

Fifth, teachers provided advanced, enriched, and accelerated instruction. They went beyond the scope of prescribed curriculum: being initiative and creative, they taught what they thought was the best. William D. Phillips pointed this out well, “Dedicated and concerned teachers taught us things that were not part of the ordinary elementary school curriculum, like French and advanced mathematics. . . Interested teachers continued to provide me with advanced instruction.” (Phillips, 1997; http://www.nobelprize.org).

Teachers tolerated accelerated education and had a deep impact on future Nobel laureates. For example, this was the case of Hamilton O. Smith:

I completed high school in three years largely due to a wonderful science teacher, Wilbur E. Harnish, who allowed me to complete chemistry and physics during the two summers preceding ninth grade. Two other teachers . . . influenced my development profoundly: Vynce Hines, who taught me the beauties and rigor of plane geometry and Miles C. Hartley, who gave me a sound foundation in algebra (Smith, 1978; http://www.nobelprize.org).

Sixth, teachers manifested interest in students and encouraged them to succeed. Teachers were attentive to the interests of future Nobel laureates and strongly encouraged them to learn in more depth subjects of their interest. As Frederick Reines, who won the 1995 Nobel Prize in physics, recalled many years later, “I was strongly encouraged by a science teacher who took an interest in me and presented me with a key to the laboratory to allow me to work whenever I wanted (Reines, 1995; http://www.nobelprize.org).

Sir Paul Nurse, a winner of the 2001 Nobel Prize in physiology or medicine, had encouraging teachers as well:

I enjoyed my time at primary school because my teachers made the world seem such an interesting place and encouraged my innate curiosity. . . At age 11 . . . I moved to an academic state secondary school. . . I had an excellent Biology teacher, Keith Neal, who encouraged his pupils to study natural history and to do real experiments. I had a great time investigating the pigments of different mutant fruit flies by following experimental protocols published in Scientific American (Nurse, 2001; http://www.nobelprize.org).

Finally, teachers of Nobel laureates went beyond the classroom practice. They did many extra things for their students. For instance, one such extra thing changed the life of Martinus J. G. Veltman (the 1999 Nobel Prize in physics): “My physics teacher came to my home and suggested parents to send me to the University. . . Since then I have found out that many physicists owe their career to a good teacher” (Veltman, 1999; http://www.nobelprize.org).
The school teacher of Richard J. Roberts also went an extra step and thus greatly influenced the development of the scientific talent of the future Nobel laureate:

At St. Stephen's junior school I encountered my first real mentor, the headmaster Mr. Broakes. He must have spotted something unusual in me for he spent lots of time encouraging my interest in mathematics. He would produce problems and puzzles for me to solve and I still enjoy the challenge of crossword and logical puzzles. Most importantly, I learned that logic and mathematics are fun! (Roberts, 1993; http://www.nobelprize.org; italics added).

In these cases, at least one school teacher had an exceptional impact on the prospective Nobel laureates and almost without exception the laureates credited the actions of a key teacher in their lives. Their teachers went the extra mile – they did something exceptional. These findings are highly supportive of research demonstrating highly able and successful children had gifted teachers during their school years. Such teachers are gifted individuals themselves with the ability to inspire and support truly meaningful learning (Porath, 2009).

Finally, research shows that gifted children get the greatest amount of parental investment that is usually manifested in a high degree of attention focused upon the child and in abundant love from parents (Feldman, 1986; Howe, 1990, 1993; McCurdy, 1992).

Summing-up

This article described the exceptional role of parents and teachers in cultivating scientific talent of Nobel caliber. It was found that family played the most important role in the development of such talent. Specifically, Nobel laureates had encouraging and supporting parents. They valued education and loved to read to children. Their professional occupation was often related to science. Typically, Nobel laureates lived in homes full of books and scientific toys/kits that allowed scientific experimentation at home. Early childhood and adolescent education of each Nobel Prize winner was characterized by at least one of these three factors, which greatly accelerated the development of the future laureates’ abilities.

Each Nobel laureate also had at least one unique teacher during the school years. This uniqueness was demonstrated by teachers who were passionate about the subjects they were teaching and they taught in a different manner while providing advanced, enriched, and accelerated instruction. They were gifted and excellent teachers possessed of a playful spirit. They manifested a deep interest in their students, encouraging them to succeed by way of inspiration and challenge. They were prepared to go beyond ordinary classroom practice and do many extra things for their students. This had great impact on their student’s lives and it is what made them special teachers. All this together with a good family milieu greatly influenced developing scientific talents of future Nobel laureates.

These findings have important educational implications for today’s children. This article clearly reveals what parents and teachers should and can do if they are really concerned with nurturing kids’ high ability in science. It is interesting to note that these findings match the conditions that led to Ericsson’s findings on deliberate practice (Ericsson, Nandagopal, & Roring, 2009). Specifically, the parental encouragement and influence of a great teacher promote the increased, long-term deliberate practice, which result in high accomplishments in any field of human endeavor.

End Notes

(1) In this quote the word ‘this’ refers to Russell A. Hulse’s interest in science.
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Detecting High Leadership Potential and Promoting Talent: An Example of an Evidence-Based Approach in a French Blue-Chip Company

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Abstract

In a time of economic turmoil, finding executive managers with high potential is increasingly important in the business world. Structural constraints (such as flexibility and reactivity linked to constant environmental change), and demographic trends (such as replacement of leaders who retire) are two challenges, among others, that companies have to face. The question of high potential is raised most often with concern to executive management. Who are these high potential managers? What are their profiles and their competencies? How can we identify them and help them develop themselves? These questions are mainly raised by human resource specialists, and those involved in HR career development, whose mission is to anticipate and identify the need of the company by setting up tools and strategies that would be fruitful for the continuous development of the firm. Some authors have described the current situation as a “War of the talents” (e.g., Handfields-Jones, 2001). This article takes an evidence-based management approach (Rousseau, 2006; Pfeffer & Sutton, 2006), based on analysis of real life situations in a French blue-chip company. The practical objective is to elaborate tools and procedures that will identify management potential, and allow a personalized follow up on professional development to promote talent among managers.

Keywords: High leadership; talent development; Evidence-Based Approach.

Words such as “gifted”, “high potential”, “talent” are frequently used in companies to describe some members of their personnel. Nevertheless in the scientific research, the question of the identification of high potential and talent is relatively scarce. For example, Heller and Shofield (2000) noticed that only 5% of the research published in specialist magazines were specifically dedicated to this subject. In the literature, it is common to differentiate the notion of ability which is related to “high potential” from observed performance which is linked to “talent” (Lubart, 2006). “Ability” codes the construct of the capacity to accomplish a task or tasks. Potential for a task is, however, more than a simple index of ability because personality-motivational factors influence the expression of abilities, as do environmental conditions (facilitating or inhibiting the expression of abilities). High potential refers to the possibility to show high performance in a task; if this kind of performance really occurs, and in a repeated fashion, then the term “talent” can be used to describe the individual.

High potential and talent: A model of differentiation between gifts and talent

Today several theoretical models address “high potential” and “talent” (Renzulli, 2002). According to Gagné (1999, 2004), for example, both gifts and talent are linked to intelligence, personality, motivation, emotions and interests of an individual. In this conception, “gift” refers to the natural, spontaneous and superior ability for which the level and the development are partially controlled by genetic factors in four different fields: intellectual, creative, social emotional, sensorimotor. “Talent” designates the superior mastery of skills and knowledge which results from continuous training and development. This distinction was criticized by several authors (Baer and Kaufman, 2005) because a theoretical distinction can be made, but it is difficult to separate concretely these two aspects. In theory, the process in which the gift becomes talent involves development,
learning and constant practice. Different elements can either facilitate or prevent this process such as interpersonal skills (physical and mental, self-awareness, motivation) as well as environmental factors (social and cultural environment). The other specificity of this model is that a “chance” factor can also interact with the other components.

Thus, we can place the notion of high potential in between talent and gifts. High potential would start with a gifted nature to deliver high performance in a specific situation that could result in talent thanks to continuous practice.

**Features of high potential individuals**

In the literature, it is common to find criteria such as educational degree, flexibility, multitasking ability, interpersonal skills, fast learning, and high responsibility to qualify individuals with high potential (Falcoz, 2001, 2003). During assessment procedures, human resource managers often use psychometric tests, or other specific assessment devices, to assess applicants or new recruits. For example, intellectual tests allow a company to evaluate applicants, and based on their results, the company can decide to invest in a person’s future potential. However, applicant's intellectual potential, assessed during the selection process, does not predict completely the performance an employee will show on the job when they will be recruited (Goleman, Boyatzis & McKees 2002; Spector 2005). It is recognized that IQ correlates rarely more than .50 (Schmidt & Hunter, 1998) with on-the-job performance (25% common variance between IQ and performance). Thus, the question remains: Which factors account for the “missing” 75% of the variance? One objective of this paper is to emphasize that the management of the potential presented by individuals may, under certain conditions, account for variance observed in professional talent.

**Performance-based high potential detection**

Integrating the approach of individual characteristics with human resource management leads to the question of how potentials can be detected and developed within the business unit.

Talent and potential are respectively evaluated against the job the employee currently occupies or relative to the new job intended. The first one necessitates that current performance can be observed and measured. The second one has a prognostic value and allows an individual to be characterized prior to arranging relevant training. Thus, these two actions can be led by HR management to evaluate performance at the actual level (N) and to detect potential for the N+1 level. Hence, this implies for any professional position to first define the required and measurable elements for the N+1 grade (the potential one) and second, the indicators of performance at the actual N grade (the talent condition).

Talent can be presented as an overall characteristic of the individual, but it is inseparable from professional activity. Talent has meaning only once the goal is specified in a given situation that defines efficient professional behavior (e.g., Boyatzis, 1982).

The dynamics of the development of the professional skills and their expression through performance have been examined in earlier research (see Kanfert & Ackerman, 2005). The acquisition and development of professional skills during initial training, then through job experience are determined by various personal variables, such as personality traits and intelligence. In addition, individual differences in competencies and can be partially explained by certain aspects of the situation: work constraints, members of the team, objectives, organizational culture and work climate. In this model, it is less the personal characteristics than the dynamics between the various elements which compose them that is important for performance achievement. Indeed, there is also some feedback from performance influencing the mechanism of learning and the development of the skills in a professional situation.

Thus, to identify and develop talent, we must first define the goal. In the present study, the focus is managerial talent (Anderson et al., 2001; Sanchez, & Levinen 2001; Lievens, Sanchez & Decorte, 2004). More precisely, this paper will describe a method of work analysis used buy a model
of managerial leadership competencies relevant to organizations. The procedure and tools developed by the HR department in line with their talent development strategy, will be presented as well as the outcome achieved.

**Method**

**Population**

Three sets of operational managers were studied in a large French airline company: Team Leaders (TL), who manage a team of 10 to 50 agents and technicians; Head of Department (HD), leaders who manage 10 to 500 people (agents, technicians, and team leaders), corresponding to an intermediate level of management; and Pole Managers (PM), Grade three managers, who are executives managers that manage a group of 50 to 700 agents, technicians, team leaders and heads of department.

We sought two different points of view to define what can be regarded as effective or ineffective managerial behavior. First, it seems important to collect the point of view of the team member (the agents or technicians), a junior point of view. In the present study, each respondent had to recall what was a significant contribution - either positive or negative - to the role of the manager in his or her daily work. Second, it was also important to gather the point of view of the managers themselves, the person who sets the objectives of the team leaders and evaluates their performance. For this reason, members of the top management were also interviewed. This empirical approach allows having a top-down and a bottom-up views at the same time.

It was decided to interview the same number of employees in each grade (for example: we interviewed as many TL agents as head of departments (HD)). First, bearing in mind the distribution of employees according to their different ranks that follows the classic chain of command, and because the figure varies from 12000 agents to 25 PM, it was not possible to respect the proportionality of the population sampling the interviewed employees. Second, and more importantly, the main interest of this approach relies on responses from both the team member and the top manager. Based on the total number of PM, the number of interviews needed for each grade was: (a) for Team leaders: 25 interviews with agents and 25 interviews with HD; (b) for Head of department: 25 interviews with TL and 25 interviews with PM; and (c) for Pole managers: 25 interviews with HD.

**Collection of critical incidents**

In total, 125 interviews were conducted. The interviews were structured, semi directive and standardized. They were completed using the critical incidents technique based on Flanagan (1954). This technique leads to a customized list of key competencies that are required for a position and positive or negative case scenarios for each identified competency.

By “incident”, Flanagan (1954) refers to “each human activity which is complete enough in itself so that one can make an induction and prevision on an individual who accomplishes the action” (p166). The term “critical” indicates, “an incident that has to occur in a situation where the intention of the action appears to be clear enough for the observant and where that consequences of the actions are obvious enough” (p166). Interviewees had first to describe the professional context in which the incident occurred, and then to provide feedback about the observed behaviors of their managers or team members, whether it was effective or ineffective; as well as the positive and negative impact that those behaviors had on the team. These cases are called critical incidents (CI).
Description of the critical incidents collected (CI)

In total, 698 CI were collected with an average of 8 CI by interview and 53% of them were positive CI. The variability of this positive CI rate according to the rank of the manager and to the CI reported by the manager’s n-1 or his n+1 is presented in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Percentage of positive CI for different manager ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL Total</td>
<td>45%</td>
</tr>
<tr>
<td>From n-1 (Agents)</td>
<td>52%</td>
</tr>
<tr>
<td>From n+1 (HD)</td>
<td>36%</td>
</tr>
<tr>
<td>DH Total</td>
<td>59%</td>
</tr>
<tr>
<td>From n-1 (TL and Agents)</td>
<td>49%</td>
</tr>
<tr>
<td>From n+1 (PM)</td>
<td>66%</td>
</tr>
<tr>
<td>PM Total</td>
<td>51%</td>
</tr>
<tr>
<td>Base manager Total</td>
<td>58%</td>
</tr>
</tbody>
</table>

It can be noted that the CI recalled by the n-1 interviewees brought a slightly higher rate of positive incidents probably due to fear of their manager finding out that they provided negative feedback. We notice also that the Department heads (DH) group reported twice as many negative CI than positive ones regarding their TL, maybe meaning that they were not always satisfied with the TL work. In contrast, the PM collected twice as many positive CI than negative ones regarding their DH, likely suggesting that higher managers work more closely together. It was observed that PM would tend to speak about themselves positively instead of giving objective feedback about their DH (14 CI collected).

Categorization of critical incidents

Top managers of the organization could be considered as a group of experts. In the present part of the study, twenty-one top managers were asked to categorize individually the CI in terms of content similarity for effective team work.

The quality and redundancy of CI were first studied. After this analysis, 198 CI were eliminated. However, we could not have each expert classify the 500 remaining CI. A trial session was organized and it showed that it was difficult to classify more than 250 CI at a time. As a result, two samples of 250 CI were constructed from the corpus of 500, with the two sets of CI reflecting all the variables taken into consideration (e.g., valence of CI - either positive or negative). Thus, 500 CI were classified. A group of 12 executive managers classified the first sample of CI (group 1).

Each expert received a pack of 250 CI distributed in two sets. First two consecutive series of 50 CI were given to them (the same CI for all the experts presented in the same order) from which they had to create their own categories. Then the 150 other CI were distributed randomly, in a different order for each expert, so that they could classify them more quickly in their existing categories. They were given the option of changing the categories or creating new ones and subdivisions if they wanted. Overall, the session lasted approximately three hours.

In each phase of the categorization session, the experts were instructed to read each CI and then classify it in their own set of categories that they would have to illustrate at a later stage. Their categories had to reflect the outcome of the managers’ key behavior in the CI, and they could create as many categories as they wished. A second group of 9 executive managers classified the other sample of 250 CI (group 2) following exactly the same procedure.

During the workshop we noticed that by giving free rein to the experts to choose the logic of classification, some created taxonomies that did not allow us to sum the CI in patterns of key behavior: two of them simply separated the positive and negative CI, and another one separated the behaviors that reflected the attitude of a manager that meets the standard and performs well or, in contrast, does not (as in Boyatzis model, 1982). The classification of these two experts was not used...
in the following analysis. The remaining 18 experts from the two groups created, overall, 7 categories (minimum = 4, maximum = 9, SD = 1.3).

Results

Multiple Correspondence Analysis of the CI

The statistical analysis of the data is based on two similarities/dissimilarities matrices between the CI. To build this kind of matrix, each expert’s classification was coded in an Excel spreadsheet. Then we obtained a spreadsheet with lines and columns of the 250 CI; as soon as a CI has been jointly classified with another we indicated 1 in the intersection. Thus a data table was constructed for each expert based on the “same” or “different” categorization for each pair of CI. These individual data tables were then complied for the expert group 1 (12 experts) and group 2 (9 experts). The result was a summary table of number of times that experts categorized each pair of CI as “same” or “different”.

A Multiple Correspondence Analysis was conducted on both similarities/dissimilarities matrices, respectively for group 1 and 2, to summarize the classification of the different experts. The results of these analyses showed that the first five statistical axes explain approximately 70% of the variance for the first group of experts and 64% for the second group, however an inflection of the percentage of explained variance is noted for the third axe.

Table 2: Results of the multiple correspondence analysis.

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigen value</td>
<td>Pct. of explained variance</td>
</tr>
<tr>
<td>Axe 1</td>
<td>.135</td>
</tr>
<tr>
<td>Axe 2</td>
<td>.065</td>
</tr>
<tr>
<td>Axe 3</td>
<td>.045</td>
</tr>
<tr>
<td>Axe 4</td>
<td>.029</td>
</tr>
<tr>
<td>Axe 5</td>
<td>.024</td>
</tr>
</tbody>
</table>

Thus, three axes were selected in each group for statistical reasons (decrease of eigenvalues). With three axes, 56% of the total variance was explained for group 1 and 49% for group 2.

Managerial competency modeling

For each group, we worked from the relative contribution of the CI to the axes. We noted also if the CI contributed either positively or negatively to the axes. Then we took the CI that contributed the most for each axe. Each CI was condensed into a short sentence (for example: spreading distorted information). Next, all the CI that contributed strongly to the axis were synthesized to provide a global meaning to the dimension.

Each pole (negative or positive) of each axe had a sense that was coherent: six key behaviors were identified from the correspondence analysis. They were nominated using the categories created by the experts during the classification. It happened that the same key competencies were found in the both groups of experts, however in a different order (for example “recognition” on the positive pole of the second axe in group 1 and on the negative pole of the first in the group 2).

Additional statistical analyses were conducted; in particular, a hierarchical clustering of the CI. The ten classes were analyzed in each group, leading to 6 key behaviors and in some cases subcategories of CI within the key behaviors. This division of the key competency through different
indicators was made in a qualitative manner. Then the competences models developed for the two groups of experts were combined into one coherent model. This general model is presented in table 3.

Table 3: Model of managerial competencies.

<table>
<thead>
<tr>
<th>Competencies</th>
<th>Key Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership skills</td>
<td>• Respect of seniors, follow chain of command</td>
</tr>
<tr>
<td></td>
<td>• Support company rules and procedures</td>
</tr>
<tr>
<td></td>
<td>• Lead by example</td>
</tr>
<tr>
<td></td>
<td>• Take ownership of action and be liable</td>
</tr>
<tr>
<td></td>
<td>• Objective and fair</td>
</tr>
<tr>
<td>Communication</td>
<td>• Share relevant information</td>
</tr>
<tr>
<td></td>
<td>• Write effective report to relevant department</td>
</tr>
<tr>
<td></td>
<td>• Give reasons behind decision</td>
</tr>
<tr>
<td></td>
<td>• Active listener</td>
</tr>
<tr>
<td></td>
<td>• Facilitator</td>
</tr>
<tr>
<td>Recognition</td>
<td>• Praise and thank the team</td>
</tr>
<tr>
<td></td>
<td>• Create incentives</td>
</tr>
<tr>
<td></td>
<td>• Delegation</td>
</tr>
<tr>
<td>Interaction</td>
<td>• Support team in difficult situation</td>
</tr>
<tr>
<td></td>
<td>• Create a friendly working atmosphere</td>
</tr>
<tr>
<td></td>
<td>• Respect others and be considerate</td>
</tr>
<tr>
<td></td>
<td>• Understanding</td>
</tr>
<tr>
<td></td>
<td>• Willing to help and give support</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>• Define role and mission of team members</td>
</tr>
<tr>
<td></td>
<td>• Follow up on the allocated task</td>
</tr>
<tr>
<td></td>
<td>• Take into consideration the different needs</td>
</tr>
<tr>
<td>Development</td>
<td>• Evaluate and develop performance and competencies</td>
</tr>
<tr>
<td></td>
<td>• Step back but supervise the work from afar</td>
</tr>
<tr>
<td></td>
<td>• Follow up</td>
</tr>
</tbody>
</table>

Discussion

The main difficulty of the present study lies in the complexity of the role of a manager which is not always compatible with the critical incident interview technique (Mispelblom Beyer, 2006).

Moreover, the interviews did not relate solely to the analysis of one position but rather the role of a leader-manager according to three different levels of perspective taking. The CI technique has proven to be very efficient when it comes to evaluating positions featuring technical skills or production skills. However for managers, it was not an easy task to collect incidents that were really “critical” in the meaning of Flanagan (1954), ie, actions for which intentions and consequences were obvious. To what extent can we be sure that there is a link between an isolated specific action from a manager and the consequences in the subordinate team? And to what extent can we be sure that the feeling of the team has any impact on their performance at the moment? Given our goal to have employees express themselves about the consequences of each action made by a manager, we realized that sometimes some consequences were described with uncertainty or exaggeration, which raises issues on whether the CI reflect reality in all cases. Furthermore, those who were interviewed related what happened with a biased vision, which does not allow us to verify if it “really” happened (Did the manager use an authoritarian, cold, sharp language with his colleagues? Does the manager promote...
people who really deserve it or is it based on privileges?) Subordinates are not always aware of all the elements of a situation to judge whether the managers behavior suits or not the situation (Did the manager have any other option in a given situation?). The CI always remains subjective to a certain extent.

In terms of a set of global competencies, the large number of interviews and collected CI, and the statistical analysis of CI categorization (instead of the classical technique of subjective taxonomies construction) give us a reliable result. As far as specific competencies are concerned, numerous CI contributed to several axes of the Multiple Correspondence Analysis. This means that the competency fields are not always independent, which is expected given the complex nature of management tasks.

Despite the limits of the above methodology, a model of management competencies was obtained. The developed model of management potential defines what is expected from managers. Thus it sets the goals, allowing various management methods to be used to achieve the objectives. In other words, “to be a talented leader in this organization” is: (i) to know how to be approachable and fair but, at the same time maintain a professional distance that will allow respect from collaborators; (ii) to organize and follow up on a specified task; (iii) to share the vision and the mission of the company; (iv) to recognize and praise team effort; (v) to respect others and be considerate; and (vi) to develop and train team members. Each of these six competencies is based on observed skills for every management level. Even if managers have their own personality and their own style of management, they nevertheless have to stay in line with the set standards and make sure that key competencies are met. Through the identified set of key behaviors, managers can achieve their mission and meet the vision of the company.

Moreover, the competencies listed in the model are somewhat equivalent to what is described in classical models in literature devoted to management. For example, “Organizational skill” is described in the model of Boyatzis (1982), Yulk (1987) and Bartram (2005). The competency labelled “Development” is very similar to two competencies, called “Develop co-workers” and “Recognize”, respectively described in the models of Yulk (1987) and Tett et al. (2000). Finally, the competency of “Communication” is also postulated by Tett et al. (2000) and Bartram (2005). In contrast, one advantage of the present model is that all the competencies have not only been objectively identified, but they have also been defined in terms of observable behaviors. The collected and classified CI provide numerous examples of concrete behaviors corresponding to each competency.

The other strength of the model is that it matches the n+1 and the n-1 point of views that are both important. The different point of views of top-down and bottom-up observations were complementary. The model of competencies and management potential gained value by including the vision of the managed people which is often considered partial and distorted.

By listening to the feedback of the team members, managers were able to take into account an alternate perspective which allowed the HR team to include different key competencies in the appraisal system such as work recognition and creating a motivating working environment. Those key behaviors are often missing from the grid of appraisals.

From high potential employees to talented managers

The advantage of the current evidence-based approach of setting up procedures and tools for leadership competency management is that key behaviors can be clearly identified for each competency, and that effective and ineffective behaviors can be illustrated with specific examples. This strategy helps also to convince managers that these competencies are fundamentals and that they need to be developed among their personnel. In fact, in the current approach, managers are involved in every phase from the identification of high potential employees to talent promotion.
In fact, as mentioned earlier, the current approach is partly inspired from the Differentiated Model of Giftedness and Talent developed by Gagné (2004) in the domain of education; especially the distinction made by this author between the concepts of gift and talent. With reference to Gagné's model, the concept of high potential, as evoked in this article, refers to a collection of outstanding performance in a professional field (similar to a set of “gifts”). When this potential is identified by managers, and employees are selected through appropriate procedures. The next step is to enable them to express their skills and develop the highest level of performance possible in their new jobs. Such an approach aims to promote talent within organizations. Thus, in the present study, it is important to help managers to identify employees presenting a high potential for leadership; and, by reference to Gagné’s model, it is also important to provide the equivalent to a “developmental process” by which the “gift” becomes a “talent”. In this study, the procedure developed involved in a dynamic process of competency identification/training in which, for a given position, a manager can detect and assess among members of his or her team those who present the prerequisites (skills, values and motivation) of the competencies needed for their next possible position; and, for the employee who has not already reached a sufficient mastery for some competencies, the manager can help to develop these specific competencies. What are the main characteristics of this dynamic process?

First, the identification of potential takes place in a concrete working context and allows the managers to collect specific performance criteria, determining managerial potential, which could not have been directly assessed in a more traditional selection process. The main objective was to enable the managers to make the best possible decision when one of their team members is ready to enter the selection process to become a manager. To help managers in their identification task, an evaluation grid containing several prerequisite indicators was developed. Managers were also provided with an interview guide and standardized questions to assess the motivation and professional values of the employee. For each assessment tool, an operational definition and some behavioral criteria that could easily be assessed were provided for each competency. The manager had time to observe employees at work and assess their competencies. At the end of the identification process, the leadership potential of an employee was estimated, for each required competency, in terms of “in the process of being acquired”, “already acquired” or “fully mastered”. An employee was allowed to enter the selection process when most elements of his or her identification profile were assessed as “fully mastered”. Nevertheless, when a team member’s potential was not expressed at that level of mastery, the identification procedure enabled the manager to know which competencies needed improvement, and guide him or her to help develop these competencies. This could be done, for example, by confronting the employee with particular work activities that will mobilize unmastered core competencies. The choice of these activities was based on the competency model developed previously, that specified some examples of working situations that could evoke each competency, and give a set of effective and ineffective behaviors that could be observed in these situations. The process of detection/training ended with the selection procedure. It consisted of an Assessment Center to select applicants presenting high potential who were really able to access a managerial position.

Conclusion

Thus, this study developed an evidence-based approach to management potential. Key competencies were identified by a critical incident technique and managers were involved in the development of the categories used to assess high potential. In general, the critical incident technique can provide new insights into contextually relevant conceptions of giftedness in adults and children, providing a source of behavioral checklists to identify high potential. Numerous tools can be developed to accompany individuals as they evolve in the workplace or more generally in their field of endeavor.
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Research on Personality and Affective Dispositions of Gifted Children: The Israeli Scene

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Abstract
This paper reviews empirical research related to the personality and affective characteristics of gifted students in the Israeli educational context. The educational backdrop for the research is described and group differences in personality, emotional intelligence, self-identity, and mental health are discussed. Conclusions include a number of broad observations bearing on the personality and affective profiles of gifted students garnered from the research conducted in the Israeli scene over the past few decades.

Keywords: Gifted students; personality; affect; anxiety; self-concept; mental health; emotional intelligence.

Overview
This article reviews empirical research bearing on the personality and affective characteristics of gifted students in Israel. The non-cognitive characteristics of gifted children in Israel and across the globe have traditionally been given short-shrift when compared to the massive research bearing on the cognitive facets of the gifted, along with instructional and pedagogical issues in teaching gifted children and youth. A systematic understanding and mapping out of the personality and affective profile of gifted students is essential for a comprehensive understanding of the factors affecting the gifted student’s well-being and personal thriving, as well as for the maximal utilization of the exceptionally high cognitive potential of the gifted.

The review includes a broad social and educational backdrop for understanding gifted research in Israel, followed by a discussion of a number of narrow-band personality variables that are highly relevant to the development of gifted students, and an account of broad personality factors in Israeli gifted students, in comparison to their non-gifted counterparts, using the Five-Factor Model (FFM) as the major theoretical framework. Research focused on selected affective attributes of gifted students, including emotional intelligence, self-identity, and mental health, issues which have been of particular interest in gifted research in Israel, are covered with a number of broad observations garnered from the research conducted over the past few decades in the Israeli scene. In particular, empirical research conducted by these authors in the Israeli context is showcased.

Gifted education in Israel
This article reviews gifted research conducted in the Israeli educational context, providing the reader with some general background information relating to gifted education in Israel. To begin with, the Israeli national educational system has long been committed to providing appropriate resources for students with special needs, including gifted populations. These services have been provided by the Division for Gifted and Talented Students of the Israeli Ministry of Education. Two major goals have guided gifted education policy in Israel: (1) To develop and evaluate educational programs and interventions congenial to the special needs of students, and (2) To identify and utilize the rich human potential and special talent that giftedness implies for the future development of human capital and resources in Israeli society (The Ministry of Education in Israel, 2012; Peyser, 2005; Shani-Zinovich, 2009).
According to the current policy of the Israeli Ministry of Education, special educational programs are offered to individuals who are identified as scholastically gifted, based on overall scholastic achievements and cognitive ability tests performance (The Ministry of Education in Israel, 2012).

The Israeli Ministry’s Division for Gifted and Talented Education is responsible for coordinating provision for gifted and talented children in the Israeli educational system and offers a slew of special programs for gifted and talented children nationwide. The nature of each program and the educational program are determined by the instructions issued by the division and by the policy and needs of the local authorities, as well as the program directors. Each program serves students from a specific magnet area in Israel.

The following two programs are the most prevalent programs for gifted elementary school children in the Israeli school system.

(1) **Special homogeneous classes for the gifted**: Children attending this program study in a special class with other gifted students in a regular municipal school. Teaching is based on the mainstream curriculum. However, topics are often taught in an accelerated manner, i.e., in greater depth and offering more autonomy to students in choosing enrichment activities. These classes are hosted by designated magnet schools throughout Israel. Classes are employed in a limited number of large cities in Israel and are offered at the elementary (3rd or 4th grade onwards), junior-high, and high school levels (up to the 12th grade). Although the standard curriculum is taught, teachers in these classes tend to emphasize co-operative learning, work in small groups, and individually paced student work. In addition, these classes are designed to provide the opportunity for individual students to select and pursue their own areas of interest and negotiate special enrichment materials, such as individual research projects and field trips. Students compete with their gifted peers for grades, which are generally assigned by classroom teachers on a normative basis (i.e., relative to other gifted students).

(2) **Mixed ability classes**: The classroom, typically including 'pull out' programs, are comprised of students enrolled in regular mixed-ability classes. These programs serve students from a broad catchment area and are employed, in most cases, in grades 4 through 9. In comparison to the comprehensive and demanding program and challenging curricular materials presented to students in special classes, the curriculum in regular classes is, on average, considerably less demanding. In addition, these gifted students are eligible for a one-day 'pull-out' (or extension) enrichment program in science, math, the arts, and the like, with the selection of specific courses depending on the program. Weekly enrichment programs are provided for elementary school (grades 3 or 4 onwards) all the way through junior high school (The Ministry of Education in Israel, 2011). The enrichment classes are held in a relatively non-evaluative and relaxed learning environment outside school grounds, with no grades given for participating in this program. It is noted that not all special full-time classes for gifted students are taught in a highly evaluative and competitive manner, and not all regular classes have to be taught in a manner that is less this way. Considerable within-group variance is found in the way these classes are taught in the Israeli context.

Each year, the educational system employs a two-stage process for the identification of gifted students in the Israeli school system, typically in grades 2 to 3.

The first stage involves an initial screening procedure, in which all students in grades 2 or 3 are tested. This stage entails the administration of standardized group-administered achievement tests, which are designed to gauge the student’s academic level in two key areas: reading comprehension and arithmetic. National cut-off scores, based on the top 15% of the students in a particular year nationwide, are employed in order to identify those students eligible for the next stage of selection. In addition, teachers are encouraged to recommend outstanding students who did not reach the cut-off score, but who are believed eligible to participate in the final selection procedure.
In the second stage, the identification phase, an advanced placement test is group-administered for the purpose of selecting gifted children for special programs. Each test battery is group-administered and comprised of several sub-tests containing verbal, numerical, and figural tasks that are commonly used in intelligence tests (word identification, sentence completion, arithmetical problems, figural analogies, general knowledge, series identification problems, etc.). Anywhere from 1% to 3% of the students taking this test, and obtaining the highest scores in their respective school districts, are recommended for special enrichment programs. Gifted students thus identified are generally unevenly distributed by gender, typically comprised of approximately 70% males and 30% females.

In contrast to traditional psychometric practice, in which test scores are interpreted in accordance with pre-established national age norms, the test scores for identification of the gifted are generally interpreted according to specific regional norms. The use of local norms is designed to reduce bias against children coming from low socioeconomic backgrounds, who may not make the grade if national cut-off scores are used. Thus, by using local norms, it becomes possible to offer enrichment programs in poverty-stricken areas plagued with poor scholastic achievement (Peyser, 2005). In evaluating the data reviewed the reader should keep in mind that direct comparison of gifted children in Israel with the characteristics of gifted students in other systems is somewhat problematic if the process in Israel produces less socio-economic bias in the identification of those considered gifted through its regional norm model.

In the sections to follow research focusing on the personality and socio-emotional attributes of gifted vs. non-gifted students is examined.

**Personality**

The literature examining the personality and affective characteristics and development of gifted children and youth has a long and chequered history. The literature is permeated by a heated debate between the advocates of two polar positions (Richards, Encel & Shute, 2003; Shani-Zinovich & Zeidner, 2009).

On one hand, on account of their rich intellectual capabilities, gifted students are claimed to show normative (or even superior) psychosocial adjustment relative to their non-gifted counterparts. Accordingly, high levels of intelligence may be construed as a ‘resource’ or ‘resistance factor’, which help gifted adolescents cope with the stresses, challenges and life tasks throughout the different stages of their emotional, and social development. On the other hand, it is claimed that intellectually gifted children and youth are particularly vulnerable and at risk for the development of social and emotional problems during critical times of their development. Many of these difficulties are attributed to their unique personal and developmental characteristics, such as: asynchronous development, i.e., the marked disparity between the gifted adolescent’s accelerated cognitive development, on one hand, and affective or socio-emotional development, on the other; negative labelling and stereotyping of gifted students (‘nerds’, ‘geeks’, ‘bookworms’, ‘eggheads); isolation from normative peer group; unrealistic parental performance expectations; and heavy social pressure to excel in school (Neihart, Reis, Robinson & Moon, 2002; Pfeiffer, 2001; Robinson, 1996). Moreover, a growing body of recent research supports the notion that intellectually gifted youth are frequently at risk for the development of social and emotional complications during critical periods of their development—particularly during their adolescent years (Masse & Gagne, 2002; Plucker & Stocking, 2001).

In the sections following, research on the personality and affective attributes and profiles of gifted vs. non-identified students, is examined, that might shed light on the above debate. Relevant research bearing on two narrow-band personality attributes, anxiety and self-concept is presented along with recent research focusing on broader personality traits, emotional abilities, self-identity development, and mental health.
Anxiety: Trait, state, and evaluative

Anxiety is arguably the most researched among specific personality trait (Zeidner & Matthews, 2011). Do gifted and non-gifted students differ in anxiety? On one hand, it is plausible that high internal standards and success expectations in gifted adolescents, coupled with strong parental press for success and inordinately high social expectancies, may result in higher levels of state anxiety in gifted students. On the other hand, given the often observed negative relationship between intellect and anxiety, gifted students may be lower on anxiety in view of their greater intellectual resources.

An early study of gifted students in the Israeli scene by Milgram and Milgram (1976) reported lower mean levels of general anxiety in gifted 4th though 8th graders, compared to their non-gifted counterparts. Furthermore, a significant interactive effect between gender and giftedness showed that gifted girls reported lower anxiety than non-gifted girls, but no differences in anxiety were found between gifted and non-gifted boys.

Zeidner and Schleyer (1999a) probed differences between gifted and non-gifted students with respect to evaluative anxiety. Data were collected on a national sample of 772 intellectually gifted students and 716 regular students in mixed ability classes in elementary and junior high schools throughout Israel. Across grade levels and gender groups, gifted students were reported to be less test anxious relative to their non-gifted counterparts. These data are consistent with research by Milgram and Milgram (1976) supporting the more general notion that intellectually gifted students have a lower mean level of social evaluative anxiety than their regular counterparts, whether measured by self-report (Davis & Connell, 1985; Milgram & Milgram, 1976) or physiological indices (Wooding & Bingham, 1988).

Furthermore, the “Big-Fish-Little-Pond” effect (for overviews see Marsh, 2005) was vindicated for test anxiety by Zeidner & Schleyer (1999b), who reported that gifted students enrolled in a pull-out program showed lower mean levels of test anxiety compared to gifted students in homogenous gifted classes. Evaluative anxiety in academic settings may be generated by more or less veridical appraisals that failure is likely, due to low ability or lack of preparation and study. In other words, anxiety is a marker for poor intellectual skills, rather than a factor which directly impairs academic performance. Accordingly, intellectually gifted students, who appraise their ability and chances for success more favorably would be less prone to test anxiety. Thus, evaluative anxiety appears to be of a dynamic character, being shaped, in part, by social comparison processes.

Furthermore, to test for group differences on both trait and state anxiety, Shani-Zinovich (2008) examined the effects of giftedness and gender on state anxiety components and 4 forms of trait anxiety, i.e., social evaluative, physical-danger, ambiguous, and daily routine anxiety. Respondents were 374 gifted students (62% male, mean age of 15.9, \(SD = .82\)) and 428 non-gifted students (45% male, mean age of 16.4, \(SD = .91\)), enrolled in regular (heterogeneous) classes in grades 10 to 12 in the Israeli school system.

Figure 1 depicts the profile of trait anxiety scores for gifted and non-gifted students. No effects for giftedness were found on any of the trait anxiety scales. By contrast, as depicted in Figure 2, gifted students in both gender groups were shown to be lower in state anxiety levels than their non-gifted counterparts. As hypothesized by Zeidner and Shani-Zinovich (2011), these results may be accounted for by higher intellectual coping resources in gifted students, allowing them to cope better with stressful encounters in academic situations.
**Self–Concept**

Self-concept is currently viewed as a dynamic multidimensional construct (Byrne, 1988; Shavelson & Bolus, 1982), referring to the total amount of self-related information that the person processes, stores, and organizes systematically. Studies focusing on the self-concept of gifted children and youth reveal mixed findings. A modicum of studies support the notion that gifted children have a relatively higher self-concept than non-gifted students (McCoach & Siegel, 2003; Hoge & Renzulli, 1993). Other studies, however, support the opposite conclusion, noting that the development of self-concept in gifted children may be qualitatively different from that of non-gifted children (Shi, Li & Zhang, 2008).

Research comparing gifted and non-gifted students on various facets of self-concept, aside from academic and social facets, is scant. In order to test group differences on a wider array of self-concept facets than normally assessed, Shani-Zinovich and Zeidner (under preparation) collected data on 374 gifted students (62% male) and 428 non-gifted students (45% male), enrolled in regular (heterogeneous) 10th and 12th classes in the Israeli school system. Students were assessed on 5 facets of self-concept—the academic, social, personal, moral, and physical. Figure 3, depicts the group profiles on the 5 self-concept measures. Overall, significant effects for giftedness were found for 4 of the 5 subscales. By contrast, compared to their non-gifted counterparts, gifted students held higher...
academic and social self-concepts, but lower personal and physical self-concepts. No group differences were found on moral self-concept. Similarly, based on a comparison of 1,000 gifted and non-gifted students in Israel, Silektor (2009) found that gifted students had a higher academic self-concept, and a lower physical self-concept compared to their non-gifted counterparts.

![Figure 2: Anxiety component means, by educational and gender groups.](image)

Reference group theory posits that self-perceptions in educational settings, such as self-concept, are shaped by the process of social comparison. The “big-fish-little-pond effect” (BFLPE), based on the basic assumptions and principles of the social frame of reference model (Marsh & Parker, 1984), has been used frequently in research as a highly influential heuristic scheme in researching the effects of academic frameworks on the development of self-concept in gifted adolescents. According to this
model, self-perception in educational settings is largely shaped by the process of social comparison. With the increasing ability level of the reference group (school, class, etc.), students often compare themselves with high ability peers and are compared by their teachers with more intellectually able peers, which in turn affects the feedback (e.g., grades) students receive. Thus, the likelihood for upward social comparisons with more able students, as well as the likelihood to get lower grades, increases with ability level of the reference group. This, in turn, results in lower academic self-perceptions (for overviews see Marsh, 2005).

In order to test this model in the Israeli context, Zeidner and Schleyer (1999a) analyzed academic self-perceptions of gifted students in regular mixed-ability classes in addition to those in special gifted classes. The hypothesis was tested on a sample of 321 gifted students in special homogeneous gifted classes and 661 students in mixed-ability heterogeneous classes, with a one-day pull-out program. Overall, the findings of Zeidner and Schleyer (1999a) supported the BFLPE. A more recent study (Preckel, Zeidner, Goetz, & Schleyer, 2008) re-examined the “big-fish little-pond effect” (BFLPE) using Hierarchical Level Modeling (HLM) methodology and also found support for the BFLPE for academic self-concept. Similarly, Vidergor (2001) found that gifted Israeli children in pull-out programs have significantly higher academic self-concept when compared to peers in gifted and in regular classes.

Broad personality traits

Although many different personality traits have been linked to individual differences in intelligence and giftedness, research on personality is increasingly structured around the Five-Factor Model (FFM), which provides a comprehensive theoretical framework for the systematic assessment of traits (McCrae et al., 2002). The FFM includes the following 5 broad personality factors (Big-Five): Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C), and each is defined by a number of more specific traits or facets.

In one of the few studies comparing gifted and nonselected adolescents on the Big-Five, McCrae et al. (2002) reported that American high school students were about half a standard deviation lower in N and about half a standard deviation higher in O than their non-selected counterparts. The existing literature is inconsistent with respect to the relationship between intelligence and the remaining factors of the FFM. Unfortunately, the literature aimed at discerning personality differences between gifted and non-gifted individuals is plagued by a number of serious methodological pitfalls and shortcomings (Martin et al., 2010).

These include: inconsistencies in defining gifted individuals; employment of small and non-representative samples; use of clinical measures or personality assessments not satisfactorily validated by empirical research; use of norm group data for comparisons, rather than conducting concurrent comparisons between gifted students and their non-gifted same-aged peers. Taken together, the constraints of current research limit the tenability of reported findings and generalizations about personality differences between gifted and non-gifted students.

In order to improve upon the shortcomings of prior research, Zeidner and Shani-Zinovich (2011) recently examined a representative sample of academically gifted (N = 374) and non-gifted (N = 428) Israeli high-school students enrolled in grades 10 to 12 in order to compare these two student populations on the ‘Big-Five.’ Figure 4 presents the group profiles on the “Big-Five” factors of the Five Factor Model of personality. Gifted students in Israel reported higher mean O scores compared to their same-age non-gifted peers, by the order of half a sigma unit. These data are consistent with prior research suggesting that O is the Big-Five personality factor most closely associated with intelligence (Zeidner & Matthews, 2000) and consistent with data presented by McCrae for adolescents in the U.S. Indeed, gifted individuals are characterized by a number of traits typically associated with O, such as perceived intellect, curiosity, originality, imagination, creativity, and a wide range of intellectual, artistic, and aesthetic interests (Kaufman, 2009).
In addition, gifted Israeli students demonstrated lower mean levels of N compared to their nonselected counterparts, by the order of a quarter sigma unit. These data are consistent with prior research indicating that N is negatively related to psychometric intelligence (Ackerman & Heggestad, 1997). Individuals who are high on N (i.e., low on emotional stability) may tend to focus on their tense emotional state and experience self-related cognitions that frequently interfere with their cognitive performance (Zeidner, 1998).

Given that prior research has shown A to be negligibly and inconsistently related to intelligence, Israeli gifted students surprisingly scored lower on A compared to non-gifted students. It is not implausible that some of the temperamentally based primary facets of A, i.e., trust, straightforwardness, altruism, warmth, compliance, modesty, and tender-mindedness, are lower in gifted students due to their competitive and perfectionist strivings. In fact, some evidence from occupational studies suggest that low A individuals may have more competitive drive than their more agreeable counterparts (Boudreau, Boswell & Judge, 2001). The data from the current study did not reveal significant differences between gifted and non-gifted students on the remaining factors of the Big-Five.

**Emotional Intelligence**

Emotional intelligence (EI) refers to competencies in identifying, understanding, expressing, and managing emotion, in both self and others (Matthews, Zeidner, & Roberts, 2005; Mayer, Caruso, & Salovey, 2000). Proponents of EI have had rather little to say about relations between EI and academic giftedness. Mayer, Perkins, Caruso, and Salovey (2001) described case studies that indicate how emotional giftedness may be distinct from intellectual giftedness, but they left open the issue of how the two forms of giftedness may be related. However, there is relevant previous research on the emotional and social adjustment of gifted students, dating back to Terman’s (1925) pioneering longitudinal study of “genius”. In addition to possessing high levels of academic intelligence, Terman’s sample proved to be generally well-adjusted with respect to moral development, emotional maturity, and social relationships. Subsequent studies have generally confirmed this positive view of
the social-emotional concomitants of academic ability (see Zeidner et al. 2005, for a review). These findings mesh with other results suggesting that superior intelligence is modestly related to positive attributes such as self-efficacy and ego resiliency, as well as reduced vulnerability to delinquency and some forms of mental illness (Austin et al., 2002; Zeidner, 1995; Zeidner & Matthews, 2000). Perhaps these social-emotional strengths of the gifted child might be attributed to elevated levels of emotional intelligence.

Zeidner and co-workers (2005) set out to investigate whether academically gifted high school students obtain higher scores on ability-based and questionnaire-based tests for “emotional intelligence” (EI) than non-gifted students. Data were gathered on 83 academically gifted and 125 non-gifted students drawn from 7th to 10th grade classes in junior-high and high schools in Israel. Emotional intelligence was measured using both performance-based and self-report approaches, namely the MSCEIT and SSRI, respectively. Verbal ability was assessed by the Vocabulary subtest of the WISC-R-95. Gifted students obtained higher scores than non-gifted students on the performance measure (MSCEIT) and the group difference was statistically dependent upon group differences in vocabulary. However, gifted students scored lower on the self-report measure (SSRI). As graphically depicted in Figure 5, both measures resulted in meaningful group differences, though in entirely opposite directions!

![Figure 5: Gifted vs. non-gifted student performance on two types of EI measures (Based on Zeidner et al., 2005).](image)

**Self-Identity of gifted students**

A major developmental task confronting gifted adolescents is the formation of a clear and stable ego identity, which will differentiate and integrate their special abilities and talents with other facets of their personality. Erikson’s psychosocial theory (Erikson, 1980) conceptualizes life-span development as a series of critical developmental stages, eight in total, each posing a set of bipolar dilemmas or conflicts. During the fifth developmental stage, overlapping with early and late adolescence, the crisis of ‘identity vs. role confusion’ comes to fore. During this critical stage, the adolescent achieves a sense of meaning, direction, and purpose in life (Erikson, 1968). Marcia (1966) further elaborated upon Erikson’s basic conceptual framework by identifying two distinct facets during the forging of self-identity—commitment and status—each subsuming two categories. A cross-partitioning of facet categories forms 4 distinct identity statuses presented in Table 1: achievement, foreclosure, moratorium, and diffusion.
While the psychosocial tasks proposed by Erikson are seen to be universal and epigenetic, there is a reason to assume that gifted adolescents may negotiate this process differently than their same-age peers. However, the literature directly addressing the question of identity formation among gifted adolescents is relatively scant. The few empirical studies which have focused on this topic have examined broad issues in the emotional or social adjustment of gifted adolescents, rather than systematically examining the identity formation process per se. Nonetheless, it can be assume that specific socio-emotional characteristics of gifted children might be linked to the formation of ego identity.

In order to fill this much needed gap in the literature, (Shani-Zinovich & Zeidner, have embarked upon a study of gifted adolescents in Israel in order to cast light on the identity formation of gifted and non-gifted adolescents, using both quantitative and qualitative methodologies. It was hypothesized that given the greater degree of commitment attributed to gifted compared to non-gifted students, the latter would show higher levels of identity status achievement as well as identity foreclosure, compared to their non-gifted counterparts.

A self-report measure of ego identity formation was administered to a sample of 802 adolescents, later followed by a semi-structured in-depth interview of 80 participants drawn from the original sample. A profile analysis assessing differences between gifted and non-gifted scores in the profile, flatness, and elevation of ego identity scores, showed non-significant effects for parallelism and flatness, but significant effects of giftedness, across the 4 ego identity scales. Inspection of subgroup means showed that gifted adolescents have significantly lower mean levels of ego diffusion than their non-gifted counterparts.

Furthermore, differences in identity status were examined for three distinct groups of students: (1) gifted students in homogeneous classes, (2) pull-out gifted students in heterogeneous classes, and (3) same-age non-gifted students, sampled from the same schools as the gifted participant. When comparing the 3 student groups on dimensions of self-exploration and commitment, gifted students in pull-out classes reported a higher level of self-exploration compared with students in gifted classes and regular (non-gifted) students, respectively. Also, gifted class students revealed the highest degree of commitment, followed by gifted pull-out students, with non-gifted students showing the lowest level of commitment. Furthermore, students in gifted classes were more frequently associated with the 'foreclosure' status; gifted students in pull-out classes were more frequently associated with the 'moratorium' status; and non-gifted students were associated more frequently with the 'diffused identity' status (Shani-Zinovich, 2008).

In an attempt to identify additional themes related to the development of self-identity in gifted adolescents, a qualitative analysis of the interview protocols gathered during the second phase of this study was conducted. The analyses suggest that gifted adolescents were characterized by the following profile: a strong commitment to academic achievement; serious consideration of prestige and other external factors in choosing a vocation; a strong commitment to their professional future at a relatively young age; and a heightened fear of academic failure. It is not entirely implausible that gifted adolescents, who assume academic and vocational commitments relatively early, narrow and delimit the self-exploration process required for adaptive identity formation.

### Mental Health

Given the ongoing debate over whether or not giftedness is associated with adaptive socioemotional development and mental health, a comparison of gifted and non-gifted same-aged
individuals on subjective mental health, using validated measures and a representative sample was employed (Zeidner & Shani-Zinovich, 2011). On one hand, it was reasoned that the high internal standards and success expectations in gifted adolescents, coupled with strong parental press for success, result in lower mental health in gifted students. On the other hand, given the negative relationship between intellect and the broad factor of neuroticism (N), coupled with the lower levels of N reported for gifted students, gifted adolescents may reflect superior mental health, particularly, in view of their greater intellectual resources. Overall, the data suggested that gifted and non-gifted students do not differ significantly in mean mental health, based on measures of both, distress and well-being.

These data, showing no significant differences between gifted and non-gifted adolescents on facets of mental health, are consistent with recent empirical work supporting the notion that gifted adolescent demonstrate similar (and often more healthy) psychological characteristics than their non-gifted peers (Cross, et al, 2008). While a number of factors may put gifted children at risk for unhealthy personality development (social stigma, asynchronic development, other-ascribed perfectionism, societal press to succeed, etc), a number of protective factors (high cognitive ability, problem-solving strategies, problem-focused coping, self-understanding, high academic self-concept, openness, emotional stability, etc.) may mediate the impact of any potential adversity on these students and ensure their development into competent and productive individuals. (Gardynik & McDonald, 2005).

Conclusions

This article examined empirical research related to the personality and affective characteristics of gifted students in the Israeli educational context. In the discussion to follow we address the major findings presented in the review.

Personality. Research on narrow-band personality factors in the Israeli scene show that gifted students tend to be lower in test anxiety and state anxiety, but not reliably discernible with respect to trait anxiety. Similarly, in the U.S., Reynolds and his coworkers (Reynolds & Bradley, 1983) and Davis and Connell (1985) reported lower anxiety in gifted compared to non-gifted elementary school students. Furthermore, the high academic self-efficacy of gifted students should serve to enhance their performance and concomitantly reduce their academic anxiety. By contrast, for non-gifted students, who have lower academic self-efficacy and who have fewer cognitive resources to draw upon, the same academic task may be perceived (and in fact actually be) relatively difficult. This, in turn, may lead to reduced performance. Furthermore, the findings of the current study suggest that gifted students hold a more favorable academic self-concept than their non-gifted counterparts, but a less favorable social self-concept.

The data showing higher scores for gifted Israeli adolescents on the broad personality factor of Openness (O) to experience and lower scores on Neuroticism (N), are consistent with prior findings reported by McCrae et al. (2002). Thus, this research is consistent with prior studies in other national sites attesting to the adaptive emotional adjustment and openness of gifted students when compared to their nonidentified counterparts. Also, across ability groups, adolescent boys in Israel evidenced higher mean scores than adolescent girls on Agreeableness (A) and N.

Emotional intelligence. Emotional intelligence in gifted vs. non-gifted adolescent students suggested that the outcome depends on the measure employed. When an ability-based measure was employed, gifted students had the upper hand; when a self-report measure was employed, non-gifted students scored higher. In other words, whether or not gifted vs. non-gifted students differ significantly in emotional intelligence depends entirely on the operationalization of EI. Overall, these
findings suggested that the differences between gifted and non-gifted students are measure dependent, with the profile of scores variable across EI assessment procedures.

**Self-identity.** Recent data on the development of self-identity in gifted adolescents show a rather complex pattern of effects for giftedness. While the profile of ego identity scores for gifted and non-gifted students are not reliably differentiated, gifted students show a rather 'mixed bag' of statuses, including lower levels of both identity diffusion and achievement compared to their non-gifted counterparts. Overall, these results provide little evidence attesting to systematic differences in ego identity statuses between gifted and non-gifted adolescents. The Israeli research on the nature of identity formation in gifted adolescents is important in that a successful resolution of the identity crisis is a prerequisite to successfully progressing to further stages in the life cycle and thus crucial for a complete utilization of the exceptional intellectual talents of the gifted. From an applied perspective, the understanding of the unique needs of gifted adolescents may enable educators, counselors and psychologists to deal more efficiently with difficulties or problems detected in identity formation. These identity statuses are characterized by different styles of personality organization that must be appreciated for effective educational counseling or intervention.

**Mental Health.** Data collected in the Israeli context showed no significant differences between gifted and non-gifted adolescents on mental health. These data are consistent with recent empirical work supporting the notion that gifted adolescent demonstrate similar (and often more healthy) psychological characteristics than their non-gifted peers (Cross, et al, 2008). While a number of factors may put gifted children at risk for unhealthy personality development, a number of protective factors (high cognitive ability, problem-solving strategies, problem-focused coping, self-understanding, high academic self-concept, openness, and emotional stability) may mediate the impact of any potential adversity on these students and ensure their development into competent and productive individuals (Gardynik & McDonald, 2005).

Overall, research in both Israel and abroad support thinking and research suggesting that gifted students may be no less adjusted, than their non-gifted counterparts. The direction of the findings suggests that intellectual giftedness may be considered an asset in coping with life’s challenges, and is associated with a variety of indices of favorable social and personal adjustment, such as more openness to experience, greater emotional stability, and less state anxiety than their non-gifted counterparts.

**Contextual effects.** Contextual effects on the affective states, mainly anxiety and self-concept, have been noted in both Israel and abroad. Thus, gifted students are subject to the "big-fish little pond effect (BFLPE)" and show higher levels of academic self-concept and lower anxiety in heterogeneous than gifted class (Marsh & Parker, 1984). Thus, with the increasing ability level of the reference group (school, class, etc.), students often compare themselves with high ability peers and are compared by their teachers with more intellectually able peers, which in turn affects the feedback (e.g., grades) students receive.

Thus, the likelihood for upward social comparisons with more able students, as well as the likelihood to get lower grades, increases with ability level of the reference group. This, in turn, results in lower academic self-perceptions (for overviews see Marsh, 2005; Marsh & Craven, 2002). Although attending selective gifted classes is likely to cause feelings of pride and to improve academic self-concept (assimilation or “basking-in-reflected-glory”) the negative effects of high-achieving environments due to the BFLPE seem to be stronger than positive assimilation effects (see also Marsh, Kong, & Hau, 2000).

Placing gifted students in special homogeneous classes for the gifted can be a “double edged sword”: on one hand it may enhance school achievement and scholastic skills (Kulik & Kulik, 1982, 1984), while, on the other hand, it may pose a serious threat to the child’s ego, especially if students are transferred from a framework in which they ranked high in the grade distribution, to a framework
in which they need to cope with others who are similar to them or even intellectually better than them. Program planners will need to carefully consider this “trade-off” in formulating policies for the gifted.

**Conclusion**

By and large, the bulk of research has been concerned with cognitive aspects of the gifted. The time has come to systematically map out the socio-emotional profile of gifted children across the globe, and take this into consideration when developing intervention and guidance programs for the gifted. Furthermore, until recently, researchers have focused largely on giftedness as a personal asset, with the potential darker shades of giftedness largely ignored. Accordingly, there is considerably much more research focusing on meeting the academic needs of the gifted through accelerated and enrichment programs than research and applications focusing on meeting their socio-emotional needs, problems, and strains (Yoo & Moon, 2006). More direct research is needed on numerous facets of the psychosocial development of gifted vs. non-gifted youth in order to assess the need for remediation, identification of problem foci and provision of interventions to help gifted adolescents cope with various sources of psychosocial stress related to the special characteristics of the gifted. Immediate attention to the socioemotional characteristics and problems of gifted adolescents is needed; particularly, in view of the recent reports of alarming rates of school avoidance and poor school adjustment; reports of low self-esteem, feelings of loneliness, isolation, and dejection; and emotional incapacitation, and feelings of alienation from the school and social environment (e.g., Silverman, 1993; Zeidner, Shani-Zinovich, Matthews, & Roberts, 2005).
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A Multidimensional Model for the Identification of Dual-Exceptional Learners

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Abstract
This research takes mathematics as a model for investigating the definitions, identification, classification and characteristics of a group of gifted student related to the notion of ‘dual-exceptionality’. An extensive process using qualitative and quantitative methods was conducted by a multidisciplinary team to develop and implement a multidimensional approach to dual-exceptionalities of ‘mathematical giftedness’ and ‘learning difficulties’ (MG/LD) in upper elementary students in public schools in Jordan. A multidimensional evaluation involving eight criteria (e.g. teacher nomination, parent and teacher interviews, documentary evidence and direct observation) and a combination of psychometric (i.e. WISC-III-Jordan, Perceptual Skills Tests, and a diagnostic Arabic Literacy Language Skills Test) and dynamic mathematics assessment was used. The findings are discussed and two assessment profiles are presented.

Keywords: Multidimensional model to identification; dual-exceptionality; mathematically gifted with learning difficulties; assessment profiles.

Introduction
In the field of gifted and talented education, increasing attention has been given to the pressing issue of ‘dual-exceptional’ learners, or highly able students who also have disabilities or learning deficits. However, gifted students with learning difficulties/disabilities (G/LDs) are most commonly referred to as ‘dual- or twice-exceptional’ children (Erten, 2005; Silverman, 1989, 2005; Willard-Holt, 1999) and we have adopted this term in the present study. There are several subsections of ‘dual-exceptionalities’, such as ‘gifted with specific learning difficulties’, ‘gifted with Asperger’s/autism’, ‘gifted with attention deficit disorder’, ‘gifted with dyslexia’, ‘gifted with dysgraphia’, ‘gifted with sensory disabilities’ and ‘gifted with behavioral disorders’ (Montgomery, 2003). In the literature, however, the term ‘dual-exceptionality’ is more commonly used with the larger section of ‘gifted children with learning difficulties’ (Silverman, 1983, 2005). In the current research, therefore, gifted students who have high potential in mathematics, yet have specific learning difficulties related to literacy, are referred to as ‘dual-exceptional’ children. Indeed, the neurological differences found in students with dyslexia or learning difficulties may confer advantages on some individuals (e.g. in visual or perceptual skills), which may to some extent explain the apparent paradox that some individuals who have problems with elementary skills, such as reading and writing, can nevertheless be highly gifted in other areas (Singleton, 2000).

Brody and Mills’ (1997) proposal of a definition of G/LD student includes the following statement about such students’ superior ability, as well as their performance deficits:
Gifted/specific learning disabilities students are students of superior intellectual ability who exhibit a significant discrepancy in their level of performance in a particular academic area such as reading, mathematics, spelling or written expression. Their academic performance is substantially below what would be expected based on their general intellectual ability. As with other children exhibiting learning disabilities [difficulties], this discrepancy is not due to lack of educational opportunity in that academic area or other health impairment. Because academically gifted students with learning disabilities [specific learning difficulties] demonstrate such high academic potential, their academic achievement may not be as low as that of students with [specific] learning disabilities who demonstrate average academic
potential. Consequently, these students may be less likely to be referred for special education testing (p. 285).

According to Baum (1989) and Brody and Mills (1997), these dual-exceptional children who remain unrecognized can be classified into at least three subgroups: the first subgroup comprises students with hidden LDs, which includes students who are identified as gifted yet exhibit difficulties in school or, as Baum (1989) describes them, “gifted students who have subtle LDs” (p. 1). This group is easily identified as gifted; however, the gap between what is expected and their actual performance is often wide (Fetzer, 2000). The second subgroup consists of students with hidden giftedness, which includes students whose LDs are severe enough that they have been identified as having LDs, but whose high abilities have never been addressed or recognized. They are first noticed for what they cannot do, rather than for the talent they also demonstrate (Brody & Mills, 1997; Little, 2001). The third subgroup is composed of students with hidden giftedness and LDs and “perhaps the largest group of non-served and unidentified students” (Brody & Mills, 1997, p.2) are those whose high abilities and LDs mask each other (Baum, 1989; Brody & Mills, 1997). These students sit in regular classrooms, are not considered as qualifying for services provided for students who are gifted or have LDs, and are regarded as possessing average abilities (Brody & Mills, 1997).

In the field of exceptional and dual-exceptional children, identification is always related to definitions. Accordingly, vagueness about the definitions of giftedness and learning difficulties generates problems in identifying gifted children with LDs. The major difficulty in identifying those students is that there are too many gifted children with LDs who fail to meet the qualification requirements for either gifted programs or special needs services. For example, research has shown that teachers are much more likely to refer gifted students who do not have LDs, than gifted students who do possess them, for placement in gifted and talented programs (Minner, 1990). This is because students with LDs who are gifted rarely show consistently high academic achievement; they usually go unrecognized as being gifted and eligible for special programs (Baum, 1989; Beckley, 1998; Brody & Mills, 1997; Ruban & Reis, 2005).

Lazarus (1989) developed assessment profiles for four case studies of gifted students exhibiting learning difficulties. The researcher used a multidisciplinary team that included a psychologist, a learning difficulties specialist, a language specialist, a teacher of artistically gifted children, gifted teacher, a learning difficulties teacher, a physical education professor, parents and a school nurse. In addition, the students’ school reports were used to provide the assessors with historical data about the students’ progress. A combination of standardized tests (e.g. the WISC-R, achievement tests, and a behavioral test) was administered in addition to direct student observation, and interviews with parents, teachers and students. However, Lazarus did not use dynamic assessment or a dyslexia test, which could clearly have made distinctive contributions to the incorporation into an assessment of dual-exceptionality. McCoach, Kehle, Bray, and Siegle (2004) proposed a comprehensive longitudinal system which includes behavioral observation, an individual intelligence test, measures of cognitive processing, and a full achievement battery. The proposed identification system also suggests assessing the student’s level of functioning in the regular classroom environment, using curriculum-based assessment, and conducting interviews with students to assess their perceptions and attitudes toward academic work. Recently, Al-Hroub (2010) proposed a multidimensional model for identifying gifted students with LDs, which indicates that psychometric test scores need to be supplemented with dynamic and informal assessments, historical data, task analysis of permanent products, and information from parents, teachers and students. The model includes teacher and parent nomination, documentary evidence and school records, behavioral observation, an individual intelligence test, measures of cognitive processing, perceptual skills and literacy tests, and a dynamic assessment.

Baum and Owen (2004) report that in order to recognize the potential for gifted behavior in students with LDs, educators should generally approach the identification process in two ways: (a) a priori identification, entailing collection and analysis of test data and interview information about students; and (b) dynamic identification, involving the use of activities purposely designed to elicit creative responses and signal possible areas of student talent. In order to recognize gifted students
with LDs, there are four defining characteristics that should be considered (Al-Hroub, 2010; Brody & Mills, 1997), comprising evidence of an outstanding talent or ability, evidence of an aptitude achievement discrepancy, evidence of verbal-performance IQ discrepancy, and evidence of a processing deficit.

**The Dual-Exceptionality of mathematically gifted with learning difficulties**

Some mathematically gifted students do not necessarily demonstrate outstanding academic achievement, display enthusiasm toward school mathematics programs, or obtain top grades in mathematics. There are many possible reasons that these students may not be doing well, but often it is, at least in part, because of a mismatch between the needs of the student and the mathematically gifted programs provided for them. Many students refuse, or are unable, to conform to the expectations of programs (Miller, 1990), which can be a result of their specific LDs.

Krutetskii (1976) identified three basic types of mathematical abilities in gifted students: (1) *The Analytic*: who tend to think in verbal, logical terms; (2) *The Geometric*: who tend to think in visual, pictorial terms; (3) *The Harmonic*: who combine characteristics of the other two. Krutetskii argues that students with a harmonic type of mind are most likely to have mathematical aptitude (Presmeg, 1986; Straker, 1982). The importance of Krutetskii’s research, however, lies in its distinction between levels of mathematical abilities, determined largely by a verbal-logical component of thinking, and type of mathematical giftedness, determined largely by a visual-pictorial component (Presmeg, 1986).

According to Krutetskii’s (1976) concept, mathematically gifted students may show an outstanding talent in mathematics accompanied by deficits in other areas. An instance of early mathematical giftedness was described in 1964 by psychologists in the German Democratic Republic. S. Reiner’s parents first paid attention to his abilities when he was 5 years old. After one year at school, he went directly into the second grade. According to the experimenters, although Reiner showed remarkable skills in arithmetic and problem-solving, he had considerable difficulty in studying language and spelling (Krutetskii, 1976). Leonardo da Vinci (1452-1519), the remarkable Florentine artist, architect, engineer, and mathematician is another case of dyslexic genius. An example of his “mirror writing,” a distinctive symptom of LDs, may be seen in his notebooks exhibited at the British Museum in London (Aaron, Joshi, & Ocker, 2004).

A controlled comparison study of the performance of dyslexics in mathematics was carried out by Steeves (1983). Her subjects were 54 dyslexic students between the ages of 10 and 14 years, and 54 suitably matched controls. The researcher divided them into four groups, namely, (a) dyslexic high (DH), that is dyslexics with a high score on the Raven Standard Progressive Matrices; (b) dyslexic average (DA), namely dyslexics with an average score on the Raven Standard Progressive Matrices; (c) non-dyslexics in a mathematics class for those of high ability (NH); and (d) non-dyslexics in a mathematics class for those of average ability (NA). The DH group was found on testing to be at the same level as the NH group in the Raven Standard Progressive Matrices; in a mathematics school test, however, they scored less well than the NH group and were on a level with the NA group, whereas in the Wechsler Memory Test they had lower scores than both of the non-dyslexic groups. The DA group was on a level with the NA group in the Raven Standard Progressive Matrices, but below them in the other two tests, and was particularly weak in the Wechsler Memory Test.

In a study that was carried out at the University of Aston, Joffe (1981) gave a test of computation to 102 students aged between 8 and 17. Half of them were dyslexics, and the other half formed a control group. All of the subjects had been found to be average or above in intellectual ability in standardized tests. The results showed that 10% of the dyslexics scored very highly, whereas 60% scored well below expectation. A study carried out in the U.K. by Lewis, Hitch, and Walker (1994) on a population of over a one thousand 9 to 10-year-olds, explored the incidence of arithmetic difficulties within the general population. The results showed that 3.9% of the sample had reading difficulties only, 2.3% had arithmetic and reading difficulties, and 1.3% had arithmetic difficulties only.
Significant success in using multidimensional assessment was experienced in a previous research study that was conducted on five mathematically gifted children with learning difficulties in the UK (Al-Hroub, 2010). This previous research used multidimensional assessment, which combined psychometric (including the WISC-III UK, the Dyslexia Screening Test, and the Neale Analysis of Reading Ability) and dynamic mathematics assessments, and without which any approach to assessing the students would have remained inadequate.

**Research design**

**Research aim and questions**

The issue addressed by the current research is whether multidimensional assessment can be an efficient approach to identifying mathematical giftedness and LDs in the same students. One of the purposes of this research was to broaden our insight into the definitions, identification, characteristics and classification of this group of gifted students, sometimes labeled as ‘dual- (or twice) exceptional’ children (Al-Hroub, 2008, 2010, 2011, Silverman, 1983, 1989, 2005). A multiple-case-study approach was used to dealing with the following five research questions: (1) What is the efficacy of using specific multiple measures to identify MG/LD students? (2) To what extent are elementary teachers able to identify MG/LD students? (3) What are the parents’ contributions to identifying those students have? (4) What are the specific cognitive abilities and perceptual skills that those students tend to have? and (5) What is the nature of the relationship between students’ mathematical abilities and their learning difficulties (LDs)?

The rationale for using a multidimensional approach was perceived as follows: (a) important information can be obtained from parents, teachers and schools about the academic and social activities of the children, which may not be demonstrated when using standardized tests; (b) the Jordanian version of the Wechsler Intelligence Scale for Children (WISC-III UK) is a good means of identifying cognitive strengths and weaknesses; (c) Verbal, Performance or Full-Scale scores, or Verbal-Performance discrepancies tend to obscure the subtly distinctive patterns that characterize and identify the various G/LDs groups (e.g. Al-Hroub, 2010; Kaufman, 1994); and (d) a dynamic assessment approach can provide a means of assessing potential development of dyslexic and underserved gifted students, and of determining the discrepancy between potential and performance (Al-Hroub, 2010, 2011; Haywood & Lidz, 2007; Kanevsky, 2000; Kirschenbaum, 1998).

**Method**

The conceptual approach of this research is based on this new understanding that accepts the coexistence of giftedness and learning difficulties simultaneously in the same individual. Therefore, the mixed-method approach was used to explore critical issues related to the notion of ‘gifted children with learning difficulties’, taking mathematics as a model, at three public primary schools in Amman, Jordan.

A triangulated approach to data collection was utilized. More specifically, a multidisciplinary team administered a range of psychometric and dynamic assessments related to different abilities and aspects of learning. The study also included teacher nomination, school document analysis, direct and indirect observation, and structured and semi-structured interviews with Arabic and mathematics teachers and parents.

**Participants**

The identification process was conducted by a multidisciplinary team of two diagnosticians to identify a sample of 30 students (16 girls and 14 boys) who revealed dual-exceptionalities of ‘mathematical giftedness’ and ‘learning difficulties’ in the fifth and sixth grades, aged 10 years to 11 years and 11 months, at three public primary schools in Amman, Jordan. The participants were chosen from Grades 5 and 6 so as to avoid earlier years, as students who have specific learning difficulties or high ability in mathematics are difficult to recognize or identify in the earlier years of schooling. All the students were from relatively middle-class backgrounds and Arabic was the first language and spoken one at home. In the process of selecting the 30 cases, 52 students were nominated by their
classroom teachers and evaluated in the study; 22 students were excluded from the research because assessment showed that they were not mathematically gifted with specific learning difficulties (MG/LDs).

**Data collection**

A combination of eight techniques for identification was used, with some being used to identify giftedness and others, to identify LDs. Each student was evaluated formally and informally for approximately 12-15 hours over 7-9 sessions. The formal and informal assessments were conducted in the following order: (1) documentary evidence; (2) teacher’s nomination; (3) teacher interviews; (4) parent interviews; (5) the Wechsler Intelligence Scale for Children (WISC-III-Jordan, 1996); (6) the Group of Perceptual Skills Tests (Waqfi & Kilani, 1998); (7) the Diagnostic Arabic Literacy Language Skills Test (Waqfi, 1997a); and (8) dynamic assessment involving a mathematics achievement test. Most of the assessments were carried out in the counselors’ rooms and, if not there, in a learning resource room or the library.

**Teacher nomination**

Teacher nomination is one of the most widespread methods used for identifying the mathematically gifted, but it is also one of the most troublesome (Davis, Rimm & Siegle, 2011). Therefore nominating students to participate in the current research was the first process in the assessment of mathematically gifted students who were dyslexics. However, 15 regular-class Arabic and mathematics teachers from the three public primary schools participated in this nomination, and most of them had long experience in education. Nine teachers were Arabic language teachers, and the other six were mathematics teachers. Ten teachers were male and five were female. However, the researcher organized two seminars for all of the teachers of Grades 5 and 6 at their schools. The purpose of these seminars was to discuss the concept of ‘dual-exceptional’ children and their characteristics in order to draw a clear picture of this population of students, which in some way would help the teachers to make more accurate nominations. The seminars discussed the broad definitions of giftedness and learning difficulties, their characteristics and the three categories that classified ‘dual-exceptional’ students in the literature. The researcher held two one-hour seminars in each school. Questions were asked, and specific explanations were given to all teachers as to what we mean by this term, and why we have difficulty in schools in recognizing ‘dual-exceptional’ students.

**Documentary evidence**

The local school system in Jordan has repositories of qualitative and quantitative information on individual students, their families, individual schools in the system and the school system as a whole, for example, student demographic characteristics, student academic and test performance, student behavior, attendance records and curriculum documents. Permission was obtained from both parents and head teachers to ensure access to all information that was of clear relevance to the education of the student. The information obtained from the records included familial information, medical background, school history, cognitive test scores, aptitude test scores, psychological reports, achievement test results, teachers’ anecdotal records, student’s paperwork, and special education files.

**Observation**

Direct and indirect observation of academic and non-academic settings was carried out: students were observed inside the regular classroom, mathematics classes, music classes, and the playground. Initial observations were made in six classes, two from each school, to familiarize the researcher, students, and Arabic language and mathematics teachers with each other: this was important because of the focus on the classroom environment. In the current research, it was clearly difficult to identify students with LDs by observing their academic work inside or outside the regular classroom. Students’ difficulties in the class could be assigned to more than one category, such as underachiever, emotionally disturbed and children with low self-esteem. Similarly, it was not possible to identify all of the aspects of mathematical giftedness by observing the students in their mathematics classes. Consequently, it was useful to use observation as a complementary informal assessment to gather some useful information about the students’ academic and non-academic
behavior. Furthermore, direct and indirect observation assisted in determining the main areas that should be discussed with parents and teachers in relation to each subject.

**Parent and teacher interviews**

Interviews were conducted with the parents and teachers, as they were considered to be the best source of information about the students. In the first stage, teachers and parents were asked to complete a questionnaire. The parents were given a case history form that was designed to demonstrate that familial, physical, psychological, social, and educational histories were the main areas that were to be discussed with them. Likewise, the teachers were given a form to complete about the student’s academic level, special interests, and his/her behavioral patterns. Teacher interviews focused on students’ strengths and weaknesses in reading, writing and spelling, in addition to their high achievement in solving mathematical problems, all of which are important in identifying any aspects of mathematical giftedness or LDs. In the second stage, teachers and parents were asked to talk about issues that they felt were significant in the relation to the development and education of the child concerned.


The WISC-III-Jordan (1996) is an individually administered clinical instrument for assessing the intellectual ability of children and young people aged from 6 years 0 months through to 16 years 11 months. This age group fits the ages of the study’s participants. In 50-70 minutes, the WISC-III Jordan assesses general intellectual functioning by sampling performance in many different types of activity. The scale consists of 13 subtests grouped into two scales: verbal, six subtests; and performance, seven subtests. The WISC-III-Jordan scores yield an overall intelligence quotient called the Full-scale IQ, as well as a Verbal IQ and a Performance IQ. In research studies of the gifted it is usual for the ‘gifted’ sample to be confined to those who have at least one IQ score of 130 or above (Montgomery, 1996). Silverman (1989) suggests the level for inclusion in these gifted education programs should be dropped by ten points in the case of those with a learning difficulty. Accordingly, students in this research who scored 120 or above on the Full-Scale IQ were labeled ‘gifted’. The WISC-III-Jordan manual reports an acceptable validity for use as a criteria achievement test. A multivariate method factor analysis was used also to provide construct-related evidences of the validity of subtests. The reliability of the scale was studied by the test-re-test method for all of the subtests. Verbal, Performance, and Full-Scale IQs showed high reliability coefficients of 0.95, 0.94 and 0.96 respectively across all ages. Reliability was also measured by inter-rater/scorer agreement. Verbal, Performance, and Full-Scales IQs have average reliability coefficients of 0.94, 0.88 and 0.95 respectively across all ages (Wechsler, 1996).

**Dynamic Assessment (DA): the mathematics achievement test**

A pre-test– intervention–post-test method was used to determine whether students who exhibit performance deficits in mathematics have cognitive strengths that are not readily observed. This particular method of assessment comprises two parts: in the first a specially developed test is applied to the child under study, and in part two an equivalent test is applied to the same child after providing him/her with particular teaching in skills and problem-solving relating to what the child has experienced in the pre-training test. Before conducting the DA, pilot test sessions were used with eight mathematically gifted students who were chosen by their mathematics teachers (four girls and four boys; four Grade 5 and four Grade 6) and according to their academic superiority in mathematics at school. These pilot test sessions were conducted to modify the questions and estimate the time required for solving the problem, which was approximately 45 minutes. However, the DA test was developed from items in the Diagnostic Scale of Mathematical Basic Skills (Waqfi, 1997b), which is applied to students from 1st to 9th grades at the national level in Jordan, and the Standardized National Curriculum Mathematics Test, which is administered to Years/Grades 4-7 at the national level in the UK. In part one of the test, the researcher applied a pre-test developed from the above-mentioned Jordanian and UK tests. The mathematical areas that the test covered were: (a) calculation operations, (b) ordering of decimals, (c) rounding up, (d) geometry, (e) algebra, and (f) problem-solving. Then the
researcher-as-teacher undertook three sessions (45 minutes each) of teaching particularly related to the nature of the problems in the test. In part three of the DA procedure, the post-teaching stage, another developed test was used to assess the same areas that were covered in the pre-teaching test. The researcher read the questions and tasks to the students and emphasized that the children were free to ask if they did not understand the wording of any of the questions.

The Group of Perceptual Skills Tests (Waqfi & Kilani, 1998)

The Group of Perceptual Skills Tests provides a profile of the strengths and weaknesses that are often associated with specific learning difficulties of children aged from 6 years 7 months to 16 years 6 months. The Perceptual Tests take around 45 minutes overall to administer, which is within the attention span of most children in this age group. The Perceptual Skills Tests battery includes seven diagnostic subtests covering the range of skills that are known to be affected in dyslexia, and the profile of difficulties that can be used to interpret the causes of attainment difficulties; these subtests are: (1) Auditory Discrimination Test, (2) Auditory Analysis Skills Test, (3) Word Span Test, (4) Digit Span Test, (5) Visual-Motor Sequence Test, (6) Visual-Motor Integration, and (7) Visual Analysis Skills Test (Waqfi & Kilani, 1998). However, the seven perceptual subtests are categorized into six major perceptual areas (Waqfi & Kilani, 1998), as follows: (1) Auditory Perceptual Skills, which consists of four subtests: (a) Auditory Discrimination, (b) Auditory Analysis Skills, (c) Auditory Word Span and (d) Auditory Digit Span; (2) Auditory Discrimination and Analysis Skills, which consists of two subtests: (a) Auditory Discrimination, and (b) Auditory Analysis; (3) Auditory Short-Term Memory, which consists of two subtests: (a) Auditory Word Span and (b) Auditory Digit Span; (4) Visual Perceptual Skills, which consists of three subtests: (a) Coding, (b) Visual-Motor Integration and (c) Visual Analysis Skills; (5) Visual Integration and Analysis Skills, which consists of two subtests: (a) Visual Motor-Integration and (b) Visual Analysis Skills; and (6) Visual Short-Term Memory, which consists of the Coding subtest. Construct validity was assessed by administering the seven subtests to a group of 270 children previously diagnosed as dyslexic. The author presents evidence of validity based on the internal structure between subtests across all age groups. All subtests were found to significantly correlate with one another, as would be expected considering that they all presumably measure ‘perceptual skills’. Further evidence of internal structure is presented through correlation coefficient validity of subtests across all age groups. The seven perceptual skills subtests have average validity coefficients (r) of 0.51, 0.73, 0.96, 0.92, 0.67, 0.95, and 0.96 respectively across all ages. This result agrees with the performance development along with all ages’ development. A study with 270 children has showed that the inter-item reliability, using Cronbach’s alpha coefficients (r), is excellent (above 0.90) for most of the subtests, and satisfactory (0.73 and 0.68) for Word and Digit spans. The study has shown that the correlations are 0.92, 0.93, 0.73, 0.68, 0.96, 0.90, and 0.95 respectively across all ages. Further, split-half reliability coefficient alphas were calculated using Spearman-Brown formula. Stability coefficients for the subtests ranged from 0.71, and 0.94 (Waqfi & Kilani, 1998).

The Diagnostic Scale of Arabic Language Basic Skills (Waqfi, 1997a)

This is a diagnostic scale which covers a comprehensive range of topics in Arabic language skills. It is designed to test the listening comprehension, oral expression, reading and writing skills at a basic level of most children between the ages of 6 and 15 years. However, seven subtests were extracted from this diagnostic test, which allow year-on-year testing as each level spans more than one grade-level grouping. The seven subtests are: (1) Vocabulary Recognition, (2) Reading Different Vocabulary, (3) Reading Similar Vocabulary, (4) Reading Comprehension Passages, (5) Listening to Comprehension Vocabularies, (6) Listening to Comprehension Passages, (7) Spelling and Dictation. These seven subtests were categorized into one of three learning aspects: (1) Reading Ability: this contains four subtests, namely, Vocabulary Recognition, Reading Different Vocabulary, Reading Similar Vocabulary and Reading Comprehension Passages; (2) Listening Ability: this examines the extent to which the student can comprehend information to which he/she has listened. It contains two subtests: Listening to Different Vocabulary and Listening Comprehension Passages; and (3) Spelling and Dictation: this area is represented by the graded Spelling and Dictation subtest (Waqfi, 1997a). The Scale has been correlated significantly with a sample of students’ achievement in Arabic
language, and showed high inter-correlations, particularly in Reading Vocabularies, Passage Comprehension, Listening Comprehension Vocabularies and Spelling, which provides evidence for the construct-related validity of the test. The predictive validity of the same edition has been thoroughly investigated. The Scale’s manual reports two main types of reliability measure for the test: stability (parallel forms) reliability, and internal consistency. The correlation coefficient between the parallel forms A and B on the number of children’s reading incorrect words (on all of the vocabulary scale series) suggests high stability between 0.65 and 0.89 at all grade levels. Also, the results of the correlation coefficient between the two forms on the number of students’ reading incorrect Different Vocabularies vary between 0.38 and 0.72, whereas it is between 0.34 and 0.74 for Reading Similar Vocabularies (Waqfi, 1997).

**Data analysis**

In order to address the study’s questions, various data analyses were conducted. The analyses for the whole group of 30 students were conducted using independent t-tests. Analyses for dynamic mathematics assessment and all visual and auditory perceptual skills tests were conducted using the paired sample t-tests. Moreover, literacy language delay was obtained and compared statistically using the Mann-Whitney U-Test. This non-parametric test was used as an alternative to the equal-variance t-test, as it is safer to employ this substitute test when sample sizes are small and the assumptions of normality and homogeneity are not valid.

**Results**

This section presents the key findings of the research, which, in addition to the discussion section, answer the research questions presented in the research design.

**Teacher nomination**

By comparing the number of students who were nominated by their teachers as ‘dual-exceptional’ learners (N = 52 students), with the number of students who were identified through psychological and dynamic assessment (n = 30 students), it appears that 57.6% of teachers’ nominations were accurate, whereas 42.4% were incorrect. There can be found in this study, therefore, a wide variation between teacher judgments and objective measures. Also, Arabic language and mathematics teachers showed a broad inter-individual variance in the accuracy of their nomination. Consequently, the accuracy of the three primary schools’ nominations varied between 33.3% and 80%.

**Parents’ and teachers’ identification**

The outcomes of the interviews stressed the essential contribution of parents in providing information about the familial, physical, psychological, and educational histories of the students. Further, they were the chief source of information about the unusual behavioral patterns of their dual-exceptional children. Teachers were found to be less able to identify these behavioral patterns, but more capable than parents of identifying students’ learning difficulties and/or even their mathematical giftedness. According to the parents, about three-quarters of their dual-exceptional children tended to have unusual behavioral patterns, such as withdrawal, anger, hostility, being overly affectionate or overly sensitive, while teachers reported that only one-quarter of students had these patterns. Also, while more than one-third (37.9%) were reported by parents to show emotional tension, fear, irritation or lack of confidence, teachers reported that the percentage was less than one-third (30%). However, parents reported, like teachers, that girls tended to show these behavioral patterns more than boys.

On the other hand, while teachers reported that the 30 identified students were suspected of having learning difficulties together with their high mathematical abilities, parents identified those children according to five subgroups: (a) about half of the students (15 out of 29) were identified as mathematically gifted but without their learning difficulties being recognized; (b) 2 out of 29 students were not identified as mathematically gifted but their learning difficulties were recognized; (c) around one-third (10 out of 29) of the students were neither recognized as mathematically gifted nor as having learning difficulties; (d) 2 out of 29 students were recognized as mathematically gifted with
learning difficulties; (e) the reports of two parents indicated that their children were misdiagnosed with some other problems or disorders (e.g. attention deficit hyperactivity disorder [ADHD], emotional problems, or slow learning).

**Analysis of the WISC-III-Jordan cognitive factors**

Means, standard deviations and ranges for the subtest scaled scores were computed and are presented for the two groups in Table 1. The WISC-III-Jordan subtest scores of the MG/LDs and Average-IQ/LDs students were compared to determine whether there were any significant differences between the two groups. The independent sample *t* tests indicated that there were significant group differences for the Comprehension [*t* (50) = 5.42, *p* < .01], Arithmetic [*t* (50) = 6.03, *p* < .01], Vocabulary [*t* (50) = 4.57, *p* < .01], Picture Completion [*t* (50) = 4.46, *p* < .01], Information [*t* (50) = 6.13, *p* < .01], Similarities [*t* (50) = 6.65, *p* < .01], Block Design [*t* (50) = 4.01, *p* < .01], and Picture Arrangement [*t* (50) = 5.33, *p* < .01] subtests. On the other hand, the independent sample *t*-tests indicated that there were no significant group differences for the Coding [*t* (50) = 1.72, *p* = .092] and Object Assembly [*t* (50) = 1.84, *p* = .071] subtests.

**Table 1:** Means and standard deviations of WISC-III-Jordan subtest scaled scores for MG/LDs sample and average-IQ/LDs group.

<table>
<thead>
<tr>
<th>WISC-III-Jordan</th>
<th>MG/LDs (n = 30)</th>
<th>Average-IQ/LDs (n = 22)</th>
<th>Independent sample <em>t</em>-tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subtests</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Comprehension</td>
<td>15.23</td>
<td>1.76</td>
<td>12.22</td>
</tr>
<tr>
<td>Arithmetic</td>
<td>14.87</td>
<td>1.87</td>
<td>11.73</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>14.67</td>
<td>2.17</td>
<td>11.59</td>
</tr>
<tr>
<td>Picture Completion</td>
<td>13.97</td>
<td>2.06</td>
<td>10.81</td>
</tr>
<tr>
<td>Information</td>
<td>13.37</td>
<td>1.47</td>
<td>10.59</td>
</tr>
<tr>
<td>Similarities</td>
<td>13.27</td>
<td>1.70</td>
<td>9.68</td>
</tr>
<tr>
<td>Block Design</td>
<td>12.40</td>
<td>2.13</td>
<td>9.90</td>
</tr>
<tr>
<td>Picture Arrangement</td>
<td>12.20</td>
<td>2.16</td>
<td>9.00</td>
</tr>
<tr>
<td>Object Assembly</td>
<td>11.40</td>
<td>2.04</td>
<td>10.22</td>
</tr>
<tr>
<td>Coding</td>
<td>10.07</td>
<td>1.46</td>
<td>9.31</td>
</tr>
</tbody>
</table>

* Significant at level *p* < .05 ** Significant at level *p* < .01

Table 2 reports means and standard deviations of Verbal, Performance and Full-Scale IQ Indices scores for the present dual-exceptional learners sample and also the Average-IQ group. The results show that there were significant differences for the three IQ Indices scores as follows: Verbal Scale IQ [*t* (50) = 9.49, *p* < .01], Performance Scale IQ [*t* (50) = 6.85, *p* < .01], and Full-Scale IQ [*t* (50) = 11.04, *p* < .01]. In general, the data in Table 4 show that the composite IQ scores, Verbal, Performance and Full-Scale, of the Average-IQ group were generally lower than the dual-exceptional sample.

**Table 2:** Means and standard deviations of WISC-III-Jordan scaled indices scores for MG/LDs sample and average-IQ/LD group.

<table>
<thead>
<tr>
<th>WISC-III-Jordan</th>
<th>Dual-Exceptional Group (n = 30)</th>
<th>Average-IQ Group (n = 22)</th>
<th>Independent sample <em>t</em>-tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ Indices</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Verbal-Scale IQ</td>
<td>126.77</td>
<td>5.91</td>
<td>107.60</td>
</tr>
<tr>
<td>Performance-Scale IQ</td>
<td>114.03</td>
<td>6.56</td>
<td>99.64</td>
</tr>
<tr>
<td>Full-Scale IQ</td>
<td>122.57</td>
<td>3.17</td>
<td>104.32</td>
</tr>
</tbody>
</table>

* Significant at level *p* < .05 ** Significant at level *p* < .01

Table 3 presents the WISC-III-Jordan scatter/range indices for the dual-exceptional sample and the Average group. The analysis of the subtest scatter/range indices results indicates that the mean VIQ-PIQ discrepancy of 12.73 points for the dual-exceptional sample is more than one and a half times the value of 7.95 points for Average-IQ students, but it is not significantly greater than the Average-IQ mean [*t* (50) = 1.72, *p* = .092].
Table 3: Comparisons between WISC-III-Jordan scatter indices for MG/LDs sample and average-IQ/LDs group.

<table>
<thead>
<tr>
<th>WISC-III-Jordan Scatter Indices</th>
<th>Dual-Exceptional Sample (n = 30)</th>
<th>Average-IQ Group (n = 22)</th>
<th>Independent sample t tests (df = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Difference</td>
<td>SD</td>
<td>Mean Difference</td>
</tr>
<tr>
<td>(VIQ-PIQ) Discrepancy (Regardless of direction)</td>
<td>12.73</td>
<td>11.04</td>
<td>7.95</td>
</tr>
<tr>
<td>(VC-PO) Discrepancy</td>
<td>8.63</td>
<td>10.90</td>
<td>5.91</td>
</tr>
<tr>
<td>Verbal Scaled Score Ranges</td>
<td>4.40</td>
<td>1.73</td>
<td>4.50</td>
</tr>
<tr>
<td>Performance Scaled Score Ranges</td>
<td>5.57</td>
<td>2.27</td>
<td>5.45</td>
</tr>
<tr>
<td>Full-IQ Scale</td>
<td>7.70</td>
<td>1.84</td>
<td>6.68</td>
</tr>
</tbody>
</table>

* Significant at level p < .05 ** Significant at level p < .01

Mathematical giftedness

The findings in Table 4 show the mean and standard deviation values of the dynamic mathematics tests for the dual-exceptional sample. There was a statistically significant difference, as measured on the scale of Dynamic Mathematics Assessment, between pre-test and post-test [t (29) = 25.24, p < .01]. The findings also show a large Cohen’s effect size (d = 5.06), and stet correlation (r =0.93), which indicate that the difference has high practical significance. Given the relatively brief instruction provided, the impressive degree of learning evidenced by this result indicates that this group of students was indeed highly capable of learning novel mathematical problem-solving, and responded very effectively to the instruction provided.

Table 4: Comparison of the Dynamic Mathematics Pre- and Post-Test scores for the Dual-Exceptional sample.

<table>
<thead>
<tr>
<th>Dynamic Mathematics Tests</th>
<th>Min</th>
<th>Max</th>
<th>M</th>
<th>SD</th>
<th>Paired t test (df = 29)</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics Pre-test</td>
<td>8.00</td>
<td>14.00</td>
<td>10.55</td>
<td>1.49</td>
<td>25.24 **</td>
<td>5.06</td>
</tr>
<tr>
<td>Mathematics Post-test</td>
<td>15.0</td>
<td>20.0</td>
<td>17.63</td>
<td>1.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematical Learning Progress</td>
<td>4.50</td>
<td>10.50</td>
<td>7.08</td>
<td>1.54</td>
<td>25.24 **</td>
<td>0.93</td>
</tr>
</tbody>
</table>

* Significant at level p < .05, ** Significant at level p < .01, M = Mean, SD = Standard Deviation, r = Correlation

Auditory and Visual Perceptual Skills

Table 5 reports the numbers and percentages of girls and boys according to their skills and abilities (good = high average, above average or competent; poor = low average, below average or incompetent). This table is based on many discussions in the relevant literature referring to two broad subtypes: auditory dyslexia and visual dyslexia (Johnson & Myklebust, 1967). Whilst researchers have generally agreed on the importance of the roles of phonological processes and memory in dyslexia, for some years the issue of subtypes of dyslexia has been the subject of controversy. The individual with visual dyslexia tends to have problems with visual discrimination, visual memory, visual sequencing, visual analysis, left-right scanning and rapid visual recognition of words. The individual with auditory dyslexia tends to experience difficulty with discriminating speech sounds, sound blending, auditory sequencing and serial memory, and phonological awareness (Singleton, 2000, 2006).

The results showed that a total of 40% of the MG/LD sample were poor in Auditory Perceptual Skills but had good Visual Perceptual Skills, while only 6.7% were poor in the Visual Perceptual Skills but had good Auditory Perceptual Skills. In addition to this result, a total of 40% had poor Auditory-Visual Perceptual Skills, and only 13.3% of the sample was good in terms of both skills. The results also showed that 26.7% of the students were poor in Auditory Short-Term Memory but good in Visual Short-Term Memory; only 3.3% were poor in Visual Short-Term Memory but good in...
Auditory Short-Term Memory; a majority of 63.3% was poor in both types of memory, while a total of 6.7% only were good in both.

Table 5: Numbers and percentages of girls and boys from the MG/LD sample in the perceptual skills areas.

<table>
<thead>
<tr>
<th>Categories</th>
<th>MG/LD Sample (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td><strong>Perceptual Skills</strong></td>
<td></td>
</tr>
<tr>
<td>Poor Auditory &amp; Good Visual Perceptual Skills</td>
<td>9</td>
</tr>
<tr>
<td>Poor Visual &amp; Good Auditory Perceptual Skills</td>
<td>0</td>
</tr>
<tr>
<td>Poor Visual &amp; Auditory Perceptual Skills</td>
<td>4</td>
</tr>
<tr>
<td>Good Visual &amp; Auditory Perceptual Skills</td>
<td>3</td>
</tr>
<tr>
<td><strong>Short-Term Memory</strong></td>
<td></td>
</tr>
<tr>
<td>Poor Auditory ST-M &amp; Good Visual ST-M</td>
<td>8</td>
</tr>
<tr>
<td>Poor Visual ST-M &amp; Good Auditory ST-M</td>
<td>1</td>
</tr>
<tr>
<td>Poor Visual &amp; Auditory ST-M</td>
<td>19</td>
</tr>
<tr>
<td>Good Visual &amp; Auditory ST-M</td>
<td>2</td>
</tr>
</tbody>
</table>

It is noticeable that the main points to emerge from this analysis were the relative weakness in Auditory and Visual Short-Term Memory, noted above, and the relative weakness of overall Auditory Perceptual Skills in relation to Visual Perceptual Skills, as illustrated in Figure 1.

Figure 1: Bar-Graph illustrating the mean scores in auditory and visual perceptual skills and auditory and visual short-term memory for the MG/LD sample.

The Arabic Language Basic Skills

Table 6 presents the grade average delays, standard deviations and Mann-Whitney U-Test results of the girls and boys in the Arabic Language Basic Skills tests and its areas. The results reported in Table 6 show that the girls and boys in the sample had a delay in all of the six subtests and the three language areas of the scale. The findings also showed that there were statistically significant differences between the two groups in their literacy language delay, with the boys showing consistently greater delays. It is noticeable that boys tended to show greater delay than girls in all of the literacy language subtests and areas. The least difference in mean delay was found in the Listening Comprehension Vocabularies test (only significant at the .05 level) and this was the area of mean delay for both genders.
Table 6: Comparisons of the mean grade delay in the Arabic Language Basic Skills Tests for boys and girls.

<table>
<thead>
<tr>
<th>Literacy Language Tests and Areas</th>
<th>Gender</th>
<th>Mean Grade Delay</th>
<th>D</th>
<th>Mean Rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tests</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary Recognition</td>
<td>Girls  6</td>
<td>1.19</td>
<td>95</td>
<td>11.69</td>
<td>51.0</td>
<td>2.61</td>
</tr>
<tr>
<td></td>
<td>Boys 14</td>
<td>2.50</td>
<td>.47</td>
<td>19.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.83</td>
<td>.21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Different Vocabulary</td>
<td>Girls 6</td>
<td>1.06</td>
<td>96</td>
<td>11.34</td>
<td>45.5</td>
<td>2.85</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>2.42</td>
<td>.21</td>
<td>20.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.73</td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Similar Vocabulary</td>
<td>Girls 6</td>
<td>1.44</td>
<td>85</td>
<td>11.19</td>
<td>43.0</td>
<td>2.95</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>2.86</td>
<td>.28</td>
<td>20.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.13</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Comprehension Passages</td>
<td>Girls 6</td>
<td>1.56</td>
<td>.93</td>
<td>10.28</td>
<td>28.5</td>
<td>3.59</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>3.21</td>
<td>.14</td>
<td>21.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.37</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening Comprehension Vocabularies</td>
<td>Girls 6</td>
<td>.69</td>
<td>.42</td>
<td>12.13</td>
<td>58.0</td>
<td>2.31</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>1.79</td>
<td>.49</td>
<td>19.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.23</td>
<td>.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening Comprehension Passages</td>
<td>Girls 6</td>
<td>1.06</td>
<td>.73</td>
<td>10.81</td>
<td>37.0</td>
<td>3.36</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>2.21</td>
<td>.83</td>
<td>20.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.63</td>
<td>.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spelling Passage &amp; Dictation</td>
<td>Girls 6</td>
<td>1.06</td>
<td>.21</td>
<td>11.16</td>
<td>42.5</td>
<td>2.94</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>2.86</td>
<td>.55</td>
<td>20.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.93</td>
<td>.41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Ability</td>
<td>Girls 6</td>
<td>1.31</td>
<td>.64</td>
<td>10.06</td>
<td>25.0</td>
<td>3.64</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>2.75</td>
<td>.10</td>
<td>21.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.02</td>
<td>.90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening Ability</td>
<td>Girls 6</td>
<td>.88</td>
<td>.96</td>
<td>11.31</td>
<td>45.0</td>
<td>2.83</td>
</tr>
<tr>
<td></td>
<td>Boys 4</td>
<td>2.00</td>
<td>.02</td>
<td>20.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.43</td>
<td>.97</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at level $p < .05$, ** Significant at level $p < .01$

Two case study profiles

This section presents two case study profiles. The reason for choosing them is because they show different types of characteristics and each case received a different teaching program. In addition, while Naseem was recognized by his parents and teachers as a MG/LD student; Salwa’s parents recognized only her high mathematical abilities. All names used are pseudonyms.

Case study 1: Naseem

Naseem was 11 years and 5 months old when he first was evaluated in a sixth-grade class. He lives at home with his mother, father and siblings in a socio-economically advantaged area. His father is constantly away from home as a part of his job as engineer on a ship. His mother is a housewife who holds a higher diploma degree in English literature. Naseem and his parents and siblings are all right-handed. Naseem is the eldest boy of two brothers (10 years and 6 years old), and one sister (one year old). He has not been evaluated by any private psychologist or by the learning difficulty school diagnostician as having learning difficulties.

Naseem attended a kindergarten (nursery school) at the age of 4 years. He entered the first grade in a co-educational public school when he was 6 years and 1 month old and attended this school until the fourth-grade. Within the present research, Naseem appeared to be a gifted student in mathematics with well-developed higher-order thinking skills.

Naseem’s Arabic teacher reported that “he has reading difficulties especially in dictation”. According to his teacher, these difficulties were affecting his self-confidence. Sometimes, he receives
special help with dictation at school, and once he finishes the work correctly, he is clearly very relieved. His mathematics teacher reported that “his mathematical achievement is not constant, but I suspect that he has high [mathematical] abilities”. Both Arabic and mathematics teachers agreed that “Naseem is a quiet and well-behaved boy who has good relations with his classmates, but he fears exams and failure badly”.

Naseem has a very good relationship with his mother, as she provides a relaxed environment for him, although he “needs some prompting to do homework”. According to his mother, Naseem is “a very sensitive child and much attached to his father”, and she described her son as a “very sensitive, quiet, and unsociable boy”. He does not have friends and he becomes very angry when his parents invite his classmates or neighbors to play or study with him. His mother reported that “he can solve any hard mathematical problem at home, but cannot solve similar ones in school exams”. Naseem’s special interests are judo, football, and using the computer; in fact he spends most of his day time working on the computer.

Through long-term observation in the course of the multidisciplinary evaluation, Naseem appeared to be a very quiet, polite, shy and self-conscious boy. He listens carefully to instructions, but rarely smiles or shows facial expressions. He is a perfectionist when it comes to examination; he tries to solve each problem given to him as perfectly as possible. This has resulted in his underachievement in terms of his IQ score.

Naseem adjusted well to the testing situations, and during the test sessions, he was cooperative and generally followed the directions carefully. According to the WISC-III-Jordan results within the present study, his Full-Scale IQ score indicated that he is a ‘superior’ student, with a Full IQ of 126. The test showed a discrepancy of 13-points between the two scales of the test (Verbal IQ 130, Performance IQ 117). What was glaringly apparent was that, in spite of this score, Naseem’s Coding raw score was 35, which is well below the average for his chronological age (Wechsler, 1996), although on all other subtests he scored very highly. Coding indicates the speed at which new tasks are learned, as well as visual memory, motor coordination, perception, and persistence. However, in this case the scale indicated that arithmetic is Naseem’s major strength.

A dynamic assessment method was used to determine whether Naseem exhibited high performance in mathematics. In the pre-test, Naseem solved most of the problems and scored 14-points, which is well above the expected score for average students in sixth grade. In the intervention phase, Naseem received three sessions (45 minutes each) of teaching with a group of students. The teaching sessions were particularly related to the nature of the problems in the test. The sessions concentrated on the questions particularly related to the nature of the pre-test. In the post-test, he solved all of the questions correctly with not a single error. According to the score interpretation, Naseem’s score set him well above the average level. In this teaching session, Naseem showed himself to be a quick learner who listened to the instruction with high levels of concentration. He was eager to learn new concepts of geometry.

Naseem was assessed on the Perceptual Skills Tests and the Scale of Arabic Language Literacy Basic Skills. The profile indicated a noticeable delay of one grade level in the Reading Passage test; by contrast, there were strengths in terms of Vocabulary Recognition, and Listening to Different Passages. Naseem showed relative weakness in perceptual skills subtests, such as Visual Organization and Visual-Motor Coordination. In contrast, he showed relatively high strength in Auditory Discrimination, Visual-Motor Integration and Visual Analysis Skills. He also demonstrated above-average Visual Perceptual Skills, and below-average Auditory Perceptual Skills, as well as below-average Auditory and Visual Short-Term Memory skills.

There is no doubt that Naseem is intellectually and mathematically gifted. Although he shows good use of written language, his poor fine motor skills and reading and listening difficulties affect his performance. Naseem’s high intellectual and mathematical abilities, as well as his spelling and writing difficulties, are clear to his parents and school.
Case study 2: Salwa

Salwa was 10 years and 11 months when she was first evaluated at fifth grade level. She lives at home with her parents and seven siblings (four girls and three boys), and is the second among her brothers and sisters whose ages range from 1 year to 13 years and 1 month old. No illness or medication was reported when Salwa’s mother was pregnant with her. All of the family members, including Salwa, are right-handed. Arabic language is the spoken language at home. Salwa’s father is an accountant who holds a higher diploma degree in accounting, while her mother is a housewife who holds the general Jordanian secondary certificate (Tawjehi).

Salwa receives only a regular programming in all the subjects of the Jordanian curriculum in a public-school setting. She attended a nursery school (kindergarten) for one year before entering the first-grade class at a single-sex girls’ school at the age of 6. According to her mother, Salwa has “a very good, warm, loving, and happy relationship with her parents, brothers and sisters”. She gets on better with female rather than male playmates, and she has six to ten female friends who are aged between 10 and 16 years old. She is an “independent but overly sensitive and affectionate girl”, whose special interests are art, drawing, reading novels and sports.

Salwa’s mother reported that “her mathematics teacher evaluated her as a student who has high mathematical abilities”. However, she does not consider her daughter to be a student with learning difficulties. No previous school assessment has reported that she has learning difficulties. Her Arabic and mathematics teachers agreed that she is “a shy girl who has fear and lack of confidence”. Her Arabic language teacher indicated that “she is a low achiever, which is an effect of her fear of exams”, although her mathematics teacher recognized Salwa’s “high mathematical abilities”, in spite of her “low school achievement in mathematics”.

Salwa was described by all sources as “a very quiet and cooperative” youngster. She is shy when she meets new people, therefore to avoid the effects of her “shy personality” on the scores of the tests, the multidisciplinary team opened a discussion with her about her family and school in order to familiarize her with the examiners.

Salwa listened carefully to the instructions in the test situations. Her strong reaction was revealed by her facial expressions when she was unable to answer questions. Salwa obtained a Full-Scale IQ of 123 on the WISC-III-Jordan, which places her in the 96th percentile, which falls in “the superior range” of intelligence. The Scale showed a significant discrepancy of 24 points between the Verbal and Performance IQ Scales, with her Verbal IQ Scale of 133 at the 98.6th percentile level, falling within the very superior range, whilst her Performance IQ of 109 was at the 73rd percentile level, and thus in the average range. Salwa scored well below average for Object Assembly, and average on Coding and Picture Arrangement, although she scored very highly in all other seven subtests. Object Assembly measures a child’s ability to make a whole out of its individual parts, as well as visual analysis skills and ability to construct objects, while Picture Arrangement shows her attention to visual detail, sequential reasoning and ability to create the whole from its parts. Coding indicates the speed at which new tasks are learned, as well as visual memory, motor coordination, perception, and persistence. The low scores may be partly explained by the fact that Salwa has specific writing difficulties. In the arithmetic subtest, Salwa scored well above average.

A dynamic test-teach-test method was used to determine whether Salwa exhibited high performance in mathematics. In the pre-test, Salwa was unable to solve some written questions and scored only 9.5 points (out of 20), which is on average score for students at fifth-grade level. In the intervention phase, Salwa received three sessions (45 minutes each) of teaching with a group of students. The sessions concentrated on the questions that Salwa and the other students had been asked to answer in the pre-test, which involved problem solving of time, money, geometry, algebra, and advanced operations. Throughout the teaching session, it was noticeable that Salwa preferred to solve the problems mentally without showing how she had reached the solutions. Salwa was taught how to show how she had worked out the solution to the problems on papers. In the post-test, she answered
all of the questions and showed a significant improvement in solving the problems correctly by scoring 19.5 points (out of 20). According to the interpretations of the scores, her achievement was well above the average level.

Salwa was assessed using the Perceptual Skills Tests and the Scale of Arabic Language Literacy Basic Skills. The profile indicated a noticeable delay of ½ grade levels in the Vocabulary Recognition, Listening Different Vocabulary and Reading Passages subtests. She also showed a delay of one grade level in Reading and Listening Abilities. She was also relatively weak in Perceptual Skills Areas, such as Visual Organization and Visual-Motor Coordination. In contrast, she showed relative strengths in the Auditory Discrimination and Visual Motor Integration subtests. The latter subtest distinguishes between students with visual motor problems and those with exceptional copying skills. Salwa showed average skills on Auditory and Visual Short-Term Memory.

Salwa’s example reveals that her reading difficulties affect her performance in all areas and seem to override her high mathematical and intellectual ability. However, both her parents and the school were aware of her high mathematical ability, but not of her learning difficulty.

Conclusion and discussion

The findings revealed that using multiple criteria of assessment instruments gives a more complete picture of the student’s cognitive abilities and difficulties as indicated in previous studies (e.g. Al-Hroub, 2010; Lazarus, 1989). Although no single source was able solely to identify the ‘mathematically gifted students with learning difficulties’, each single source complemented the others, and it was helpful to use all of the sources together. For example, it was not possible to screen or identify MG/LD students without considering teacher nominations as the first element of the identification process. Also, historical data, a student’s school records, psychological reports, teacher and parent interviews, and task analysis of the student’s paperwork not only provided supplementary information, but also clarified the quantitative data relating to the student participants (Al-Hroub, 2010). Moreover, the assessment profiles and case histories developed for each participant presented a complete picture of the educational, familial, medical, and psychological backgrounds. Furthermore, the findings regarding the mathematical achievements in terms of the dynamic interaction between the students and their opportunity to learn added valid results to the psycho-educational assessment involving the WISC-III-Jordan and other learning difficulties tests.

More specifically, parents provided important information about the behavioral characteristics of their children. They were found to be better able to identify these behavioral characteristics than teachers. On the other hand, parents were found less able than teachers to identify learning difficulties and/or mathematical giftedness in their children. According to parent interviews, MG/LD students can be categorized into the following five subgroups: (a) mathematically gifted with hidden LDs; (b) LD students with hidden mathematical giftedness; (c) students with hidden mathematical giftedness and LDs (d) students with recognized mathematical giftedness and LDs; (e) students who are misdiagnosed as slow learners or ADHD students. Thus the findings revealed the existence of two additional subgroups to Baum’s classification, as follows:

- **The fourth subgroup: students whose giftedness and learning difficulties are recognized.** This subgroup has been identified by some teachers and parents who have received no rigorous guidance as to how to serve such students, for example, the case of Naseem, although this subgroup may be considered the narrowest at present.

- **The fifth subgroup: students who are misdiagnosed.** This subgroup is comprised of students who have been diagnosed with some other problem or disorder (e.g. attention deficit hyperactivity disorder (ADHD), emotional problems, slow learning, autism, etc.) and it is believed that because they are receiving inappropriate support, this subgroup is the one most at risk.

As all of the subgroups are vary over time rather than being fixed, their size is unequal and is always subject to change. To conclude, there are strong indications that cooperation and partnership between parents, teachers, and the inspector of gifted education have played a major role in
identifying the target students in the present study. Therefore providing in-service training for
teachers, the school community, and parents would raise their awareness of the definitions,
identification, and characteristics of dual-exceptional students. However, training of teachers would
increase the number of referrals of this population to special education and narrow down the other
subgroups in favor of the fourth subgroup. The findings of this study correspond with those of Al-
Hroub’s (2010) research in the UK on five students from Years/Grades 5 and 6, who were identified
as MG/LD students, in three state schools in Cambridgeshire. While three students were found to fit
two of the subgroup categories that were suggested by Baum (1990) exclusively, two students, one
boy and another girl, did not fit these subgroups as their mathematical abilities and learning
difficulties had been recognized by their regular classroom teacher and the headteacher.

The analysis of the cognitive and perceptual characteristics of the MG/LD bears certain
similarities to, and differences from those previously cited in the literature. Some of these similarities
and differences support findings from previous work, but in other cases the claims made in the earlier
studies are not supported by the findings resulting from the research into this particular sample.
However, many of the differences are not surprising as the present sample is represents the
mathematically gifted with learning difficulties, and not those students who are gifted in all areas. For
example, there was a clear tendency for Verbal IQ (VIQ) to be higher than Performance IQ (PIQ)
among most MG/LDs. This supports the proposal that gifted children (e.g. the MG/LDs sample) tend
to have VIQ > PIQ (Al-Hroub, 2010; Kaufman, 1994), but it contradicts the PIQ > VIQ as an
indicator of LDs. These findings are also of interest in the context of the relationship between
dyspraxia and dyslexia. Relatively low VIQ has been considered an indicator of dyslexia and
relatively low PIQ of dyspraxia (Wechsler, 1991). However, the findings do not support Silverman’s
(1983) contention that a 7-point scatter between highest and lowest subset scores in a WISC-R may be
a good indicator of the existence of LDs in gifted students.

In addition, the MG/LD students showed high verbal and visual abilities across the WISC-III-
Jordan and perceptual skills subtests. These results suggest that such students, on average, possess
harmonic mathematical abilities according to Krutetskii’s (1976) classification of mathematically
gifted students. Presmeg (1986) and Straker (1982) report that the harmonic type of mathematically
gifted student is most likely to possesses mathematical aptitude.

We can also conclude that the MG/LD sample demonstrate weaker Auditory Short-Term
Memory than Visual Short-Term Memory. For example, a total of 40% of the MG/LD sample showed
‘Poor Auditory and Good Visual Perceptual Skills’, which could be described as auditory dyslexia,
while only 6.7% fell into the category of visual dyslexia as students with ‘Poor Visual and Good
Auditory Perceptual Skills’. This left a large percentage of about 40% with mixed difficulties (both
visual and auditory perceptual problems) and 13.3% of the sample who were good in both skills and
had no perceptual problems. In addition, the MG/LD sample tended to have significantly higher
Visual Short-Term Memory (average skills) than the Auditory Short-Term Memory (below-average
skills). This finding supports the suggestion that short-term memory is the key factor in dyslexic
students or students with learning difficulties. Noticeably, reading ability was shown as the weakest
ability for all of the students, regardless of their gender. This is consistent with the findings of
previous studies, which indicates that reading difficulties represent the most common kind of specific
learning difficulties (Hornsby, 2000).

In addition the results confirm to the substantial evidence that both phonological processing
(Auditory Perceptual Skills) and short-term memory are important factors to be considered in relation
to students with specific learning difficulties (Singleton, 2000). It is now well established that
phonological processing ability is very closely related to reading development. In general, it is argued
(a) that phonological processes underpin the development of a phonological decoding strategy in
reading and (b) that working memory plays a significant role in this strategy, enabling constituent
sounds and/or phonological codes to be held in short-term store until they can be recognized as a word
and that word’s meaning can be accessed in the long-term memory (Singleton, 2000, 2006).
A comparison between the two study groups of the rank ordering of performance in individual WISC-III-Jordan subtests did not show any strong differences. Most of the subtest averages were close to each other. Accordingly, there is no evidence that rank ordering of WISC-III-Jordan subtests is an effective method of identifying students with G/LDs, but it may be concluded that because the two study groups both had LDs, this similar rank ordering could therefore be an indicator of a LD.

Finally, the psychometric test scores present only a partial picture; therefore, the current research suggests that the method of dynamic mathematics assessment provides a clearer diagnosis of each student’s expected competence. The results demonstrated that dynamic measures are better predictors of pre-test and post-test mathematical improvement than either IQ or the initial static scores. Dynamic assessment gives the student the opportunity to transfer newly acquired skills to other similar situations (Brown & Ferrara, 1985; Kirschenbaum, 1998). Therefore dynamic assessment should be carried out in all the curriculum subjects by the regular-class teacher and/or the gifted/LDs support teacher. However, it is important to note that in line with Vygotsky’s theory, dynamic assessment methods should not be viewed as being in direct opposition to individually based static techniques such as IQ testing. In contrast, the current research suggests that researchers should be able not only to modify the administration of the standardized assessment of mathematics (e.g. The Diagnostic Scale of Mathematics Basic Skills), but also to benefit from standardized concrete hints, cues or gradual prompts in order to apply unstandardized mediation, and adapt the tasks to a hands-on, interactive pre-test–intervention–post-test format for unidentified exceptional children.
References


About the Author

Anies Al-Hroub is an Associate Professor of Educational Psychology and Special Education at the American University of Beirut (AUB), Lebanon. Al-Hroub completed his Ph.D. and MPhil in special/gifted education from the University of Cambridge and his MA (Special Education) and BA (Psychology) from the University of Jordan. He was selected as the British Academy Visiting Scholar to the Faculty of Education at the University of Cambridge in 2010. His publications appeared in leading international gifted and special education journals in addition to a book published titled ‘Theories and programs of education for the gifted and talented’. Al-Hroub research interests focus on gifted and talented education, dyslexia, dual-exceptionality, educational assessment, psychometric and dynamic assessment, counselling gifted and talented, metacognition and school dropout. He led a number of educational projects sponsored by UNRWA, Issam Fares Institute for Public Policy and International Affairs (IFI), USAID, the British Academy, and Welfare Association and served as consultant for UNESCO and UNICEF.

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Developing a Teacher Administered Anxiety Rating Scale Suitable for Five to Seven-Year-Old Children

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Abstract
This paper presents results of twin studies pertinent to the development of a rating scale designed for use by teachers to identify anxious and shy children, aged 5 to 7 years, in Kindergarten and Grade One. Currently, no instruments designed specifically for this purpose exist. Children experiencing difficulty with internalizing disorders such as anxiety, shyness, and behavioural inhibition represent a growing segment of the population (Merrell, 2001). Evidence indicates the educational, psychological, and emotional needs of these children are not being addressed (Barlow, 2002). Kindergarten and Grade One teachers were interviewed to find out if they recognized behaviours drawn from the literature on childhood anxiety disorders as shyness and anxiety. Information obtained was used to formulate, construct, and evaluate a rating scale to be administered by teachers. The paper includes an overview, literature review of the research on anxiety in young children, description of methods used to obtain salient information and a discussion regarding construction of the rating scale. Data for the two studies was obtained by both quantitative and qualitative methods. The first study employed semi-structured interviews with teachers and their completion of a prototype rating scale. The second study consisted of the administration of the scale and comparisons of its psychometric properties to other instruments. The paper concludes with a discussion of the results and limitations of the studies.

Introduction
Anxiety problems in children have become a subject of both professional and public concern during the past twenty years. Until the latter part of the nineteenth century, little attention had been devoted to these problems. Indeed, for the most part of the twentieth century, little consideration was given to these difficulties (Kendall, & Flannery-Schroeder, 1998). A widespread belief prevailed that certain internalizing disorders did not exist in children at all (Merrell, 2001). However, there is now a considerable body of research indicating these problems not only exist in children and are rather widespread, but are also among the most prevalent of psychiatric problems (Barlow, 2002; Biederman, Rosenbaum, Chaloff, & Kagan, 1995; Esau, Conradt, & Petermann, 2000; Kagan, Reznick, & Snidman, 1988; Last, 1993; Merrell, 2001; Rosenbaum, Biederman, Hirshfeld, Bolduc & Chaloff, 1991; Wittchen, Kessler, Pfister, & Lieb, 2000; Wittchen, Nelson & Lachner, 1998). Despite this, although research indicates young children may exhibit symptoms of anxiety disorder ranging from mild to severe, early intervention renders the disorder treatable (Chorpita, & Barlow, 1998; Rapee, 2001; Rubin & Burgess, 2001).

Distinguishing between normal anxiety and pathological anxiety
One major challenge here is establishing a diagnostic differentiation between “normal,” and pathological anxiety. There are three factors to consider when researching a topic such as anxiety. According to Barlow (2002),

Normal anxiety is limited in intensity and duration, and is associated with adaptive defenses. Anxiety is self-defeating or pathological when it is noticeable, intense, disruptive, and paralyzing, or when it triggers self-defeating defensive processes, also called symptoms. (p. 11)

Albano and Detweiler (2001) set out three extensive components that should be taken into account in differentiating social anxiety from social phobia in youth. These are:

i. Magnitude of the social fear(s) in the context of developmental expectations;
ii. Persistence of the anxiety-provoking cue; and

iii. Degree of interference in functioning across a variety of domains These three major factors help differentiate anxiety that is a regular experience in a child’s life from anxiety that is problematic or pathological.

Clearly it is the severity, frequency and duration of anxious feelings that distinguishes between what is normal and what is pathological and ultimately the degree to which the anxiety interferes with the daily life of the child. Essentially, the three factors can assist in determining if a child has an anxiety disorder. They also can assist in ruling out other problems that may appear to resemble social anxiety, such as mutism and daydreaming.

**Frequency, severity and duration**

Frequency refers to whether the child’s reaction to a fear inducing situation occurs often, usually described as happening more frequently than for other children of similar age (DSM IV, 1994). Severity refers to the effects the child’s reaction has on his or her daily life, in terms of the extent to which the anxiety disrupts his or her routine. Duration refers to the length of time the child has been experiencing negative reactions to stimuli he or she deems to be fearful or anxiety provoking. Obviously, if the child’s reaction occurred just one time, then there is little likelihood the child has an anxiety disorder. However, if the reaction of the child has been present for a considerable period of time, at least six weeks according to the DSM IV (1994), then the possibility of the child having an anxiety disorder is higher, and a subject of concern to all.

Social and performance anxiety is considered a normal human reaction in a variety of situations. For example, it is common for children to experience some anxiety in new and unfamiliar situations, e.g., entering a new school, meeting new people, and performing in front of the class. The goal of treatment for children with anxiety is not to eliminate it, especially in social and performance anxiety, but to minimize it so as to be more manageable in meeting the anxiety-provoking situation or person (Hope, Heimberg, Juster, & Turk, 2000).

**Statement of the problem**

This study is based on the fact that anxiety in young children may have strikingly negative effects on their daily lives (King, 1993; Silverman, LaGreca, & Wasserstein, 1995; Weems, Silverman, & LaGreca, 2000). It is also true that, although tests are available that include subtests or subsections with questions relating to internalizing behaviours, including anxiety, there is no test currently available which is both teacher administered and solely dedicated to the identification of anxiety in children aged five to seven years.

**Review of literature**

**Prevalency in children**

Anxiety disorders are among the most common mental health problems (Esau et al., 2000; Kagan, 1989; Kessler, McGonagle, Zhao, Nelson, Hughes, Eshleman, Wittchen, & Kendler, 1994). At one time, little information was available about the frequency of occurrence of mental disorders in the community. Recently, large-scale epidemiological studies have produced much information about the prevalence of these disorders, age of onset, and patterns of comorbidity (Kessler et al., 1994; Offord, Boyle, Campbell, Goering, Lin, &Wong, 1996; Roberts Attkisson, &Rosenblatt, 1998).

Kessler et al. (1994) undertook a study which “presented estimates of lifetime and 12-month prevalences of 14 DSM III-R psychiatric disorders from the National Comorbidity Survey (NCS), the first survey to administer a structured psychiatric interview to a national probability sample in the United States” (p.8). NCS data was obtained from interviews with 5388 people and conducted between 1990 and 1992. Kessler et al. (2005) presented data obtained from 4319 people and presented in the (2001-2003) NCS Replication. The interviews were primarily of face-to-face using diagnoses from the DSM IV.
Kessler et al. (2005) discovered the prevalence of mental disorders had not changed significantly in the years between 1990 and 2003. Rates went from 29.4 percent in 1990 to 30.5 percent in 2003. The mental disorders examined were anxiety disorders, mood disorders, and substance abuse.

It is normal for the percentages of the prevalence of anxiety disorders in children to vary from study to study because different assessment measures are involved. This does not mean we can’t or do not understand different anxiety problems in children. It just means that when different assessment techniques are used, slightly different results are obtained. Since children often meet the criteria for more than one anxiety disorder, some studies may just give an overall rate for anxiety disorders or list the most common disorders. Some disorders, such as Obsessive Compulsive Disorder (OCD), are not as common, so the numbers may not be reported, e.g., “Of 15 epidemiological studies, 11 estimate the prevalence of childhood anxiety disorders at greater than 10%” (Pine, 1994).

Roberts et al. (1998) reviewed recent studies and reported median prevalence rates of clinical disorders in the studies were 8% for preschoolers and 12% for preadolescents. Each anxiety disorder has its own distinct features; consequently, prevalence and frequency rates vary from one to another. Also, the few large-scale studies conducted to determine the proportion of the population suffering from psychological or psychiatric disorders have often overlooked children and youth (Merrell, 2001). Further, after reviewing previous studies on anxiety in children and adolescents, Morris & Kratochwill (1983) estimated the number of children affected by anxiety disorders to be 8% of the general population. Merrell disagreed. He felt this estimate is overstated, the true prevalence likely to be 3 - 4%.

**Age of onset**

One of the first reliable studies carried out to investigate the ages of onset of anxiety in young children, selected 368 participants for a 14-year longitudinal study (Giaconia, Reinherz, Silverman, Pakiz, Frost, & Cohen 1994). The children were from a community population rather than a referred group. Results from this study showed simple phobia to be the earliest of all disorders to manifest in children. Interestingly, the study found the foremost period of risk for developing a simple phobia reached its peak at ages two through five.

Although this study had many limitations, as ethnicity and socio-economic status were not sufficiently representative to enable generalizations to a large population to be made, its findings do indicate the need for the early identification of anxiety disorders.

Several studies have addressed the issue of the age at which children first begin to display symptoms of anxiety. They indicate separation anxiety disorder, avoidant disorders, social and simple phobias are the earliest most common disorders to manifest. One study reported the median age of onset as 10 years of age for phobias (Bourdon, Boyd, Ray, Burns, Thompson, & Locke, 1988). Other researchers have presented findings consistent with Bourdon et al.’s findings (Cohen, Cohen, Kasen, Velez, Hartmark, Rojas, Brooke, & Streuning, 1993; McGee, Feehan, Williams, Partridge, Silva, & Kelly, 1990; Verhulst, F. C. 1995).

**Etiology**

Various researchers have attributed different reasons for the etiology of anxiety disorders. The most notable theoretical views regarding sources have been grounded in research into social phobia and social anxiety (Hofmann & DiBartolo, 2001). This research, however, produced a great deal of helpful information in understanding the theoretical bases for the onset of these disorders and conceptualizations of their possible causes. These viewpoints can be considered from four perspectives: (1) biological, (2) behavioral, (3) cognitive, and (4) interpersonal (Hofmann & DiBartolo, 2001). It is important to note that it is by no means certain these causes act individually. It is likely some combination acting together bring about anxiety.
Implications of untreated anxiety

Studies of the onset of anxiety disorders indicate they often begin in early childhood or adolescence (Wittchen, et al. 1998 & 2000). It is only in recent years large community studies of the epidemiology of childhood disorders have become available (Shaffer, Fisher, Dulcan, Mina, Davies, Piacentini, Schwab-Stone, Lahey, Bourdon, Jensen, Bird, Canino, & Regier, 1996; Wittchen, et al., 1998). A variety of researchers have found anxiety disorders and symptoms of anxiety have implications for the development of emotional and behavioural problems in adolescence (Barlow, 2002; Biederman, Rosenbaum, Bolduc-Murphy, Farone, Gertsen, Meminger, Kagan, Snidman, & Reznick 1990; Patton, Carlin, Coffey, Wolfe, Hibbert, & Bowes, 1998; Pine, Cohen, Gurley, Brook, and Ma, 1998; Schatzberg, Samson, Rothschild, Bond, & Regier, 1998). Their research suggests untreated anxiety disorders in early childhood can lead to anxiety and depression in adolescence, which in turn, if left untreated, may lead to similar but more entrenched symptoms in adulthood. In fact, these studies present explicit verification that anxiety disorders have a tendency to continue into adulthood if there is no intervention to deal with them. Also, studies indicate that when anxiety disorders are ignored, and consequently left untreated, they often lead to the establishment of psychiatric disorders over time which then become more difficult to treat and to manage (Anderson, Williams, McGee, & Silva, 1987; Last, Perrin, Hersen, & Kazdin, 1992).

Difficulties with testing

The testing of young children, for whatever reason, is fraught with peril; and to do so runs the risk of further complicating an already delicate and complex situation. In 1987, the National Association for the Education of Young Children (NAEYC) issued a position paper on the use of standardized testing with children three through eight years of age. It reiterated the Standard for Educational and Psychological Testing (American Psychological Association, 1985) and specifically addressed the assessment of young children. The NAEYC argued that certain tests used for kindergarten screening are suspect, because the normal behaviour of young children is rather variable. In addition, it was noted young children might not be able to demonstrate what they know and what they can do because of problems in reading, writing, and responding. These problems, which could include such basics as, e.g., difficulty with pencil grip, lack of vocabulary, unfamiliarity with test requirements, and weak sustainability of attention, can apply to tests of all types. They not only include academic achievement tests, but also teacher-administered tests of any kind. Among these test instruments are surveys and rating scales, including those requiring direct input from children. According to Merrell (2001),

Despite the obvious advantages of using self-report instruments..., some concerns should also be considered. One concern involves the cognitive maturity that is required for a child to understand the demands of various self-report tests and to make accurate differentiations on response choices. Most experts agree that for typical children, it is very difficult for those younger than the age of 8 years to comprehend accurately and complete self-report instruments. (pp.47-49)

Since behavioural rating scales and self-report instruments are thought to be unreliable for very young children (National Association for the Education of Young Children, 1987), and as children often first begin to experience anxiety disorders in the social context of schooling, it is appropriate to focus on the role of the teacher in the early identification and prevention of anxiety disorders for children in Kindergarten and Grade One. Some of the most commonly administered psychological assessment forms include a self-report measure. However, the use of self-report measures for children from birth to age four is inappropriate for obvious reasons. Clearly their behaviours are not as easily determined at this age and it is difficult for young children to rate their own behaviours with any meaningful result (Campbell, & Rapee, 1996; National Association for the Education of Young Children, 1987). This is likely due to the fact that many young children who experience anxiety disorders begin to experience them in a social context where there are unfamiliar people and unfamiliar settings. Self-report measures are also inappropriate at this young age given they are unfamiliar with testing procedures, often lack both rudimentary skills such as the use of a pencil and the language necessary for reading, interpreting, and completing such an instrument.
Summary of challenges

Some of the challenges that need to be overcome in developing and designing an anxiety measure for young children are: the age of the children, the attitudes of the teachers to using such a measure, skepticism about the notion of anxiety in young children, and the need to establish all types of reliability and validity.

Children from five to seven years of age pose a problem for developing a rating scale in that a self-report scale likely would not be of much use. Children at this age are only just beginning to develop the ability to read and write. Consequently, their academic skills are unreliable. A rating scale, to be completed by their teacher, would overcome this difficulty. It would allow for an unobtrusive report with respect to a child who is suspected of having anxiety or shyness problems. An interview or observation is likely to produce further anxiety for children who are already experiencing uneasy feelings about the presence of a stranger in the classroom – perhaps even more a probability if the child were aware he or she is the subject of the observation. An interview leaves no doubt in the mind of the child that there is something amiss and he or she is the subject of investigation.

Teachers’ attitudes towards use of such a measure are a concern that has to be addressed. Many teachers are familiar with rating scales. However, they may need to be reassured use of one to identify an anxious child is going to be in the child’s best interests at such a young age. This might be accomplished by explaining the content of the scale, how the information will be used, and that the scale is valid and reliable. Also, teachers would have to be informed all results are confidential and assured that identified children fitting the profile of an anxious child will receive appropriate and timely treatment. Or, at least, that treatment options will be offered to the family.

Many other factors present challenges in the development of an anxiety measure. Measures employed currently are often too general to be applied for use in assessing anxiety in young children. Most measures are broadly based instruments which may contain a sub scale dealing with anxiety, but anxiety as such is not their purpose or focus. Most measures are also oriented towards older children, adolescents, and adults. Consequently, these instruments are not suitable for this study.

The purpose of this study is to develop an instrument designed specifically with young children from five to seven years of age in mind. Existing rating scales in wide use but not developed for use in schools with early years students include: The Behavior Assessment System for Children, the BASC (Reynolds & Kamphaus, 2004), the Child Behavior Checklist, the CBCL (Achenbach & Edelbrock, 1992); and the Conners Teacher Rating Scale, the CTRS-S (Conners, Sitarenios, Parker, & Epstein, 1998).

Significance of the studies

Young children spend a great deal of time with teachers. Teachers require as much knowledge about their students as they can possibly obtain in order to be able to successfully deliver the education needed. As a result they need to be brought into the early identification and intervention process. They play a crucial part in early identification and are often required to assist in an intervention plan for young children with anxiety. Therefore, the development of a valid and reliable rating scale for use by Kindergarten and Grade One teachers to identify young children aged 5 to 7 years with anxiety would be an important contribution to education.

The steps involved in developing an instrument suitable for the early identification of children at risk of developing anxiety will be presented. As these studies are intended to help educators develop a deeper understanding of young children experiencing problems of shyness, anxiety, and behavioural inhibition, it is anticipated the results will help provide a basis for better identification and determination of the educational, medical, and psychological interventions designed to best accommodate young children plagued by anxiety.
Purpose of the studies

Given no instruments focusing specifically on anxiety in children aged 5 to 7 years old which can be administered by teachers currently exist, the purpose was twofold. The first objective was to develop an instrument suitable for teachers identifying anxious, shy, or fearful children aged 5 to 7 years who may be prone to developing or already suffer from an anxiety disorder.

This instrument was designed in the form of a rating scale. In this study 25 kindergarten and grade one teachers were interviewed to ascertain what behaviours they recognize as shyness and anxiety in young children. The behaviours identified were framed in a manner consistent with the literature on childhood anxiety disorders. Information was obtained from teachers via administration of a prototype instrument called The Teacher Interview Questionnaire of Survey Items (TIQ). The information obtained from this preliminary form was evaluated to determine consistency with a test called The Teacher Administered Rating Scale of Anxiety in Young Children Aged Five to Seven Years (TRAC) (Coaching for Confidence Research Team, 2002).

The second objective was to analyze the psychometric properties of the TRAC. Analysis of the psychometric properties involved examining the reliability of the TRAC by comparing the results obtained by its completion by parents and teachers with three other well-known and widely used test instruments containing items related to anxiety.

Method

A mixed methods research approach was employed. Data are presented in a two-study format. The first study involved both quantitative and qualitative methods, including semi-structured interviews with teachers and completion of a prototype rating scale. The second study employed a quantitative method involving the administration of a revised version of the prototype scale from Study 1, and comparisons of its psychometric properties to other instruments.

Key theme-analysis.

A key theme-analysis was used to formulate common or emergent themes in the data. It proved valuable in endorsing the items appearing in the prototype rating scale (TRAC). Confirmation of items meant reconstruction of the Teacher Survey was unnecessary. It was interesting to note how teachers had many descriptions in common for anxiety in children. This commonality proved the validity of the emergent themes because an understanding of what constitutes anxiety and shyness appeared to be consistent within the group.

Study one

Participants

The twenty-five provincially certified full time Kindergarten and Grade One public school teachers participating in the study were either employees selected from one of three urban school divisions in Winnipeg, Manitoba, or one rural school division in Manitoba. Permission to conduct the research was obtained from the relevant parties concerned, the Education/Nursing Research Ethics Board (ENRB) Office of Research Services, the University of Manitoba, and the Health Research Ethics Boards Faculty of Medicine, University of Manitoba.

Instruments

Two instruments were used in the first study. They were developed to elicit teachers’ attitudes and concepts about childhood anxiety. The instruments were developed by the team from the Anxiety Disorders Clinic at St. Boniface General Hospital. Team members, all psychologists, had expertise in various areas of child behaviour in addition to childhood anxiety. Several methods were employed by the team to formulate the two prototype instruments. For development of the Teacher Interview Questionnaire (TIQ), team members first engaged in brainstorming ideas. A review of the literature was employed to derive questions for the TIQ. The questions chosen were then reviewed by the team.
The Teacher Interview Questionnaire is a semi-structured interview containing six open-ended questions divided into two sections of three questions each (see Table 1).

**Table 1**: Correspondence between items in the TRAC and seven descriptors by teachers of anxiety from question 3, comments one and two of the TIQ.

<table>
<thead>
<tr>
<th>Anxiety Description</th>
<th>TRAC Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quiet</td>
<td>21, 37</td>
</tr>
<tr>
<td>2. Withdrawn</td>
<td>18</td>
</tr>
<tr>
<td>3. Isolate self, loner</td>
<td>2, 3, 18, 23</td>
</tr>
<tr>
<td>4. Cry</td>
<td>6, 7, 8, 42</td>
</tr>
<tr>
<td>5. Nervous</td>
<td>10, 11, 19, 26, 43, 45, 46</td>
</tr>
<tr>
<td>6. Hesitant</td>
<td>4, 5, 9, 10, 11, 23, 26, 34, 43</td>
</tr>
<tr>
<td>7. Fearful</td>
<td>1, 2, 3, 4, 5, 8, 9 10, 11, 13, 18, 19, 26, 39, 40, 44, 45</td>
</tr>
</tbody>
</table>

The second instrument used, i.e., the prototype Teacher Ratings of Survey Items for Children (TRAC), was developed as previously described by a team of experts from the Anxiety Disorders Clinic at St. Boniface General Hospital. The team conducted a review of the literature and examined specifically three instruments containing items relating to anxiety in children. They reviewed: a) Behavior Assessment System for Children (The BASC), b) the Child Behavior Checklist (CBCL, 1992), the Conners Teacher Rating Scale (CTRS-S), and c) the Spence Preschool Anxiety Scale (SPAS). The team reviewed 50 questions for suitability of fit for inclusion into a prototype scale (see Table 2).

**Table 2**: Correspondence between items in the TRAC and teachers’ descriptors of five behaviours of anxiety from question two comments one and two in the TIQ.

<table>
<thead>
<tr>
<th>Behaviours</th>
<th>TRAC Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Refuses to Speak</td>
<td>13, 14, 43</td>
</tr>
<tr>
<td>2. Cries</td>
<td>6, 7, 8, 42</td>
</tr>
<tr>
<td>3. Poor or Non-participation</td>
<td>2, 3, 4, 5, 13, 15, 16, 23, 24, 25, 27, 43</td>
</tr>
<tr>
<td>4. Difficulty in Joining Groups</td>
<td>2, 3, 12, 18, 23, 24, 27</td>
</tr>
<tr>
<td>5. Quiet</td>
<td>21, 24, 28, 43</td>
</tr>
</tbody>
</table>

**Qualitative methods**

The data was gathered using semi-structured teacher interviews. Discussions with participants about their perceptions regarding shyness and anxiety in young children preceded the introduction of the prototype rating scale. Semi-structured interviews, along with the open-ended questions on the scale facilitated the combination of data management and its analysis. Given the intention of identifying common themes it was interesting to note similarities in teachers’ responses regarding what constituted anxiety despite their not knowing each other and the fact their comments were made at different times and in different places.

**Development of the questions**

The interview questions for the Teacher Interview Questionnaire (TIQ) were developed by experts – including the principal investigator - in the field of anxiety disorders from St. Boniface General Hospital. These questions were designed to elicit opinions from the respondents, and to generate discussion relating to the characteristics that make up anxiety and shyness in young children.

**Procedure for Study One**

School principals from various school divisions were sent a letter requesting the participation of Kindergarten and Grade One teachers who might be prepared to present themselves as candidates to
be interviewed for the study. The letter contained the process involved and the rationale for the study. Those who wished to participate received a letter from the principal investigator outlining the procedure to be employed in the interview. The school principals did not know the specific identities of the participants.

Twenty-five teachers were recruited from five different schools located in four different school divisions. Three of these school divisions are in the City of Winnipeg. The fourth one is in a rural area. The principal and teachers were informed that the interviews and the completion of the survey form would take no more than a half-hour, with about 10 minutes for the completion of the Teacher Interview Questionnaire form (TIQ). Teachers were able to complete the TRAC in approximately 15 to 25 minutes. Participants were sent a letter outlining the procedures along with a Consent Form to be discussed and signed prior to the interviews.

Data was obtained from the interview session and a completed two-page Teacher Interview Questionnaire (TIQ). The form requested information about their perceptions of shy, anxious, or inhibited children. The teachers were fully informed as to the purpose of the semi-structured interview to put them at ease and help them formulate and conceptualize the nature of anxiety, shyness, and inhibition in young children along with any associated behaviours. They could refer to children either in their current or past classes.

The teachers were then asked to respond to three open-ended questions about children who may be very shy or socially anxious in school settings. They were allowed to complete the form alone using a pen or pencil or, if preferred, discuss the questions and then complete the form. The purpose was twofold: a), to obtain important information as to what the teachers perceive as behaviours describing anxiety and shyness, and b), to prepare teachers to conceptualize how these behaviours may be presented, and thus better prepare them for filling in the survey form.

Participants were informed of the principal investigator’s availability if assistance should be needed. A further three questions were asked concerning children who may be fearful or anxious although perhaps not especially shy in social situations. Immediately following completion of this semi-structured interview, teachers then completed a Teacher Ratings of Survey Items form (TRAC) a semi-structured interview which took about 20 to 30 minutes. Teachers completed the forms, which were then placed in sealed envelopes.

As the investigation focused on the suitability of the survey form for use in identifying shy and anxious young children, all data was treated as confidential information. Results were released only to the principal investigator who was to determine if the results of Study 1 showed consistency among (1) the literature, (2) teachers informal ideas about anxiety in school children derived from interview questions, and (3) TRAC questions. The psychometric properties of the TRAC would then be assessed as presented in Study Two.

Study two
Participants
Participants included 16 teachers and the parents of children identified as having anxiety disorder by the Anxiety Disorders team at St. Boniface General Hospital. Parents selected were participating in a program for parents of shy and fearful children called Coaching for Confidence. Each teacher received a honourarium of $10 for returning the completed forms to the researcher. The children were not participants in this study.

Quantitative research
For Study Two, quantitative research methods were deemed appropriate for use. They facilitated examination, numerical interpretation, and presentation of information in a measured way allowing for statistical analysis.
The first goal was to administer the Teacher Rating of Anxiety in Young Children instrument (TRAC) to teachers of a group of children nominated by their parents as being anxious. The second goal was to compare results obtained from the TRAC with anxiety items from the Spence Preschool Anxiety Scale (SPAS), Conners Teacher Rating Scale (CTR-S), and the Behavior Assessment Scale for Children (BASC).

**Psychometric properties of the TRAC**

The American Heritage Dictionary defines psychometrics as, “The branch of psychology that deals with the design, administration, and interpretation of quantitative tests for the measurement of psychological variables such as intelligence, aptitude, and personality traits” (1969, p.1056). With this definition in mind, several properties will be presented. The TRAC was compared with three other instruments, with resulting data being used to determine its efficacy and reliability. Favourable comparisons with well-known and widely used psychometric instruments would signify the TRAC has reasonable and acceptable properties for use in identifying anxiety in young children.

**Procedure for study two**

Sixteen teachers completed a battery of four test instruments. Parent participants were again selected on the basis their being parents of children with anxiety disorders. Parents were asked to complete the SPAS. The tests were administered by the Anxiety Disorders Clinic team at St. Boniface General Hospital. Teachers of these children were asked to complete a battery of three tests, the CTR-S, TRAC, and the BASC. Although the CTR-S and BASC contain items in subtests dealing with anxiety, they are not wholly focussed on anxiety and offer a global approach to identifying several problematic behaviours of children.

Data from TRAC, SPAS, CTR-S, and BASC was compared. Responses were coded for analysis using the Statistical Package for the Social Sciences (SPSS) - a computerized program which allows for the cross comparison and correlation between the test instruments used in this study. The program assigns a value designated by the product-moment correlation or Pearson $r$ to the strength of (or lack thereof) a relationship existing among these instruments.

Favorable correlations give information as to how well, or not, the results obtained are consistent. In turn this consistency gives positive information as regards the reliability and validity of the TRAC. In this case, the reliability score compared favourably with the other tests indicating a high likelihood of its utility in identifying children with anxiety. Good internal consistency suggests that if a child were to be re-assessed later, results have a very high probability of confirming earlier results indicating the TRAC may employed with confidence.

**Findings of study one**

**Analysis of teacher responses**

Data analysis was conducted in a multi-step process. An analysis of teacher responses to the six questions in the Teacher Interview Questionnaire (TIQ) was conducted with a view to ascertaining emergent themes common to the twenty-five teacher responses. The themes were identified and organized. The teacher responses were assembled by looking at common words, terms, and phrases. The commonalities were sorted out by examining carefully which teacher responses matched. The data was the reexamined so as to verify the results obtained.

**TRAC items and teachers’ descriptors**

A study to determine whether a correlation exists between TRAC items and the teachers’ descriptors in the TIQ found items corresponded with each other. These descriptors were presented in replies to three comments to two questions. Please see Table 1, Table 2, and Table 3 for examples of this correspondence between the items in the TRAC and the teachers’ replies to questions in the TIQ forms.
Table 3: Correspondence between items in the TRAC and teachers’ descriptors of three situations of anxiety from question 3, comments one and two in the TIQ.

<table>
<thead>
<tr>
<th>Anxious Situation</th>
<th>TRAC Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Changes in routine</td>
<td>2, 3, 4, 7, 9, 16, 18, 19, 33, 43</td>
</tr>
<tr>
<td>2. Groups</td>
<td>2, 3, 12, 13, 18, 23, 24, 27</td>
</tr>
<tr>
<td>3. Social</td>
<td>2, 3, 11, 12, 14, 15, 35</td>
</tr>
</tbody>
</table>

Establishment of a close, positive relationship among TRAC, SPAS, CTR-S, and BASC, demonstrated a significance supporting administration of TRAC with a high degree of certainty. This finding underlined the merits of TRAC as an instrument for the identifying anxiety in young children.

Correlations between the four instruments were obtained from the administration of the TRAC, the SPAS, the CTR-S, and the BASC. The results were acquired from 16 children. The TRAC, the CTR-S, and the BASC are teacher-administered instruments, while the remaining one, the SPAS, is completed by parents. The TRAC was found to correlate well with the anxiety items from the items of the other three. Given the great quantity of raw data generated from this study, SPSS was used for analysis. The correlation coefficient used was the Pearson product-moment (r).

The TRAC correlated satisfactorily with the anxiety items of the CTR-S (Pearson r = 0.84) and highly correlated with the BASC (Pearson r = 0.88). These latter scores are considered to be well within a reasonable range and suggest the TRAC relates well to other measures of the same concept (i.e., the CTR-S and BASC).

Data analysis indicated one significant result at the 0.05 level, i.e., the relation between the sum of the scores of the SPAS and TRAC. The Pearson r was calculated at 0.55. While not as strong a relationship as the other tests, it is considered by the team to be a responsible and consequently, acceptable score. The SPAS was rated by the mothers, consequently, the results are considered to be reasonable given the different perspectives of parents and teachers about the concept of anxiety and what constitutes it. Also, teachers and parents see children in different situations and differences between raters exist. The teacher rating scales in Study One, were administered by the principal investigator, while in Study Two, the scales were provided by the parent and then returned to the teacher by mail.

The results of the remaining two correlations are also significant at the 0.01 level. The relation between the sum of scores of the CTR-S, BASC with those of the TRAC indicate a significance of 0.01. The Pearson r was calculated at 0.84 and 0.88 respectively. Results from the data analysis presented in Table 4 indicate TRAC properties are dependable and therefore it may be implemented with confidence.

Cronbach alpha

Scores from BASC, CTR-S, and TRAC were calculated using the SPSS. The result produced a Cronbach alpha (α) which is, according to Aiken (1996, p.80), ‘‘A more general formula for estimating the reliability of a rating scale’’ The closer the correlation coefficient is to one (1) the higher the reliability of the scale.

SPSS output showed very good scores for all three measures with the TRAC quite high, partly because it is a longer scale than BASC, and CTR-S. Scales with more items generally produce higher α scores (Aiken & Groth-Marnat, 2006; Gay & Airasian, 2000). The results compared two anxiety scales with TRAC—the BASC and CTR-S. The α scores were as follows: TRAC =.97; BASC =.85;
and CTR-S = .76. Overall the data suggests the TRAC measures childhood anxiety with a high level of consistency without significant deviation.

**Validity**

To establish validity is to establish the degree to which a test actually measures what it purports to measure. It provides a check on how well a test fulfills its function (Anastasi, 1988). The validity of TRAC was established by using expert judgment. The St. Boniface General Hospital team (psychologists with expertise in the areas of childhood anxieties, testing, and the psychometric properties of test instruments), examined TRAC items and in comparison to BASC and CTR-S, found them to be valid.

**Table 4:** Correlations between the four instruments.

<table>
<thead>
<tr>
<th></th>
<th>Sumspence N=16</th>
<th>Sumteach N=16</th>
<th>sumCTRS N=16</th>
<th>sumBASC N=16</th>
</tr>
</thead>
<tbody>
<tr>
<td>sumspence Pearson Correlation</td>
<td>1</td>
<td>.55*</td>
<td>.32</td>
<td>.48</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.03</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Sumteach Pearson Correlation</td>
<td>.55*</td>
<td>1</td>
<td>.84</td>
<td>.88</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.23</td>
<td>.00</td>
<td>.00</td>
<td></td>
</tr>
<tr>
<td>sumCTRS Pearson Correlation</td>
<td>.32</td>
<td>.84**</td>
<td>1</td>
<td>.79**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.23</td>
<td>.00</td>
<td></td>
<td>.00</td>
</tr>
<tr>
<td>sumBASC Pearson Correlation</td>
<td>.48</td>
<td>.88**</td>
<td>.79**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.6</td>
<td>.00</td>
<td>.00</td>
<td></td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

**Conclusions**

The evidence suggests this teacher administered rating scale will be a helpful instrument in the early identification of young children at risk for the development of an anxiety disorder. The study demonstrates a need for a community-based model in which parents, teachers, and clinicians work together to manage both the identification and treatment of young children with anxiety disorders. In this particular model, parents would be first to initiate the process of identifying children at risk. Parents concerned about their child’s behaviours, and who are tentative about what the behaviours signify, first talk with the child’s teacher. Teachers then administer the TRAC to help distinguish at-risk children from children with a non-pathological level of anxiety. Parents would be consulted and encouraged to contact local health care providers. The information obtained by teachers would be submitted to professionals or clinicians engaged to provide appropriate assistance, intervention, resources, and treatment plans to deal with anxiety-induced behaviours and problems. Use of this model would encourage collaboration between parents, educators, clinicians, and psychologists in support of the child. More study is needed to determine the efficacy of using a tri-partite model for the delivery of service to young children.

**Limitations concerning anxiety and culturally different groups**

The study is oriented towards issues peculiar to Canadian aboriginal peoples. It also presupposes a close relationship between anxiety and shyness. Shyness is known as a key indicator of anxiety, however, further research into the cultural aspects regarding perceptions of shyness should be undertaken. A considerable number of children in many Canadian cities are of aboriginal origin or come from immigrant families. Canadian culture may accept shyness as culturally appropriate behaviour, however there is virtually no research on shyness and anxiety in the Canadian aboriginal population. As Barlow (2001) one of the foremost researchers in anxiety puts it, “With the enormous difficulties in defining anxiety even in Western cultures, it is not surprising that problems increase across cultures. This makes an investigation into the basic nature of anxiety all the more compelling” (p.3).
References


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“Mathematics in the Workplace”: A Pilot Enrichment Programme for Mathematically Talented Primary Students in Hong Kong

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Abstract
The authors report on the implementation of an enrichment programme titled “Mathematics in the Workplace” for mathematically talented students, aged 8 to 12 years, who were studying in Primary 3 to Primary 6 classes in Hong Kong. The aim of the pilot programme was to enable gifted learners to make connections between mathematics and its applications in the workplace, apply higher-order thinking skills in relation to workplace mathematics, and enhance their communication skills. The rationale, theoretical orientation, curriculum design, and the format of lessons are outlined in the article. Evaluation of the programme indicated that the majority of participants perceived the activities to be interesting, and cognitively and creatively challenging. Interventions of this nature can serve as additional sources of stimulation for gifted learners. Limitations of the programme are discussed, together with suggestions for future research.

Keywords: Mathematics; career education; mathematically talented; Hong Kong.

Introduction
The National Council of Teachers of Mathematics (NCTM, 1980) has reminded us that outstanding mathematical ability is a precious societal resource, sorely needed to maintain leadership in a technological world. This is one good reason why mathematics, particularly the ability to solve real-life problems, is regarded as an essential core subject in the curriculum of all schools today, and is accorded due instructional time and attention. However, the issue of whether students who possess exceptional talents in mathematics are sufficiently challenged and motivated by the programme they receive in the average classroom remains a topic of debate (Donovan & Bransford, 2005; Latterell, 2005). It has been suggested by Sharma (2010) that the standard curriculum is often inadequate for young gifted mathematicians. Some educators suggest that students who are highly gifted in mathematics need a separate or supplementary mathematics programme, tailored to their needs and abilities (Gavin, et. al., 2009; Gavin & Sheffield, 2010). With this in mind, the authors of this paper set out to design and evaluate a supplementary enrichment programme to satisfy the learning needs of primary school children in Hong Kong with high abilities in mathematics.

Rationale
Conceptually-oriented curricula for mathematically gifted learners
Although the US handbook Principles and Standards for School Mathematics (National Council of Teachers of Mathematics [NCTM], 2000) did not mention gifted students explicitly, it did clearly point out that students vary in their levels of ability, and that this fact should be taken into account when designing curricula. The handbook also stressed the need to relate mathematics to real-life situations, and to focus on conceptual understanding rather than on purely computational skills.

The extent to which this principle has been embodied already in several specifically designed programs has been investigated by several researchers. For example, Maddux (1986) suggested that The Challenge of the Unknown provides sound applications for real-world problem solving. Similarly,
Johnson and Sher (1997) from the Center for Gifted Education suggested the model called *A Study of Animal Populations* as a valuable problem-based learning unit. A pre-algebra unit developed for mathematically gifted learners by the South Carolina Consortium for Gifted Education (Peeples, 1994) is a good example of a programme with an emphasis on learning mathematical concepts rather than simply learning their application. Procedures and instruments for assessing mathematical ability should also reflect real-life situations and contexts. However, simply adopting existing programmes and assessment tools from the West often fails to match local cultural contexts and conditions in the East. It is argued here that topics, themes and activities designed to develop gifted students’ conceptual understanding and problem-solving abilities in mathematics need to be tailored where possible to real local contexts. This principle has been applied in the pilot programme described in this article.

**Using open-ended exploration with mathematically gifted students**

Johnson (2008) suggested that more open-ended exploration (where there is no obvious solution or procedure to apply) should be used to enable mathematically gifted students to experience what mathematicians really do. Open-ended exploration of unique real-life problems can be both motivating and enriching for students who already possess fluency in basic mathematical skills (Cotic & Zuljan, 2009). These students need to be encouraged to create and then solve their own problems, individually and collaboratively. In order to experience what mathematicians have done in the past, mathematically gifted students need time to grapple with solutions for some quite complex problems that cannot be solved immediately. For example, one of the key features of mathematics teaching in Japanese schools—where standards of achievement are known to be very high—is that teachers and students together may spend ten minutes or more in working out solutions to a single problem, thus deepening students’ conceptual understanding (Benjamin, 1997; Stigler & Hiebert, 1997). In general, it is believed in most countries that solving real-life problems will lead students to acquire valuable ways of thinking that will serve them well beyond school (Cotic & Zuljan, 2009).

Johnson (2008) pointed out that mathematically gifted students need to be encouraged to study a given problem at a deeper level than average students. As an example, average students would be expected to learn the four basic rules for determining whether two triangles are congruent; but mathematically gifted students would be expected to understand, explain and prove why the four basic rules are true. Similarly, McMaster and Betts (2007) recommended that mathematics problems used during lessons should be ‘messy’ (i.e., difficult to penetrate and process) in order to strengthen gifted students’ mathematical thinking.

The programme described in this article aimed to include problems and mathematical themes that motivated students, and helped them appreciate the role that mathematics plays in many workplace contexts.

**Learners need to develop career-related knowledge and skills**

Increasingly, in this technological and knowledge-based era, mathematics in many different forms is now involved in more and more occupations. Similarly, many more jobs involve tasks that require higher-order thinking ability and creativity (Jarvis & Keeley, 2003). Most employers acknowledge that it is not sufficient today to enter the workforce with only a narrow knowledge base and specialized skill set. Diverse skills are now required, including problem-solving skills, teamwork abilities, and creativity (Carnevale & Descrochers; Feller, 2003). It makes sense, therefore, to ensure that the mathematics curriculum for all students should link as closely to real life contexts as possible. In particular, gifted students need to develop awareness of the types of mathematical challenges associated with different professions and occupations. This awareness can then aid their career decision-making, and can have lasting implications for their personal and occupational satisfaction throughout the lifespan (Kim, 2010).

With these points in mind, the design of the programme described below included tasks requiring higher-order thinking, creativity, and the application of personal and social competencies. The topics helped students understand more fully the nature of different workplaces and professions,
and the contribution that each makes to society. For the purposes of this study, higher-order thinking includes the cognitive processes of analysis, synthesis and evaluation—involved in problem solving and reasoning (Pohl, 2000). Creativity here includes originality in thoughts and actions, and the ability to transcend rules and traditional ideas (Kaufman & Sternberg, 2010). Personal and social competencies are often referred to as ‘life skills’—the skills required to operate successfully in the social and physical world (UNICEF, 2012).

**Hong Kong context**

It is widely known that students from Hong Kong generally perform at a high level in international mathematics tests and surveys such as the OECD Programme for International Student Assessment (PISA) (Patton, 2011) and Trends in International Mathematics and Science Study (TIMSS) (Leung, 2009). These surveys may suggest that students’ good results are due to effective teaching producing a sound foundation in mathematics established at primary school level. A sound foundation is, of course, important for all students; but students with a genuine talent for mathematics require even more than this to foster their development and to ensure that they reach their full potential.

In Hong Kong, the past decade has seen a great surge of interest in approaches that specifically address the needs of gifted students through differentiation in the curriculum and via enrichment, extension and acceleration programmes. For example, the Gifted Education Section of the Education Bureau invites different educational organizations to hold a variety of pull-out enrichment programmes twice each year, and schools may nominate suitable students to join these programmes. There are courses for gifted learners of mathematics held by outside bodies, such as Hong Kong Academy for Gifted Children, Hong Kong University of Science and Technology, and the Program for Gifted and Talented offered by the Faculty of Education at Chinese University of Hong Kong. There is always a high demand for such courses, and parents of gifted children in Hong Kong are often willing to pay high fees to enable their child to attend. There are also signs that students from mainland China are often seeking education in Hong Kong, and among them are potentially gifted students.

**Mathematics in the workplace: A pilot enrichment programme**

The programme described here was designed for students aged between 8 to 12 years who were studying in Primary 3 to Primary 6 classes in Hong Kong government schools.

The programme design incorporates critical elements said to be essential for educating mathematically talented students (e.g., Stanley, 1991). In particular, the programme provides:

- situations related to mathematics in context;
- a need to apply knowledge and skills to solve unique problems;
- opportunities to be a creative and critical learner;
- experiences to foster appreciation of the beauty and utility of mathematics;
- exploration of mathematics as it applies to daily life; and
- opportunities for gifted learners to increase their understanding of the role of mathematics in the workplace.

In the programme, problem-solving tasks, collaborative group work and in-depth discussions were used to enable students to explore more advanced mathematics knowledge and to apply higher-order thinking skills (as defined above). In particular, open-ended themes for exploration were deliberately embedded within the activities. One unique feature of this programme is its focus on mathematical themes related to the workplace and to specific types of careers. Another feature of this programme that distinguishes it from traditional classroom teaching is that people from different professions were invited to contribute as guest speakers, bringing their firsthand knowledge of mathematics in their own fields.
**Research method**

**Selection of participants**

Some educators (e.g., Gross, 2004) firmly state that grouping students with similar intellectual abilities and interests to attend pull-out programmes is to their academic benefit. The advantages of offering appropriate higher-level instruction to advanced learners have been well documented in research studies. This can be done most effectively when students with the same academic strengths and interests are grouped together (Ablard et al., 1998; Mills & Durden, 1992; Mills & Tangherlini, 1992).

Since this programme had a limited number of places available (maximum 21 students) it was necessary to invite each school to send only 2 students. The course enrolment filled very quickly.

The nominated participants were rated as being highly able students in their schools and were selected by multiple methods (teacher observation, behavioral checklist, and academic performance at school, awards in local or international competitions). Two students had participated previously in the Hong Kong Mathematics Creative Problem Solving Competition organized by the Gifted Education Section of the Education Bureau and had won awards. Several other participants had won various awards in local or international competitions. A total of 21 students finally took part in the 6-session programme. Their ages ranged from 8 to 12 years, with a mean of 10 years.

**Mathematics in the workplace**

The duration of the whole programme was twelve hours of teaching time and activities, with each of the six sessions occupying two hours.

The aims of the programme were to enable gifted learners to:

- make connections between mathematics and the workplace;
- apply critical thinking skills, creativity, problem-solving skills, and decision making in relation to the workplace; and
- enhance their interpersonal, intrapersonal, and communication skills.

The rationale for this programme was to include some mathematics knowledge, skills and concepts that gifted learners would not usually encounter in their primary school mathematics curricula. These areas of knowledge and skill were to be introduced and explored through scenarios involving the application of mathematics to real-life contexts. It was believed that gifted learners would find such an approach interesting and motivating (NCTM, 1989; 2000). The approach encouraged cooperation and collaboration among students when exploring problems and seeking solutions.

At the beginning, the authors struggled to decide upon an appropriate balance in the choice of mathematics topics to be covered in the 6 lessons. Finally, the choice was based on three of the main categories of learning objectives for Hong Kong’s Mathematics Curriculum Key Stage 3 (S.1-3), namely ‘Number and Algebra,’ ‘Measures, Shape and Space’ and ‘Data Handling.’ It was felt that these categories were most closely linked with workplace mathematics, while still being within the grasp of primary school students.

The guest speakers came from businesses such as Citigroup Global Markets Asia Limited, International Logistics Company, a global medical equipment company, and the Prudential Assurance Company Limited. The speakers occupied senior posts in their firms. They were able to share their real experiences of mathematics used in their workplaces so that the gifted learners were able to appreciate the connection between mathematical skills and the world beyond school. Each guest speaker took some time to share his or her insights. At the end of each sharing, the guest speaker engaged in discussions with the students as a follow-up to the presented topic. It was hoped (and expected) that this interaction with guest speakers would contextualize mathematics in the workplace and widened students’ horizons.
The implementation of this programme was evaluated throughout by on-going observation and monitoring, and by final outcome evaluation. The former was conducted through in-depth discussion between gifted learners and the tutor or guest speakers, as well as gifted learners’ output on worksheets. As a result, the tutor could see immediately whether or not the students were able to achieve the aims of the session, and could make amendments to course contents, activities or pedagogy if necessary.

At the end of all lessons, gifted learners received a questionnaire designed by the Gifted Education Section, Education Bureau, Hong Kong. The findings of this questionnaire were to provide the Gifted Education Section and the authors with feedback on the implementation of the programme.

**Programme framework**

1. In each lesson “A person at work” was introduced as the central theme.
2. A variety of scenarios related to this person at work were introduced, and students were asked to work collaboratively to solve related problems, organize data, propose some workable plans, and complete the assigned tasks successfully.
3. Students then presented their ideas to the whole class and invited further discussion and suggestions.

To encourage higher-order thinking, participants were asked in all lessons to evaluate and reflect upon their proposed solutions and to consider possible alternative solutions and strategies in each assigned task. The aim was also to develop students’ conceptual understanding of the mathematical content, rather than teaching only decontextualized procedural knowledge.

To foster students’ creativity, the tasks and activities in the programme required participants to combine and utilize information from different sources to produce new understandings (synthesis); and to use imagination (creativity), reasoning and analogy (higher-order thinking) to construct new knowledge or solutions.

Participants’ personal and social competencies were engaged and developed by requiring them to work cooperatively and collaboratively in teams, to communicate and negotiate with each other, to solve problems together, and take turns in performing the leadership role.

**Design of each lesson**

Each lesson, as originally planned, is summarized below. Inevitably, a few on-going adjustments had to be made during each session, according to students’ reactions and rate of progress.

**Lesson 1: Mathematics at Work – Statistics I**

Upon completion of this lesson students would be able to:

- recognize the nature of the work involved in the finance or business field;
- recognize the important roles of finance in the world;
- use a spreadsheet to organize, analyze and present large sets of grouped and ungrouped data using different forms of graphs such as histogram, frequency curve and cumulative frequency curve; and
- recognize measures of tendency and spread.

**Teaching content and procedure:**

This introductory lesson briefly explained the design rationale, the teaching approach, topics to be covered in the six lessons, and what was expected of the students. The format of each lesson was described and the award system was explained. Students’ parents were welcome to attend this session.

First, a video clip was played showing a person working in an international insurance company, introducing his daily work such as investment and insurance work. Different examples of how
statistics were used in the field of finance, banking and insurance were shown. Students, in groups of four, then discussed the important roles of finance in the world and presented their views on the issue. Students in different groups were given some relevant data and information to prepare a report on different scenarios.

Lesson 2: Mathematics at Work – Statistics II

Upon completion of this lesson students would be able to:
1. comprehend what market research is, and its importance in today’s society;
2. recognize some basic techniques in survey sampling and the basic principles of questionnaire design;
3. recognize the uses and abuses of statistical methods in daily activities.

Teaching content and procedure:

First, a video clip was played showing a person working in a global market research company introducing her daily work. Students, in groups of four discussed their thoughts on what they had viewed, and then presented the important roles of market research companies in today’s society. Necessary instruction on the basic principles of questionnaire design, and the basic techniques for survey sampling were introduced. Students in groups were given different research topics and asked to design an appropriate questionnaire. Students in groups were then asked to present their ideas on the design and purpose of the questionnaire. Students were asked to read some articles or news reports and identify any abuses or misleading uses of statistical methods therein. The programme tutor supplemented their findings with examples of other abuses of statistical methods (e.g., exaggeration; distortion; selective reporting).

Lesson 3: Mathematics at Work with Geometry and Measurement I

Upon completion of this lesson, students would be able to:
1. recognize the nature of the work involved in being a product designer;
2. sketch the 2D representation of 3D figures by Isometric View and Oblique View;
3. identify the corresponding three side-views for the solid; and
4. sketch the corresponding solid with three side-views.

Teaching content and procedure:

First, a video clip was played, showing a person working in a product design company introducing his daily work. In groups of four, students discussed the influence of product design on our lives. Students were asked to sketch a 2D representation of 3D figures through the observation of real objects.

Students in groups were asked to:
1. sketch the 2D representation of 3D figures such as cuboids, cube, cylinder, cone, prism, etc.
2. sketch the corresponding three side-views for the solid using mathematics cubes;
3. sketch the corresponding solid with three side-views also using mathematics cubes; and
4. discuss the connection between the 2D representation of 3D solids, three side-views and their uses in workplaces.

Lesson 4: Mathematics in Work – Geometry and Measurement II

Upon completion of this lesson, students would be able to:
1. recognize the nature of the work involved in surveying;
2. state the basic mathematics concepts in trigonometry; and
3. recognize the connection between trigonometry used in some workplaces such as surveying;
4. use Pythagoras’ theorem and its converse to solve problems.

Teaching content and procedure:
First, a video clip showing a surveyor introducing his daily work was played. In groups, students were asked to explore real-life questions involving right-angled triangles. Students, in groups, were asked to investigate and compare the approaches that could be used to prove Pythagoras’ theorem in different cultures. Finally they presented their results to the whole class.

**Lesson 5: Mathematics in Work – Number and Algebra I**

Upon completion of this lesson, students would be able to:
- state the nature of jobs involved in banking, such as savings or investment;
- calculate compound interest;
- calculate the standard deviation (S.D.); and
- evaluate the connection between S.D. and investment.

**Teaching content and procedure:**

First, a video clip was played showing a person working in a bank describing his/her daily work. The programme tutor introduced some services provided in local banks.

Students in groups were asked to:
- calculate compound interest using different methods;
- discuss the disadvantages of using mean, and to guide exploring the standard deviation; and
- compare the connection between S.D. and investment; and to present their proposed investment plan to the class.

**Lesson 6: Mathematics in Work – Number and Algebra II**

Upon completion of this lesson, students would be able to:
- state and describe the nature of work involving logistics; and
- recognize, plot and explore graphs in linear equations in two unknowns.

**Teaching content and procedure:**

First, a video clip was played showing a person working in a logistic company introducing his daily work. Students in groups were asked to apply the concept of simultaneous equations to other daily activities. This final session was also used to conduct one aspect of programme evaluation. This was planned to be a ‘celebration’ session to invite students to share their feelings about this programme, and to display their reflective journals and finished products. Finally, a prize-giving ceremony was conducted to give awards to those students who actively participated in the lessons or showed good performance in their class work respectively. Photos were taken at the end of the celebration session.

**Data collection**

Data were obtained from observations of students’ performance during lessons, discussions between tutor and students (and between students and guest speakers), students’ knowledge products, and students’ questionnaires. Students’ interactions with tutor and guest speakers were recorded, and their knowledge products were scanned.

Students were asked to write reflective journals during, or at the end of, each lesson. This not only provided valuable feedback to the tutor, it also promoted written communication skills, self-reflection, self-monitoring, and personal accountability. In addition, the use of portfolios (in which students’ work samples were collated) helped to provide evidence of new learning (Lewis, 1996), as well as developing organizational and self-management skills. Students’ completed portfolios were a part of the final display and presentation at the end of the programme. Compilation of portfolios was an on-going process that provided valuable feedback on how well students understood what they had learned, their viewpoints, and their own contributions to the programme. Students were also encouraged to record some or all of the following evidence in their portfolios:
- conclusions and queries arising from in-depth discussions;
- exploration of solutions to given problems;
• calculations;
• self-reflections; and
• evidence of increasing awareness of the scope of mathematical skills needed in
  modern workplaces.

To evaluate the overall implementation of the programme, a questionnaire was designed to investigate the students’ degree of satisfaction with aspects of the programme, including the quality of instruction given, learning and teaching strategies, activities involved, logistics such as meeting time and venue, and support from tutors.

The evaluation questionnaires obtained students’ perceptions of the course content, the tutor’s performance, and their own participation in lessons. In addition, face to face interviews were conducted to collect students’ ongoing perceptions of the course and how it might be expanded or refined in the future. To check for generalization of concepts and skills learned, worksheets were distributed requiring students to apply the mathematics learned in the programme in a variety of scenarios.

A questionnaire given to the participants at the end of the last session was designed to collect their views on the implementation of the programme. Finally, students’ performance on the worksheets that required application of mathematics in the course to the various real-life scenarios were evaluated.

Results

Focusing on the students’ overall response to the programme, one section of the evaluation questionnaire requested them to reflect upon their degree of satisfaction with several aspects of the programme. This section was scored quantitatively (see Table 1).

Table 1: Students’ degree of satisfaction with the programme.

<table>
<thead>
<tr>
<th>Items</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I certainly understand the objectives of this programme.</td>
<td>0.0%</td>
<td>5.0%</td>
<td>45.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>2. The programme content was easy.</td>
<td>10.0%</td>
<td>45.0%</td>
<td>40.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>3. The programme content was difficult.</td>
<td>5.0%</td>
<td>45.0%</td>
<td>40.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>4. Contents and activities of this programme were comprehensive.</td>
<td>0.0%</td>
<td>5.0%</td>
<td>60.0%</td>
<td>35.0%</td>
</tr>
<tr>
<td>5. Exercises and activities in this programme were useful for my learning.</td>
<td>0.0%</td>
<td>10.0%</td>
<td>35.0%</td>
<td>55.0%</td>
</tr>
<tr>
<td>6. This programme enabled me to acquire new knowledge.</td>
<td>0.0%</td>
<td>10.0%</td>
<td>20.0%</td>
<td>70.0%</td>
</tr>
<tr>
<td>7. This programme enriched my knowledge about its main theme.</td>
<td>5.0%</td>
<td>5.0%</td>
<td>45.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>8. This programme has raised my interests in its main theme.</td>
<td>5.0%</td>
<td>5.0%</td>
<td>35.0%</td>
<td>55.0%</td>
</tr>
<tr>
<td>9. I perceive this programme to be meaningful.</td>
<td>5.0%</td>
<td>5.0%</td>
<td>40.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>10. Tutor’s presentation was clear and easy to understand.</td>
<td>0.0%</td>
<td>5.0%</td>
<td>60.0%</td>
<td>30.0%</td>
</tr>
<tr>
<td>11. Tutor performed with great enthusiasm.</td>
<td>0.0%</td>
<td>0.0%</td>
<td>60.0%</td>
<td>40.0%</td>
</tr>
<tr>
<td>12. Tutor provided many opportunities for us to apply in-depth thinking.</td>
<td>0.0%</td>
<td>10.0%</td>
<td>35.0%</td>
<td>55.0%</td>
</tr>
<tr>
<td>13. Tutor encouraged us to present our own ideas.</td>
<td>0.0%</td>
<td>5.0%</td>
<td>50.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>14. I actively participated in this programme.</td>
<td>5.0%</td>
<td>10.0%</td>
<td>45.0%</td>
<td>40.0%</td>
</tr>
<tr>
<td>15. I got along well with other course members.</td>
<td>5.0%</td>
<td>10.0%</td>
<td>40.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>16. I actively participated in all discussions.</td>
<td>5.0%</td>
<td>5.0%</td>
<td>45.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>17. I am able to apply the knowledge I gained to my daily life.</td>
<td>10.0%</td>
<td>0.0%</td>
<td>45.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>18. I am satisfied with the arrangement of the programme.</td>
<td>5.0%</td>
<td>20.0%</td>
<td>35.0%</td>
<td>40.0%</td>
</tr>
<tr>
<td>19. I am satisfied with the location and facilities.</td>
<td>0.0%</td>
<td>0.0%</td>
<td>55.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>20. In conclusion, I am satisfied overall with his programme.</td>
<td>5.0%</td>
<td>5.0%</td>
<td>30.0%</td>
<td>60.0%</td>
</tr>
</tbody>
</table>
Students’ degree of satisfaction with the programme

A total of 20 questionnaires were collected at the end of the final lesson because one student was absent.

It can be seen from Table 1 that almost all participants (90%-95%) agreed or strongly agreed that they understood the objectives, considered that the content of the programme had aroused their interest, and was comprehensive, meaningful, and useful. They also agreed or strongly agreed that they acquired new knowledge and understanding, and that the tutor functioned effectively. In contrast, some 50% disagreed or strongly disagreed that the content covered in the lessons was easy. This could be construed as indicating that it was suitably challenging for high-ability students. It should also be noted that some 25% of the participants felt that the arrangement of the programme (the schedule) was not satisfactory. This is an issue that requires further investigation in order to adjust the schedule for future programmes. Information reported later in Table 4 helps to shed some light on possible reasons for dissatisfaction over schedule.

Regarding the programme tutor’s performance (Q.10 – 13 in Table 1) 60% and 30% of participants respectively agreed or strongly agreed that the programme tutor’s presentations were clear or very clear; and they found it easy to understand the contexts the tutor presented in lessons. In addition, it was very encouraging that 100% of the participants agreed or totally agreed that the course tutor was enthusiastic for the whole course and kept on encouraging them to express their views in lessons.

Students’ perceptions of the lesson they most appreciated

The second section of the questionnaire required them to provide their qualitative perceptions of the sessions which they found to be most interesting and least interesting (see Tables 2 and 3).

Table 2: Students’ perceptions of the lesson they appreciated most.

<table>
<thead>
<tr>
<th>Lesson(s) did you like most, and why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 1 Typical comments:</td>
</tr>
<tr>
<td>There are many sources of information and formulas.</td>
</tr>
<tr>
<td>Guest speaker is able to inspire me to engage in more thinking.</td>
</tr>
<tr>
<td>[3 students rated this lesson as the best.]</td>
</tr>
<tr>
<td>Lesson 3 Typical comments:</td>
</tr>
<tr>
<td>I can assemble “Math Cubes”.</td>
</tr>
<tr>
<td>The topic on “3 side views” is very interesting.</td>
</tr>
<tr>
<td>I love Mathematics and Medicine.</td>
</tr>
<tr>
<td>[4 students rated this as the best lesson]</td>
</tr>
<tr>
<td>Lesson 4 Typical comments:</td>
</tr>
<tr>
<td>Since my Dad is a surveyor, I now have more understanding about his job</td>
</tr>
<tr>
<td>[1 student rated this lesson as the best].</td>
</tr>
<tr>
<td>Lesson 5 Typical comments:</td>
</tr>
<tr>
<td>I have learned about investment before, and found it very interesting to learn more.</td>
</tr>
<tr>
<td>[2 students rated this as the best lesson]</td>
</tr>
<tr>
<td>Lesson 6 Typical comments:</td>
</tr>
<tr>
<td>I think the task is very interesting and challenging.</td>
</tr>
<tr>
<td>I love learning and applying formula.</td>
</tr>
<tr>
<td>It like this session because a big gift is given!</td>
</tr>
<tr>
<td>It is because the application of mathematic on that day is very interesting.</td>
</tr>
<tr>
<td>[4 students rated this as the best lesson]</td>
</tr>
<tr>
<td>Other comments</td>
</tr>
<tr>
<td>Students also expressed their preferences for different categories of concepts or content. Geometry was most popular, with statistics rating second.</td>
</tr>
<tr>
<td>Additionally, 2 students reflected that they liked all lessons because they were able to learn new mathematics knowledge, and because the course tutor performed well in teaching.</td>
</tr>
</tbody>
</table>
Table 3: Students’ perceptions of the lesson they liked least.

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Typical comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>Typical comments</td>
</tr>
<tr>
<td>I loved all lessons.</td>
<td></td>
</tr>
<tr>
<td>Mr. Kwan performs very well.</td>
<td></td>
</tr>
<tr>
<td>Each lesson is very good.</td>
<td></td>
</tr>
<tr>
<td>Every lesson is so sound.</td>
<td></td>
</tr>
<tr>
<td>Each lesson was very interactive and well taught.</td>
<td></td>
</tr>
<tr>
<td>[8 students reflected that there was no lesson they disliked]</td>
<td></td>
</tr>
</tbody>
</table>

Lesson 1  Typical comments:
- It is because I need to handle many statistics graphs.
- It is boring (4 students)
- I do not have much interest in banking.

Lesson 3  Typical comments:
- I do not understand much of the material.

Lesson 4  Typical comments:
- I did not understand some things and questions (2 students).
- It is because the challenging task on that day is very difficult.

Lesson 5  Typical comments:
- I found learning of compound interest too difficult to understand (2 students).
- I found it boring.
- No guest speaker (1 student):
- It is boring.
- Medical treatment facilities:
- I don’t understand.
- Interest (1 student)

The comments in Table 2 reveal a wide range of preferences across this group of students. No single session appeared to be rated as ‘best’ by all students. Some preferred sessions that had an emphasis on statistics, while others favored those involving geometry and measurement.

Students’ perceptions of the lesson they liked least

The responses in Table 3 reflect fairly differing views across this group of high-ability learners. At least 39% of the students reported that they enjoyed all sessions and could not identify any lesson they did not like. On the other hand, certain individuals liked least the sessions in which they had difficulty mastering the concepts or mathematical processes (e.g., compound interest; statistical graphs). It is interesting to note that while some students later expressed a desire for more difficult tasks (see Table 4) certain others had a negative reaction to the lessons that dealt with very challenging content.

Table 4: Students’ suggestions for improving this programme.

<table>
<thead>
<tr>
<th>What are your suggestions for improving this programme?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No comment from 3 students</td>
</tr>
</tbody>
</table>

Sample comments from individuals:
- Hope for more guest speakers and each lesson to last one hour.
- Shorten duration of each lesson.
- Add more gifts (rewards), and each of us also has gifts. (A view expressed by three students).
- The venue should not be too far away. (A view expressed by several students).
- More encouragement to motivate our thinking.
- Conduct this programme in summer vacation
- Don’t be so boring.
- Change the time to 1.5 hour.
- May increase number of lessons and duration for each lesson.
- Increase duration for each lesson so as to have more discussion.
- Contents of this programme should be made very difficult indeed.
- Add more elements in this programme.
- Longer duration for each lesson.
Table 4 reveals that there were obviously significant individual differences in students’ reactions to, and perceptions of, aspects of the programme. For example, there is inconsistency in students’ feelings about the length and timing of lessons, some students suggesting longer time needed while other wanted shorter sessions. Points raised by students in Table 4 regarding the schedule suggest that several felt the venue was too far away from their home or school. Distance to travel and timing issues may account for the dissatisfaction with the schedule noted in Table 1. Some students found some of the topics ‘boring’ and wanted more difficult activities. This should be weighed against the view of 50% of students (Table 1) who considered the content was already difficult. The desire expressed for more ‘gifts’ (rewards) is worrying. One would hope that students of high ability would willingly take part in such a programme without the need for extrinsic rewards. In future programmes rewards may be abolished and replaced with a simple ‘Certificate of Attendance.’

Discussion

First, the overall comments on this enrichment programme from the majority of participants were very positive and encouraging. Most students expressed an opinion that they ‘loved all lessons’ and that the tutor performed very well. They considered all lessons to be very interactive and well taught. Most participants agreed or even strongly agreed that the content of this programme was challenging enough, providing them with many opportunities to think in-depth about interesting and advanced mathematical problems. In addition, most participants agreed or strongly agreed that they were able to appreciate better the close relationship between mathematics and various workplaces. They had not had an opportunity before to experience the role of mathematics in such real contexts.

Second, students’ perception of the lesson they most appreciated tended to reflect individual differences among the students — for example, in terms of background experiences, personal interests, and parents’ occupations. Participants’ perceptions of the lessons they liked least tended to reflect the difficulty level of the lesson content. Some lessons that were deemed to be ‘difficult’ were seen by some students as the least enjoyable and effective. It is not entirely clear whether a few students perceived some lessons to be ‘boring’ because the content was too easy, or was too difficult, or the topic simply did not hold their interest.

Third, the participants’ suggestions for improving the programme almost all related to the schedule and venue rather than to the content or format of sessions. Again, individual differences among students almost certainly accounts for some students wanting more time and others wanting less time for lessons. For example, students vary in their attention span, motivation, persistence and aptitude.

In addition to helping students gain greater insights into the relationship between mathematics and workplaces, a secondary (and minor) aim of the programme was to expose participants to a range of possible occupations within the world of work. It could be argued that the primary school years are too early for students to receive any form of career education, but some gifted learners may want to know more about different career paths as early as possible. This programme provided the students with a brief window on several distinctly different areas of employment, and in doing so may have awakened the interests of some students.

It is expected that another enrichment programme of a similar nature will be organized here in the future, to provide gifted learners with an awareness of work values in different careers.

Implications for serving the needs of mathematically gifted learners

It is evident from the data that mathematically gifted learners in this programme perceived it as meaningful to learn about advanced mathematics as applied in the workplace. The implications are that all schools need to endeavour to expand their mathematics curriculum a little to include more real-life and workplace topics, with problems requiring a solution. This would not only provide challenges for gifted students but would make mathematics more relevant and appealing to average and below average students. Teachers need to recognize the value of including many open-ended
exploratory activities within a typical mathematics lesson. Such activities can lead to better conceptual understanding, and can be more challenging for all students.

Conclusions

Through this pilot programme, participants were exposed to several areas of advanced mathematics in context, and were able to better appreciate the functions of mathematics in the workplace. Evaluation of the programme on completion suggested that it achieved its goals for the majority of participants. Future programmes will provide due attention to administrative aspects of scheduling and venue.

The obvious limitation of this pilot programme was that it involved only 21 participants. In addition, these participants were a highly select group, displaying well above average ability in the area of mathematics. The findings might not apply equally to other groups of students of lesser ability. There is evidence from other studies that suggests the use of extremely challenging and open-ended mathematics problems with lower-ability students is often counter-productive, leading to frustration and disengagement (Westwood, 2011). The application of ‘Mathematics in the Workplace’ to students of lesser ability may not therefore be appropriate. Nor can be assumed that the programme is necessarily appropriate for other gifted students who are not talented in mathematics, or those who are selected by other criteria.

The programmed was fairly heavily labor and resource intensive with guest speakers, a tutor and specially collected or designed teaching resources. It would be difficult to replicate a programme of this standard as part of the normal curriculum within the resources of a typical government school.

This article has focused only on the implementation and evaluation of the enrichment programme in the mathematics domain. Research associated with future programmes may include (i) investigating more specifically the mathematics concepts and skills participants really acquire from the lessons; (ii) probing more deeply to explore why some students perceive certain topics to be ‘boring’ while others find them ‘challenging;’ and (iii) assessing the effect of exposure to different types of employment on students’ awareness of the world of work.
References


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How do Parents and Teachers of Gifted Students Perceive Group Work in Classrooms?

Katie S. Saunders-Stewart; Cheryl L. Walker; Bruce M. Shore
McGill University, Canada

Abstract
Although an abundance of information exists concerning advantages and disadvantages of certain grouping arrangements with highly able students in classroom settings, little research has focused on gifted children’s parents’ and teachers’ opinions of group work. The present study explored potential differences between these opinions. Parents (n = 15), teachers (n = 11), and a group who were both parents and teachers (n = 5) of gifted children responded to a researcher-designed telephone interview. Teachers were more favorable to group work, reported their opinions as driven by their pedagogical knowledge regarding its advantages, and perceived parents as competitive and grade-oriented. Parents were less favorable and their opinions were based on their children’s negative experiences. Both groups were aware of each other’s perspective. Reform-based pedagogy, extensively endorsed in gifted education, supports classroom group work. Educators seeking parental support for group work should ensure, beyond learning benefits, a positive experience for gifted students.

Keywords: Gifted; grouping; group work; parents; teachers; opinions.

Inquiry-based learning provides the opportunity for students to engage in such activities as “making observations; posing questions; examining books and other sources of information to see what is already known; planning investigations; reviewing what is already known in light of experimental evidence; using tools to gather, analyze, and interpret data; proposing answers, explanations, and predictions; and communicating the results” (National Research Council, 1996, p. 23). Inquiry-learning environments are authentic and, therefore, motivating for students, and learning occurs through an active process of question-asking based on student interest or curiosity (Auulls & Shore, 2008; Robinson & Hall, 2008).

Teachers and learners work together to construct parts of the curriculum, plan and execute solutions for their questions, and share and review their results. Group work is often used as a way for students to learn from each other, share and challenge ideas, and construct knowledge together (Llewellyn, 2002). The theoretical foundation of inquiry-based learning and pedagogy is social constructivism (Vygotsky, 1978): (a) Students ultimately create meaning for themselves, (b) they do so most effectively in dialog with more knowledgeable peers, teachers, or others, and (c) they are scaffolded to new levels of understanding by these other people when the new learning task is initially capable of being accomplished with help but not independently (i.e., in what Vygotsky called the zone of proximal development).

Although inquiry-based learning is appropriate for all students, it has long been recommended as particularly beneficial for students who are highly able (Auulls & Shore, 2008; Robinson, Shore, & Enersen, 2006). A widely known example of an inquiry-based learning model in gifted education, one that frequently involves group work, is Renzulli’s (1977) Enrichment Triad. In “Type III” activities, small groups or individual students engage in research investigations in areas of personal interest. Students pose questions, gather data, solve problems, and share a final product with an appropriate audience. This process is similar to how a professional would carry out research and present his or her findings. Inquiry based instruction is also widely supported in ongoing general curricular reforms (e.g., Alberta Learning, 2004; European Commission, 2007; National Council of Teachers of Mathematics, 2000; National Council for the Social Studies, 1994; National Research Council, 2000; NGA/CCSSO, 2010; Québec, 2001, 2004; UNESCO, 2008).
Common to inquiry in general and the many specific gifted-education models that incorporate inquiry is group work. In past debates about homogeneous versus heterogeneous grouping in cooperative learning, for example, the debate has been about which students are well or poorly served in the presence of higher- or lower-performing students in the working groups (e.g., Baer, 2003; Coleman & Nelson, 2009; Feldhusen & Moon, 1992; Melser, 1999; Robinson, 1991; Robinson, 2003). Gifted-education models (see, e.g., Maker, 1982), originally assumed that all participants were somehow identified as gifted; the reality in most classrooms is more diverse.

Group work offers potential for disagreement about its value, for example, between parents and teachers of gifted students. Parental opinions and attitudes have been considered regarding inclusive education (e.g., Daniel & King, 1997), and parent and teacher attitudes have been compared regarding gifted identification, early admission, and gifted programming (e.g., Gagné, 1983; Sankar-DeLeeuw, 2002). For example, Gagné (1983) collected questionnaires from parents and teachers regarding attitudes towards services for gifted students. Although no differences were noted in terms of the direction of attitudes as favorable or unfavorable, differences were discovered in terms of the intensity with which these views were held. Teachers more strongly argued in favor of the rights of gifted students and the need for specialized education, and rejected the argument that those who are gifted do not need extra support or that offering special services to the gifted is elitist. Parents clearly supported the rights of gifted students; however, they held mixed opinions in terms of providing support and elitism. In terms of special classes and acceleration, large variability was also noted indicating that individuals in both parent and teacher groups were in favor of or opposed to these interventions. Sociodemographic variables including the mostly male teacher sample and mostly female parent sample, as well as differing socio-economic status among parents and teachers, were described as possible explanations for these discrepancies. In fact, there may be genuine differences between parents’ and teachers’ perspectives. In addition, although Gagné’s research examined parent and teacher attitudes, very little is known about their attitudes towards group work within the classroom and our search revealed no prior direct studies of this phenomenon.

There have been relevant studies of students’ preferences. For example, Adams-Byers, Whitsell, and Moon (2004) discovered that gifted students perceive mixed-ability grouping as having more social advantages, and they perceived homogeneous grouping as having more academic advantages. Matthews (1992) reported that gifted children prefer to be grouped with other children of the same ability. These students also reported that they do not enjoy teaching others in their group. These studies were, however, addressed grouping in general rather than group work, although they overlap considerably.

The comparison of parental and teacher perspectives is important because of important changes happening in school governance, for example in Canada, the USA, the United Kingdom, and Australia among other countries. Parents, much more than a generation ago, are formally involved in school governance through governing boards, school committees, and other arrangements. Sometimes their decision-making influence extends to decisions about hiring and firing. The curriculum (both its content and pedagogy components) is shared with educators and central policy-makers. If the latter seek to take curriculum in new directions, and in gifted education they have been trying to do so for nearly a century, then parents and teachers need to have agreement on core issues. Group work in classrooms is one such issue, and a meaningful discourse requires understanding the starting points for both parties.

The theoretical framework of social and cultural capital may provide a useful basis for examining these differences in attitudes and opinions. Lareau and Horvat (1999) described how the social milieu plays a large role in the value of capital or resources. For example, resources that are advantageous in one setting may not be advantageous in a different setting. Furthermore, capital or resources are influenced by different skill sets. Resources to support children in a school setting can include parental finances, social support, and parental education. Specific to Lareau and Horvat’s study, race was determined to influence the relationship between parents and school personnel independent of social class. Therefore, individuals invest social capital in various social settings,
however, not all social or cultural capital is considered equivalent across social settings. White parents were determined to be at an advantage in the school setting in terms of having more trust in initial school relationships. Lareau and Horvat stressed how the ability to use capital influences its value in a given situation.

Graue’s conceptualization of social capital theory (1998) expanded on the work of Lareau and Horvat and identified potential areas of weakness. Specifically, Graue discussed how a lack of involvement with the school can often be misinterpreted as resistance from parents, and the idea that equity eliminates advantage, therefore potentially affecting outcomes of the parent-school system. Furthermore, Graue (2005) examined preservice teachers’ dispositions regarding the relationships between home and school. Parents, although experts about their own individual child, lacked objectivity that emerges through experience with large numbers of students.

Graue, Kroeger, and Prager (2001) added to the theoretical discussion of social capital, particularly incorporating Bakhtin’s ideas of answerability and addresivity (Bakhtin, 1981; Bakhtin, 1986; Bakhtin, 1990; Bakhtin, 1993). Answerability refers to a responsibility specific to an individual that cannot be transferred to another. Addresivity refers to acts that are targeted to a specific audience. Parents may be expected to demonstrate both answerability and addresivity with respect to their children, especially if they perceive the need to assure some desired outcome or process such as school success or the teacher’s attention. Graue et al. focused on the ideas of power within these concepts, specifically as a lens through which to examine home-school relations. Parents judged the progress of their children based on their own experiences. Teachers answerability and addresivity are less singularly focused, and take into account school administrators, all the learners in their class, and frequently parents. The home-school relationship is complex and influenced by social position, cultural interactions, the individual, and both answerability and addresivity issues on the part of all participants. Perhaps these influences contribute to different perceptions between the home and school environments.

A related expression of social capital specific to classroom group dynamics is termed the “free-rider” effect. A free rider is an individual or several individuals who complete a substantially smaller proportion of the work, or produce work of lower quality, and thereby take advantage of more productive or more capable members in the group. Free riders usually still reap the benefits once the final product is complete. A “sucker” refers to a group member or several members who complete most of the work for the project or activity (Orbell & Dawes, 1981). This may relate to social capital in terms of a competition for limited resources (e.g., teacher input). Access to teacher time is most challenged in group work and, regardless of whether the groups are mixed-ability or not, a parent of a child seen as providing a greater contribution may see his or her child as receiving less teacher attention in a group or having potential success diluted; this would challenge the parent’s sense of answerability. Teachers may feel the need to support weaker learners, an expression of addresivity. Social capital may apply to parent and teacher views of group work and therefore might provide an empirical test of the theory’s applicability.

Methodology

To address the opinions of teachers and parents, a researcher-designed, telephone interview was developed by examining the literature on cooperative learning and other forms of group work with gifted students, and also through discussion about topics that might differentiate the parents’ and teachers’ opinions. We could not locate any previous research that directly addressed this question. However, because of the research on the free-rider effect, we especially wanted parents to be able to indicate if they had a particularly positive or negative personal experience with classroom group work. The final interview consisted of 11 questions for all parents and teachers, three questions specifically for parents, and three questions specifically for teachers (see Appendix A). Fifteen parent, 11 teacher, and 5 parent-teacher members of the National Association for Gifted Children (NAGC) were contacted through the purchase of one-time access to a random subset of the membership list. Parent participants had at least one child who had been identified as gifted by whatever means this
was done in their schools, and teacher participants had taught gifted students at some point in their teaching career; we did not seek information about the specific local definitions. Replies to a small number of questions (e.g., about the numbers of children in the family or grades taught by teachers, and their potential for exploring differences within the parent or teacher groups) were not used in the analyses because of the small sample size.

**Results**

Parents and teachers disagreed about the importance of group work in the classroom. When asked to rank the importance of group work for gifted students on a scale from 1 (not at all important) to 10 (very important), teacher responses had a mean of 8.95 ($SD = 1.59$) while parent responses had a mean of 6.33 ($SD = 1.91$). When asked the same question with respect to average-ability students, the mean for teachers was 8.64 ($SD = 1.55$) and the mean for parents was 6.57 ($SD = 2.10$). We did not expect parents of gifted students to give meaningful replies about what is appropriate pedagogy for other children, but this question reassured us that responses about gifted students were differentiated from responses about others, and not general pedagogical opinions held by parents. The parent-teacher group, kept separate despite its small sample size, had means that were more similar to those of the teachers than those of the parents both with respect to gifted students ($M = 8.60, SD = 1.67$) and with respect to average-ability students ($M = 8.80, SD = 1.79$).

The means of the three groups were compared for each of these questions with a one-way analysis of variance. With respect to gifted students, the difference between groups was significant, $F(2, 28) = 7.85, p < 0.01$. Tukey’s Honestly Significant Difference Test indicated that teachers ranked group work as significantly more important than did parents for gifted students ($p < 0.01$). With respect to average-ability students, the difference between groups was also significant, $F(2, 27) = 16.76, p < 0.05$. Tukey’s Honestly Significant Difference Test indicated, again, that teachers ranked group work as significantly more important than did parents for average-ability students ($p < 0.05$). Given the uncertainties of relying upon significance testing with very small samples, we also calculated effect sizes. The partial-eta squared ($\eta^2$) values, 0.36 regarding gifted students and 0.26 for average-ability students, indicated that the differences observed between parent and teacher responses were large and moderate respectively (Barmette, 2006; Kiess, 1996).

Participants were also asked open-ended questions about their general opinions of group work and about what types of grouping arrangements they believed were best. General opinions were separated into three categories: (a) group work is necessary ($n = 7$ teachers, 2 parent-teachers, 0 parents), (b) group work is conditionally acceptable ($n = 3, 3, 12$, respectively), and (c) group work is undesirable ($n = 1, 0, 3$). The largest group of teachers replied that group work is necessary; only one selected undesirable. No parent rated group work as necessary; the parents overwhelmingly regarded group work, at best, as conditionally acceptable. The parent-teachers were divided between necessary and conditionally acceptable; none replied undesirable. A chi-square test, $\chi^2(4, n = 31) = 13.50, p < 0.01$, confirmed that the patterns of response frequencies for teachers, parents, and parent-teachers were significantly different across the three categories.

The most common response for teachers was that group work is necessary. Parents especially rated it as conditionally acceptable. The conditions imposed by parents included concerns about how the group work is carried out, the skills of the teacher to do so properly, and the composition of the groups. Many parents expressed concerns that their children often feel resentful that they need to take all of the responsibility when working in groups. One parent (#11) said, “we felt like our kids haven’t gotten a fair shake in the group work, or their contribution has been out of proportion with what other members of the group have contributed.” This concern is consistent with learning preferences of gifted children themselves (French, Walker, & Shore, 2011; Walker, Shore, & French, 2011) and reflects sensitivity to the “free-rider” effect (Orbell & Dawes, 1981) that can taint group work. Participants were asked to rate the following statement, “Teachers find it easier to manage a classroom when students are arranged in groups,” for its possibility as an explanation of parents’ and teachers’ differing opinions of group work (1 = strongly disagree, 10 = strongly agree). The three
groups differed significantly and the effect size was moderate in ratings of this statement, $F(2, 27) = 4.42, p < 0.05, \eta^2 = 0.25$. Tukey’s Honestly Significant Difference Test indicated that the parents ($M = 7.60, SD = 2.85$) ranked this item significantly higher than did teachers ($M = 4.00, SD = 3.09$). This is consistent with parents’ and teachers’ comments about the management of group work.

**Conclusion**

Parents and teachers of gifted students differ in their perceptions of the value of group work in classrooms. Their perceptions differ because they fundamentally view classroom group work from different perspectives. Parents focus on their own children’s opportunities for positive learning but also on their children’s reports of negative classroom experiences. Parents’ perceptions also reflect their own personal school experiences. Teachers’ perceptions are driven by their wider responsibilities for a larger group of learners and also by their commitment to pedagogical practices that depend in part on classroom group work to be fully effective and to promote students’ personal and shared responsibility for learning.

**Discussion**

The discrepancy between parents’ and teachers’ opinions about classroom group work could conceivably reflect a difference in the nature of group work to which the parents and teachers refer. We were not able to distinguish if any participants interpreted “group work” to mean general “grouping” in which the instruction teacher may have adapted instruction, but in which students still worked individually. None of the responses suggested that this interpretation was in play. Several teachers noted that it was difficult to effectively manage groups; however, the parents may have recollected their children in situations in which group work had failed because the teacher was not actively or appropriately involved, or had not taken precautions to avoid the free-rider effect or gifted children excessively acting in the role of tutor for a lower-achieving learner rather than personally being challenged with new experiences. The type of group management described in the quote above requires much more energy and effort than the version that parents may be picturing. Again, it seems that parents’ and teachers’ own experiences with group work affected their opinions.

On many of the interview questions, participants from all three groups were in agreement, even when provided with the opportunity to spontaneously provide thoughts on what might be driving the opinions of the opposite group. Parents and teachers were, for the most part, able to see and respect each others’ perspectives, while still retaining their own opinions.

Several possible explanations emerged for parents’ and teachers’ differing opinions about the importance of group work. Parents were doubtful of the value of group work for their gifted children. When asked for their general opinions of group work, parents were most likely to deem it acceptable only under certain conditions such as appropriate group management by the teacher and particular grouping arrangements. Parents were concerned that when these conditions are not met, their gifted children do not receive the best possible education for their needs because they spend a great deal of their time teaching other students rather than being challenged. Parents claimed that their negative opinions were affected by their children’s bad experiences with group work. Many said they had either observed their children doing all of the work in a group or had heard their children complaining about their frustration.

Teachers did not report the same negative experiences. They were more likely to perceive parents as competitive and grade-oriented, although parents were less likely to see these qualities in themselves. Teachers’ knowledge of the pedagogical value of group work was indicated by all three groups of respondents as a major contributor to their more positive opinions of group work.

The reasons behind parents’ and teachers’ differing views seem to relate to the different ways they have seen group work occur. Teachers see the pedagogical and social benefits of group work in the classroom, while parents receive negative feedback at home from their children. The children may be the link that will help us to understand parents’ and teachers’ differing opinions. Although children
complain to their parents, they may tell teachers what they want to hear or not tell them their honest opinions of group work. Alternatively they may be telling their parents what they think the parents want to hear. Thus, parents and teachers may be working under different assumption about gifted children’s enjoyment of or benefit from group-work activities.

Until parents and teachers walk in each others’ shoes, they will likely still disagree about the importance of group work with gifted students. However, they seem to be aware of valid concerns from each side of the coin, which is a starting point for an exchange of ideas that may help parents and teachers to better understand and appreciate each others’ points of view. Children can benefit from the input of both parents’ and teachers’ perspectives when they work together, despite differing opinions. One parent-teacher participant put it best, “As a parent, you really fight for your own individual child. And rightfully, I think parents need to advocate for their own kids. As a teacher, you see the group, and so I think there’s just going to be that conflict there. Whether it’s meant to be, you don’t intend it to be, I just think it happens.”

Overall, parents of gifted students are less favorable toward group work. Perhaps they see the more practical effects of group work on their own children first-hand, and are therefore less interested in the educational literature that supports the use of different types of group learning mentioned above. Parents’ concern about their children’s satisfaction in the classroom, gleaned from their own children’s similar feedback, is consistent with previous research on gifted children’s own opinions of different types of group work (Adams-Byers et al., 2004; Matthews, 1992).

**Implications**

Theoretically, the results support the relevance of theories of social capital (Graue, 2005) and the applicability of the notions of answerability and addressivity in studying home-school interactions (Graue et al., 2001). Also, the observed gap could widen as teachers’ pedagogical practice moves in the direction of inquiry-based instruction (Aulls & Shore, 2008; Shore et al., 2008) and its theoretical pillar in social constructivism (Vygotsky, 1978) because of its emphasis on students creating meaning together and the process of scaffolding such learning. Gifted students are more likely to find themselves in the role of more able peer when group work engages diverse groups of students.

In terms of practice, if students must be arranged in groups, parents or gifted children prefer that their children be grouped with their academic peers as opposed to mixed cooperative-learning groups. The difference of opinion between teachers and parents is consistent with the debate in the literature concerning which type of grouping for classroom activities is most beneficial. Parental perspectives often lack the professionalism and wider responsibility of a teacher’s point of reference. This may lead parents to focus on the more detrimental aspects of group-work phenomena including the free-rider effect, whereas teachers may focus on the benefits of group work for the class as a whole. The perceived relevance of the free-rider effect would reasonably appear larger for parents of high-performing children, and this could be amplified in a sample of parents, such as in this study, who are also members of an advocacy-oriented association. But this association also has a majority of members who are educators, therefore even within the professional discourse of the association, there may potential for disagreement about instructional practices. A better understanding of where and how parent and teacher attitudes differ can contribute to clearer communication and, therefore, more successful home-school relationships. It may also be important to advocacy efforts (e.g., lobbying) by gifted-education associations that group both parents and teachers and that seek to speak with a single voice. They may agree that differentiated educational services in general are needed for gifted learners, but the unity might be challenged when the message addresses to specific instructional practices.

Inquiry-based pedagogy, also at the core of gifted education, supports the use of group work in classrooms. Educators seeking parental support for group work should ensure, beyond learning benefits, a positive experience for gifted students. This includes providing gifted learners the opportunity to work with their intellectual and creative peers often enough so that they too can be
scaffolded to reach their full potential. It also implies that parents, especially when they partake in school governance or privately seek to influence teachers, accept that the latter stand on solid pedagogical ground when they implement pedagogy that builds students’ responsibility for personal as well as group learning.

Parents and teachers appear to begin their consideration of group work in classrooms from different perspectives driven by different priorities; effective dialog and mutual support will depend on creatively addressing both.

References


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Appendix (A)

Telephone Interview for Parent and Teacher Members of NAGC

Are you a parent or a teacher?
If parent: How many children do you have? I am assuming, because of your membership in NAGC, that at least one of your children has been identified as gifted. How old is he or she? How was he or she identified? What kind of school program is he or she currently in?

If teacher: What grade and subject do you teach?

If both parent and teacher: From which perspective would you be most comfortable answering our questions?

Questions for parents and teachers
1. I would like to know about your opinion of group work in classrooms in general. Are you favorable or unfavorable towards group work? Why do you feel the way you do?

Probes: What do you see as some of the advantages/disadvantages? Is your opinion different if you think about a general class or a gifted class? Does your opinion change based on in-class assignments or out of class work? Does the curriculum or subject matter? Do you think that group work is important for children’s development, either social, emotional, or academic?

2. (a) On a scale from 1 to 10, how important is group work for gifted children, with 1 being not at all important, and 10 being very important.

2. (b) On a scale from 1 to 10, how important is group work for nonidentified children, with 1 being not at all important, and 10 being very important.

Why do you think it is/is not more important for one group?

3. When students engage in group work, is it best for them to receive group or individual grades?

Probes: Why? Do you think this makes a difference for gifted versus nongifted students?

4. When you think of school-children working in groups, are you imagining of a group of children of mixed abilities, or are you imagining of a group of gifted children?

Probes: Would your answers have been different if you were imagining [the other type of group]?

Questions for parents only
5. (a) Did you have any personal experience with group work when you were a student?

Probes: If yes, please describe the situations.

5. (b) On a scale from 1 to 10, how much did you enjoy this type of work, with 1 being did not enjoy at all, and 10 being enjoyed very much.

7. Describe the ways in which you advocate directly on behalf of your child(ren), if you do so.

Questions for teachers only
5. When given the choice, how do you arrange your classroom for learning purposes?

Probes: Do you use learning centers? Do you like all the desks to be lined up in rows?
6. (a) On a scale from 1 to 10, how often do students in your class engage in group work, with 1 being never, and 10 being always.

6. (b) When students work in groups, who decides what students are in each group? How big are the groups? Are the groups flexible?

**Follow-up questions for parents and teachers**

In our previous study, there were key differences in the way parents and teachers responded regarding group work. In particular, parents ranked group-learning tasks as being relatively less important than did teachers.

1. What do you think is driving the parents’ opinions which were less favorable, and the teachers’ opinions which were more favorable?

For my final question, I am going to give you five explanations that I have come up with to possibly explain the contradictory opinions. Some of these might overlap with what you have just told me. Would you please rate each of these statements on a scale from 1 to 10, with 1 meaning you strongly disagree with the statement, and 10 meaning you strongly agree with the statement.

(a) Parents are concerned that, in groups, their children will not receive due credit or that they will get lower marks because of other group members’ performance.
(b) Parents are concerned about the lack of enrichment or acceleration for their children in mixed-ability groups.
(c) Teachers recognize the instructional value of collaborative activity for children’s social and academic development.
(d) Teachers find it easier to manage a classroom when students are arranged in groups.
(e) Parents and teachers differ in their interpretations of fairness in the classroom.
You Turn up the First Day and they Expect You to Come Back!
Gifted Students’ Perspectives on School and Being Smart

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Abstract
This qualitative multi-site case study sought to examine the current educational provisions in place for intellectually gifted primary school students in Queensland, and to consider the attitudes and perceptions of a range of different stakeholders, including teachers, parents and students. The perspectives of students towards their school and being smart are reported in this paper. The major findings suggested that while students reported being relatively satisfied with their schools, a significant number were concerned about being teased because of their academic ability and achievements. Implications for practice and directions for further research are suggested.

Introduction
It has long been established that intellectually gifted students require a differentiated educational environment, including elements of grouping and acceleration, in order to best cater for their academic, social and emotional needs (Colangelo, Assouline, & Gross, 2004; Gross, 2006). However, students’ voices in the research literature pertaining to provisions which are designed to help them are somewhat lacking. This article reports on findings of students’ perspectives of school which formed part of a larger case study involving four Queensland primary schools.

Literature review
Teachers are often concerned about the social and emotional development of gifted students, with many believing the gifted are more at risk for problems than other students (Bain, Choate, & Bliss, 2006). Gifted children can appear to lack appropriate social skills when they struggle to get along with their age-peers (Davis & Rimm, 2004; Valpied, 2005). However, getting along with others means first finding those appropriate others. Gifted children naturally gravitate towards adults and older children as they attempt to find their intellectual peers (Katz, 1994). Their greatest social need is for friendships with other gifted children (Halsted, 2002) but opportunities to interact with true peers, children of a similar age who share their advanced cognitive development, are often lacking (Davis & Rimm, 2004; Sheely, 1998).

Asynchronous development, overexcitabilities and perfectionism all have the potential to impact on a gifted child’s peer relationships. Gifted children have the same need for belonging as any other child (Sheely, 1998), but issues of friendship can be more complex for gifted children than for others (Halsted, 2002). Gifted children may be deeply worried about the future of the world when
their classmates are unaware and uninterested by such issues (Gallagher, 2006; Halsted, 2002; Smith & Laura, 2009). The tendency of gifted children to see things differently and to experience emotions more intensely allows great potential for a misunderstanding of their unique needs, which can be damaging to their self-esteem (Halsted, 2002; Sheely, 1998). Gifted children can create elaborate games with complicated rules, in which other children may not be interested. Additionally, their heightened sense of justice can result in disagreements with others if rules are not being followed or applied fairly. Their leadership ability can be directed towards organising other children, which may be perceived as being bossy or dominating (Clark, 2008).

It has been suggested that being gifted is socially stigmatising (Cross, Coleman, & Stewart, 1993), and when gifted children are particularly sensitive to social cues they may start to manage their identity during primary school in order to better fit in with their typical peers (Swiatek, 2002). Popularity becomes more important in the upper primary years and gifted primary aged children use similar coping strategies to those of adolescents to ensure a comfortable social position at school (Swiatek, 2002). Gross (1989) described the ‘forced-choice dilemma’ of gifted youth, where academically gifted students may face the choice of fitting in and being accepted by their peers, or being themselves and risking peer rejection. When gifted students recognise they are different from their age peers, they may have to choose between their drive for achievement, and their need for intimacy, realising they risk rejection if they allow their differences in abilities and interests to show.

The foremost study of student perspectives on giftedness is Galbraith’s (1985) ‘Eight Great Gripes’ in which 400 gifted children and adolescents from gifted programs across the United States were surveyed and interviewed about their experiences of being gifted. The responses ranged across eight dimensions, which were categorized by a follow-up study (Kunkel, Chapa, Patterson, & Walling, 1992) as Confusion, Boredom, Perfection, Ridicule, Loneliness, Uniqueness, Burdened, and Altruistic. The two studies achieved remarkably similar results, despite a much narrower age range of the follow-up study, and differences in methodology. Students reported both positive and negative elements of their experience of being gifted, with confusion and frustration about perfection and uniqueness being the most frequently mentioned concerns (Kunkel et al., 1992). In their book, ‘Intelligent Life in the Classroom,’ Isaacson and Fisher (2007) include a section of comments from gifted children which also mirrored these concerns. However, these students also spoke of their frustration with the lack of academic challenge at school, being made to work at the pace of the slowest student, and being ridiculed by other students for being bright. Ridicule based on intellectual ability also featured as a significant feature of bullying aimed at gifted students in an American study by Peterson and Ray (2006).

There has been very little research on the phenomenon of bullying of or by gifted children (Peterson & Ray, 2006), but the general bullying literature indicates that between 11% and 89% of school students are victims of bullying at some time (Baldry, 2003; Nansel, Overpeck, Pilla, Ruan, Simons-Morton, & Scheidt, 2001). Differences in definitions may help to account for some of the discrepancies between findings, as well as international variations, but in a review of international bullying statistics, Weir (2001) reported an average victimisation rate of between 14% and 19% and suggested bullying behaviours peaked at age seven, and again at ages ten to twelve. Peterson and Ray (2006) sought to investigate both the prevalence and impact of bullying on gifted students and conducted a retrospective survey of 432 gifted eighth grade students across the United States. Findings suggested 67% of participants had experienced some form of bullying, with verbal aggression and name-calling being the most common. Name-calling was organised around five broad themes, with name-calling related to intellectual capacity, such as ‘nerd’ or ‘geek’, the second most common form after names related to appearance (Peterson & Ray, 2006).

Earlier, a study of gifted African American girls revealed more than half were being teased for their high achievement, leading to underachievement and feelings of alienation and rejection (Ford, 1994/95). Peterson and Ray (2006) theorised that the intensity and sensitivity associated with gifted children may mean they were more likely to be uniquely affected by bullying, compared to the general population. However, this remains a theory, as the research did not compare the reactions of
gifted students to those of regular students. The study did show emotional distress related to being bullied was greatest for gifted students during grades five to eight, perhaps because this coincides with the period when peer relationships and social acceptance begin to take on greater significance (Neihart, 1999; Woolfolk, 2004).

Method and context

The data reported in this article forms part of a larger case study involving four Queensland primary schools. The focus of this article is on the perspectives of students towards their school and school in general. Findings relating to teachers and parents are reported elsewhere. This qualitative multi-site case study was set within a single educational region of Queensland with a mixture of coastal and hinterland towns. A letter was sent to the principals of primary schools in the region, inviting them to participate in the study. Of the four schools recruited to take part in this study, three were State schools (Heron Haven, Black Swan and Pelican Point) and one was an Independent school (Kingfisher).

A two-day academic extension workshop targeting intellectually gifted students in the upper primary grades was conducted at the four participating schools. At each school, up to sixteen students were nominated to attend by their teachers and gifted education coordinators. At the conclusion of the workshop, a brief qualitative questionnaire was administered to students containing open-ended questions designed to elicit their feelings about the workshop they had just attended, how they felt about school, and how they felt about being smart. Students were advised that completing the written questionnaire was voluntary and their responses would be anonymous. Qualitative content analysis was used to analyse the questionnaire data in a similar method to that employed with interview data, searching for themes and recurring patterns of meaning. Additionally, quantitative content analysis was also applied, which involved coding the raw data and constructing categories that would capture the relevant characteristics of the questionnaire responses. This allowed for generalisations to emerge in the participant responses and for comparisons to be made across cases.

Results

Pelican Point State School (PPSS)

A two-day extension workshop was held at PPSS in term one of 2009. Despite teachers being invited to nominate up to 16 gifted students, only twelve attended. Eleven of those returned a completed questionnaire although not all questions were answered by all students. The students’ feedback regarding the workshop was overwhelmingly positive, with the science activities in particular being nominated by this group of students as the sort of thing they would like to do more of in their own classrooms.

The social aspects of schooling were clearly important to this group of students as the majority nominated friends or playtime as being the best thing about school, while sport was also nominated by a couple of respondents. Only one student proposed an academic area as the thing they liked best about school, nominating ‘maths, because I like a challenge’ (PP-j). Mathematics also featured in responses to question about what students liked least about school. Here, academic responses dominated, with six students suggesting work of various kinds was their least favourite thing about school.

Work! Because I don’t like it. (PP-a)
Maths, because I am not that good at it. (PP-d)
Working. (PP-e)
Challenges and extra work. (PP-g)
Maths. It’s not fun. (PP-i)
Japanese. It is too hard and I don’t understand it. (PP-j)

Three students did not answer this question, but another response suggested they had been on the receiving end of some teasing because of their giftedness.

Being called a nerd just because you are a bright individual. (PP-h)
In considering possible improvements or changes to their school, most students opted for administrative and physical changes, including longer lunches, starting later, having fewer rules, or making changes to the uniform or school grounds. One satisfied student would change nothing about their school, while another opted for a more radical idea.

*I would say the kids teach the teachers.* (PP-a)

The students were asked to nominate the best and worst things about being smart, but several students opted not to answer these questions. Conversely, getting extra work featured in responses to both questions. While one student thought it was the best thing about being smart, three students suggested it was the worst. Getting good grades, having proud parents and being able to get a good job all featured among the advantages of being smart, with one student suggesting missing school to attend enrichment activities was a particular bonus.

**Black Swan State School (BS)**

All sixteen students who attended the workshop returned their completed questionnaires, although some questions were left unanswered. Academic pursuits were regarded as the best thing about school by half of the respondents, especially reading and mathematics. The social aspect of school was also clearly important to this group with five nominating friends as being the best thing about school, and playtime being suggested by another two. Some students were unsure about what they considered to be the worst thing about school, but some concerns were suggested.

*Learning stuff I already know.* (BS-j)

*Bad kids that stop you from learning.* (BS-m)

Mathematics also featured prominently in this section, though for different reasons. While one student nominated mathematics because they were not good at it, another suggested it was ‘soooo boring’ (BS-f) perhaps indicating they were already familiar with the material they were learning. ‘Getting in trouble’ (BS-g and BS-h) was also regarded by two students as the worst thing about school, dispelling the myth that all gifted students are well-behaved teacher-pleasers! Asked what they would change if they could, many students opted for administrative or physical things, such as the school dresses, the short eating time at lunch, or covers over the bike nets, while two students would like to see an end to homework. One student suggested:

*Not teach us stuff we already know.* (BS-j)

A myriad of responses resulted from the question, ‘what is the best thing about being smart?’ These included having extension opportunities such as the workshop, being able to have any job, finishing work quickly, and getting good marks. More unusual responses included:

*What kind of question is that?* (BS-b)

*Getting respect from the teacher.* (BS-d)

*You understand what to do in life in and out of school.* (BS-m)

Opinions were also divided about the worst aspects of being smart, although there were some commonalities. Being teased and name-calling was a concern for four students, with another three suggesting other people could get jealous. Being smart was a burden for four students, as they described other people always asking questions or wanting to copy their work, or just being given extra work to do. One student answered both questions with a question of their own – ‘I’m smart?’ (BS-f).

Students were overwhelmingly positive about the workshop itself with many suggesting they would have liked it to go for longer. The science activities were especially popular with many students nominating those as the types of things they would like to do more of in their own classrooms.

**Heron Haven State School (HHSS)**

At HHSS, students tended to be fairly positive about school in general. When asked what they liked the most about school, about half nominated learning generally or specific academic subjects
such as mathematics or English. A couple of students thought being with their friends was the best thing, while another two students included the teachers in their choice, and a third preferred interschool sport.

*I like art and English the most because they’re the easiest subjects for me.* (HH-c)
*I like seeing my friends because they are fun and cool.* (HH-f)

In deciding what they liked least about school, four responses included concerns about boredom or easy work, while a couple of students suggested they liked hard work the least. Several nominated things like short lunch breaks or PE, but three satisfied students could not think of anything they did not like about school.

*The length of the sessions because I get bored of the activity we’re doing fairly quickly.* (HH-a)
*The work is too easy.* (HH-b)
*Hard work, because it’s so hard.* (HH-d)

Asked what they would change about school if they could, there was a range of responses focused around the time spent in the classroom and school uniform, but again, a small core of satisfied students saw no need to change anything in particular. However, one student specifically mentioned the lack of provision for gifted students as something that should be changed.

*The fact that there are no special amenities for gifted students.* (HH-b)
*The number of days we go to school each week.* (HH-a)
*Playtime because it’s not long enough.* (HH-c)
*No PE and no maths but all reading.* (HH-m)

The students were also asked what was the best and the worst thing about being smart. While there was great variation in responses regarding positive aspects of being smart, students were fairly united about the negative aspects, with the majority suggesting being teased or being called names was the worst thing. Only one student proposed an alternative response, suggesting ‘having questions fired at you all the time’ (HH-m) was the worst thing, while the rest focused on the same issue, which was ‘teasing’.

*People call you a know-it-all.* (HH-b)
*The worst thing about being smart is when you get teased.* (HH-e)
*People teasing you and calling you a dork and nerd sort of stuff.* (HH-k)
*Some people don’t like you because of it.* (HH-n)

In contrast, ideas about the positive aspects of being smart were many and varied, including being able to get a good job, winning competitions, having the opportunity to participate in programs such as the workshop, and being able to help people. Other students enjoyed doing well at school, being able to solve problems without help, and despite the negative aspects, one student suggested ‘people think we’re great’ (HH-h). However, it seems at least one student struggled with the experience of being gifted at Heron Haven. In response to the question, ‘What is the best thing about being smart?’ this student answered:

*Nothing. I WANT TO BE AVERAGE* (underlining and caps in original)(HH-j)

**Kingfisher Independent School (KIS)**

Sixteen students attended the workshop at Kingfisher Independent School. Fourteen of them returned a completed questionnaire. Opinions were divided about what best liked about school, with around half nominating friends and half nominating academic work in various subjects or just learning in general. There was a little more variety regarding what they liked least. While a couple of satisfied students said there was nothing they didn’t like, mathematics, English and spelling were disliked by some. Other answers were more puzzling.

*You turn up the first day and they expect you to come back!* (K-h)
*Class room work because we do not put ourselves in it.* (K-i)
*Teacher yelling. They scare me.* (K-j)
Three students would not change anything about their school, while another three suggested school should be more like the workshop. Another two students also wanted to see some changes to their school work, either to include more science, or to make it more fun, and there were a couple of more mundane concerns, such as having a shorter school day or not having to eat in the primary school eating area.

When it came to the questions asking about the best and worst aspects of being smart, many students simply did not answer. There were four and five non-responses to these questions respectively. Of the remaining responses, three students described themselves as not being smart, with one suggesting they just liked working. Other students thought that finding it easy to answer questions, having more opportunities or having more free time was the best thing about being smart. Another two students said there was nothing bad about being smart, but others disagreed. Three students said being teased or being called a nerd was the worst thing, and others did not like being treated differently or having to wait for others to catch up.

Others aren’t as smart as you and you have to explain – people treat you differently. (K-h)
You have to wait for everybody. (K-j)

As with other participating schools, there was an overwhelmingly positive response among these students towards the workshop. However, there was much greater variety regarding which aspects of it they would like included in their classroom activities. Science was still a popular choice, but other suggestions included the debating, problem-solving, drama, the quiz and Latin activities. Responses also suggested students enjoyed the challenging nature of the activities and working in groups with like-minded peers.

Cross-case summary

Across the four schools, 55 students from Years 5, 6 and 7, returned completed questionnaires after attending an academic enrichment workshop. Responses have been tabulated to allow for easier comparison across cases, and a summary of the results can be seen in Tables 1 through 5.

Table 1: Student descriptive data regarding favourite things about school.

<table>
<thead>
<tr>
<th></th>
<th>Pelican Point SS</th>
<th>Kingfisher Ind. Sch.</th>
<th>Black Swan SS</th>
<th>Heron Haven SS</th>
<th>Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic aspects</td>
<td>2</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>Social aspects</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Sport</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>No answer or I don’t know</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Something Else</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Totals* May add up to more than 55 as some students gave more than one answer</td>
<td>13</td>
<td>15</td>
<td>18</td>
<td>14</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 2: Student descriptive data regarding least favourite things about school.

<table>
<thead>
<tr>
<th></th>
<th>Pelican Point SS</th>
<th>Kingfisher Ind. Sch.</th>
<th>Black Swan SS</th>
<th>Heron Haven SS</th>
<th>Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic aspects</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>School administrative issues, e.g. timetable</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Sport</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Nothing</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>No answer or I don’t know</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Something Else</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Totals* May add up to more than 55 as some students gave more than one answer</td>
<td>11</td>
<td>14</td>
<td>16</td>
<td>14</td>
<td>55</td>
</tr>
</tbody>
</table>
Table 3: Student descriptive data regarding proposed changes to school.

<table>
<thead>
<tr>
<th>If you could change something about school, what would you change?</th>
<th>Pelican Point SS</th>
<th>Kingfisher Ind. Sch.</th>
<th>Black Swan SS</th>
<th>Heron Haven SS</th>
<th>Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic aspects</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Physical aspects</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Uniform</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Timetable</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Nothing</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>No answer or I don’t know</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Something Else</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Totals* May add up to more than 55 as some students gave more than one answer</td>
<td>11</td>
<td>14</td>
<td>17</td>
<td>14</td>
<td>56</td>
</tr>
</tbody>
</table>

Table 4: Student descriptive data regarding the best things about being smart.

<table>
<thead>
<tr>
<th>What is the best thing about being smart?</th>
<th>Pelican Point SS</th>
<th>Kingfisher Ind. Sch.</th>
<th>Black Swan SS</th>
<th>Heron Haven SS</th>
<th>Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get good grades, win competitions</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Have more opportunities</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Have more knowledge</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Can get a good job</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Work is easy</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>I’m not smart</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>No answer or I don’t know</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Something Else</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Totals* May add up to more than 55 as some students gave more than one answer</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>14</td>
<td>56</td>
</tr>
</tbody>
</table>

Table 5: Student descriptive data regarding the worst things about being smart.

<table>
<thead>
<tr>
<th>What is the worst thing about being smart?</th>
<th>Pelican Point SS</th>
<th>Kingfisher Ind. Sch.</th>
<th>Black Swan SS</th>
<th>Heron Haven SS</th>
<th>Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being teased</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Being given extra work</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Others are jealous</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Others copying work or asking for answers</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Nothing</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>I’m not smart</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>No answer or I don’t know</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Something Else</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Totals* May add up to more than 55 as some students gave more than one answer</td>
<td>11</td>
<td>14</td>
<td>16</td>
<td>14</td>
<td>55</td>
</tr>
</tbody>
</table>

In answer to the question, ‘what do you like most about school and why?’ students’ responses were split fairly evenly between the academic and social. Students tended to nominate academic subjects described as ‘fun’ or ‘easy’ with only one student preferring mathematics because they liked a challenge. For a similar number of students, the social aspects of school, e.g., spending time with friends, were liked the most. ‘Something else’ responses that could not be categorised included several comments referring to the workshop rather than school, the classroom environment, and ‘just the experience of it [school].’

In considering what students liked least about school, responses indicating academic aspects of school dominated. These responses included particular school subjects as well as ‘work’ in general and homework. Some students complained about work being too easy or boring, while others disliked particular subjects because they were ‘hard’. Others complained about the behaviour of other students.
that interfered with their learning. School administrative issues, such as short lunch breaks or long session times, were a concern for a minority of students, while three satisfied students could think of nothing they liked least about school. A large number of students either left this question blank, or replied they did not know what they liked least about school. Responses categorised as ‘something else’ included teachers yelling, being teased, or dissatisfaction with the school house system.

Students were asked what they would change about their school if they could, and here again, academic responses dominated, with Black Swan State School leading the charge. Responses in this section included suggestions for making changes to specific school subjects or to homework, as well as general suggestions such as make learning more fun, don’t teach students material they already knew, or have the students teach the teachers. Some students suggested making changes to the physical school environment or the uniform, and timetable changes, such as having longer lunch breaks or a shorter school week were also popular. On this question, eight students appeared to be satisfied, suggesting they would change nothing about their school. Dissatisfaction with the house system again appeared and was categorised as ‘something else,’ along with comments suggesting having fewer rules and more fun or having more workshops such as the one they had attended.

There was a huge range of opinions offered in response to the question about the best thing about being smart, with no single category dominating. Students across the four schools were fairly evenly divided on this question, with most categories represented at most schools and no clear differences emerging between schools. Getting good grades, having more opportunities, having more knowledge, finding work easy or being able to get a good job were all highlighted by several students as benefits of being smart. Ten students either did not answer or did not know what they considered to be the best thing about being smart. Five students answered by suggesting they were not smart. One student preferred to be average suggesting there was nothing good about being smart. This was classified as ‘something else’ along with other individual answers that did not fit any of the other categories. These included getting rewards, having more free time, being respected by the teacher, standing out or being able to help people. Another individual student was clearly perplexed by the question, responding, ‘what kind of question is that?’

When students were asked the contrasting question, ‘What is the worst thing about being smart?’ a clear distinction emerged, especially when examining the collated data across the four schools. Being teased was nominated as the worst thing by a significant proportion of the students, although this was concentrated at Heron Haven State School, where eleven out of the fourteen respondents independently made this choice. Lesser numbers of students at the other three schools also gave responses about being teased, and other concerns included being given extra work, other students being jealous or wanting to copy work. In a pattern similar to responses to the previous question, ten students were unable to or did not provide a response. Four students responded they were not smart, while five students thought there were no disadvantages to being smart. Individual ‘something else’ responses to this question, however, included having to wait for others, having to explain things to others, being treated differently and in the words of one student, ‘it could get you in trouble.’

Discussion
The experiences of these students have obvious implications for their teachers. Overall, their responses were generally positive, especially in regards to the feedback of the workshop they had attended. Indeed, it may be that having just engaged in two days of challenging and enriching extension activities, the students may have been feeling particularly positive towards school and this positive frame of mind may have influenced their responses.

Academic aspects of school featured strongly in both the most and least favourite things about school, perhaps indicating students regarded ‘work’ as important, as would be suggested by Erikson’s psychosocial theory (Erikson, 1968). However, when discussing their favourite things about school, many students chose subjects described as being easy, with only one nominating a subject they found
challenging. It has been suggested that when gifted students are in mixed ability classrooms where they are able to be the best at everything with little effort, it may lead to arrogance or superiority, and such children are likely to avoid challenge when they meet it later on (Adams-Byers, Whitsell, & Moon, 2004; Fiedler, Lange, & Winebrenner, 2002).

The social aspects of school were also highly regarded by a significant number of students, suggesting friendship is important. Enough students highlighted the value of lunch or other breaks to suggest an over-reliance on lunch time clubs, as proposed by many schools to meet the needs of gifted students, would not be welcomed by many of these students. Having to choose between friends and academic challenge would pose an unwelcome dilemma, when many students are already faced with the ‘forced choice’ dilemma in adolescence or earlier (Gross, 1989).

Unlike Galbraith’s (1985) landmark study, in which eight main themes in students’ negative experiences of giftedness were identified, the responses of these students were dominated by just one: teasing. Concerns about being teased were classified under the construct of ‘Ridicule’ in a follow up to Galbraith’s study (Kunkel et al., 1992). In that study, the three most frequently mentioned responses fell under the categories of ‘Confusion,’ ‘Perfection’ and ‘Loneliness.’ If the constructs developed by Kunkel et al. (1992) are applied to the student responses in this study, the majority of student responses would fall under the categories of ‘Ridicule,’ ‘Burdened’ and ‘Loneliness.’ In the study by Kunkel et al. (1992) students were not specifically asked about the worst aspects of being smart but provided an open-ended probe asking about the experience of being gifted. This may explain some of the differences in responses. However, while the questions in the current study asked about the best and worst aspects of being smart, they were also open-ended. Students were not provided with a range of responses from which to choose, but independently constructed their own response.

That gifted students are concerned about being teased for being smart should be of interest for teachers, particularly at Heron Haven State School, where this response dominated. Eleven of the fourteen respondents spontaneously voiced concerns about being teased, suggesting gifted students there do not feel accepted. Fostering a school climate that celebrates excellence should be a priority and may go some way to alleviate this concern, especially given the importance of peer relationships during this time (Hamill, 2000; Hartup, 1998). Although only one aspect of the publicly portrayed climate of the school, the fact that Heron Haven did not celebrate any academic achievement by their students publicly through their newsletters, combined with the student responses, may suggest this is currently a school where students do not feel their giftedness is valued.

Feeling burdened by being given extra work has previously been reported as a complaint of gifted children (Kunkel et al., 1992), and this was a concern for a small number of students in this study. These students were concentrated at Pelican Point State School, which may suggest existing provision here has not yet progressed beyond the ‘more of the same’ variety, similar to that described by Crocker and Beeson (1997) in their study of gifted fast finishers.

**Implications for practice**

Instigating changes in the climate of anti-intellectualism and negative stereotyping of gifted students in wider society may be a lofty goal, but should at least be within reach in our schools. Most schools already have a bullying policy in place and would not tolerate behavior that targets and abuses students because of race, colour or disability. Schools should also develop a culture where it is just as unacceptable to deride students based on their intellectual capacity. Excellence should be celebrated in all its forms, and schools should be encouraged to examine whether they give equal prominence to academic achievements as to sporting ones.

While gifted students may be teased because of their giftedness, they are not immune to being targeted for teasing based on other factors, such as appearance or ethnicity, and may need additional help in understanding and dealing with this behaviour. Teachers have an important role to play in..
helping to counteract the effects of peer pressure and assisting students to put the relevance of school-based popularity in context. Providing plenty of opportunities for gifted students to spend time with other students of a similar ability will help to provide the social supports necessary for the development of resilience in the face of negative peer interactions. Additionally, incorporating an affective component into any gifted programming and using specific counseling strategies such as bibliotherapy and mentoring may also help gifted students to cope with a school environment lacking in acceptance and understanding.

**Conclusion and suggestions for future research**

Teasing emerged as a significant concern of the intellectually gifted primary school students who participated in the current study, with many of them reporting being targeted for teasing because of their intelligence. While the study did not specifically address issues of bullying, these findings are consistent with those of Peterson and Ray (2006), who found name-calling related to intellectual ability the second most common form of bullying experienced by the gifted students in their study. Given a significant majority of students independently nominated teasing as the worst aspect of their giftedness it is clearly a serious concern which warrants further investigation.

There appears to be a significant gap in the research literature addressing gifted students’ experiences of being bullied, with the survey of American gifted students by Peterson and Ray (2006) apparently the only research of its kind. There appears to be no research on the issue in the Australian context. It was beyond the scope of the current study to investigate how the experience of gifted students compares with that of other typical students, but it would be pertinent to determine whether gifted students are more or less likely to be bullied than other students and whether they are more likely to be targeted by specific forms of bullying. Additionally, while students in this study nominated being teased as the worst aspect of being smart, it is not clear how they were affected by this teasing, and whether their responses would differ from typical student responses to being bullied. These questions also warrant further investigation.

**References**


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Factors Influencing Talent Development: Stories of Four Hong Kong Elite Sportspersons

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University of Hong Kong, Hong Kong, China

Abstract
This article reports on a small-scale qualitative study that investigates how intrapersonal and environmental factors shape the beliefs and experiences of four talented Hong Kong sportspersons. Research questions focus on how their talents were identified and developed, obstacles they encountered, and the major influences on their development. Semi-structured interviews were conducted examining five key areas: participants’ perceptions of their natural ability in sports, self-motivation, coaching opportunities, family influences, and school factors. Results indicated that the interviewees tended not to perceive themselves as “naturally” talented (or “very special”), and believed that all five areas had influenced the development of their talent, both positively and negatively. The data are interpreted from a Hong Kong-Chinese perspective.

Keywords: Sports; sportsperson; talent development; Chinese; Hong Kong.

Introduction
Human talent is an incredibly valuable resource for society; thus, it is important to understand how talent develops, and how it can best be nurtured. It has been said that no issue is more important in a society than cultivation of its talented youth (Csikszentmihalyi, Rathunde & Whalen, 1993). Talent manifests itself in many domains of human endeavour. One area in which it is readily recognized and appreciated by the community is sports. Traditionally, development of sporting prowess has been conceptualized in terms of a pyramid, with the sportsperson progressing from a broad baseline involving experiences in many sports, to each new level of skill in a more focused area, and finally to achieving excellence in a specific sport (Kirk, Brettschneider & Auld, 2005; Kirk & Gorely, 2000). This model recognizes that there is no shortcut for sporting talent development, and an athlete must move gradually from beginner to world-class competitor. Many influences are at work that will make this process either extremely difficult or relatively easy. It is now recognized that developing high levels of expertise in a sport depends on a group of interacting biological, psychological and sociological factors.

One important contribution that can help our understanding of these interactions is the multidimensional framework represented in the Differentiated Model of Giftedness and Talent (DMGT: Gagné, 2003, 2009). In the most recent version of DMGT (2009), transforming natural abilities and aptitudes into true talents and competences requires long-term learning and sustained practice. The process of developing a talent involves intrapersonal (cognitive, affective, physical and psychological), environmental (milieu, significant persons, resources, and influential events), and chance factors.

In the field of sport, research into talent has shifted its focus from the discovery of talent towards the optimal development of talent. There is now much more emphasis on understanding the complex interaction among variables contributing to talent development. Several studies have already examined some of the important components (e.g., Bloom, 1985; Côté, 1999; Ericsson, 1993; Gould, Dieffenbach, & Moffett, 2002; Starkes & Ericsson, 2003). These studies focus on one or more of the following: (a) genetic predisposition or innate characteristics that are responsible for exceptional
performance), (b) training referring to appropriate environmental conditions, training hours, and quality of practice), (c) psychological factors that support athletes’ self-confidence, focus, commitment and well-being, and (d) interactions among these and other factors considered important for sports talent development. This interactional perspective fits well within Gagné’s model (2009) because it supports a holistic perspective of the development of talent in any domain.

Some studies serve as examples of this interactional approach (e.g., Carlson, 1993; Côté 1999; Thomas & Thomas, 1999; Vernacchia et al., 2000). Others conduct multi-dimensional investigations of sports talent from personal, social and psychological perspectives including from the athletes’ point of view, their families, their coaches, and their interrelationships (Csikszentmihalyi, 1998; Detterman, Gabriel, & Ruthsatz, 1998; Freeman, 1998). A study of Olympic champions by Gould, Dieffenbach and Moffette (2002) found that the major influences on the development of athletes stemmed from the individuals themselves, their families, teachers, friends, coaches, agents, and the community.

The existence of this complex network of interacting influences was supported by a recent study examining experiences and insights of high-performance athletes (Gulbin, et al., 2010). Developing from a novice to an elite athlete was found to be heavily influenced by an individual’s natural ability, personal commitment, motivation, and mental toughness, as well as his or her social environment (parents, siblings, peers), sporting experiences (play, practice, coaching support), resource provision, and chance factors. These chance factors include, for example, injuries or illness, loss of opportunity to attend training sessions, and temporary financial problems.

A somewhat similar perspective on talent development is evident in the “bio-socio-psycho model” proposed by Shi (2003). In the elite sports sector, this model can be seen to underpin much of the support provided to top athletes, with due attention being devoted to their medical, physiological, psychological, social, and welfare needs.

While international research has explored many facets of sports talent development, no study has examined these issues with Hong Kong’s athletes. The purpose of the study described here is to help fill that gap, and to provide some local socio-cultural insights.

Method

Research questions
The following questions were addressed in this study to solicit information from elite sportspersons in Hong Kong:
1. How are sporting talents first identified?
2. In Hong Kong, how do elite sportspersons attempt to develop their talents, and what obstacles do they encounter?
3. How do intrapersonal factors and environmental factors contribute to talent development?
4. What do Hong Kong’s elite sportspersons believe to be the major influences on their own talent development?

Design
Using a qualitative approach, each case in this study represents a unique story that provides valuable insights. From a research point of view, a case study approach is considered optimal for examining a phenomenon in its natural setting in order to understand the nature and complexity of the underlying processes (Benbasat, Goldstein, & Mead, 1987; Patton, 1990). Interviewing athletes is, thus, an appropriate procedure for gaining a deeper understanding of the antecedents to expert performance (Regnier, Salmela, & Russell, 1993; Starkes et al., 2001).

For research purposes, Stake (2005) defines a ‘case’ as ‘a functional unity’ or ‘a bounded system’ with many internal and external influences acting upon it. A case study approach allows detailed contextual analysis of these influences, and enables a researcher to explore possible causal factors and to find underlying principles (Yin, 2009). In the context of this study, attention is given to
the sportspersons themselves, i.e. their perceptions, motivation, preparation and experiences. Talent development of the sportsperson is viewed as responding to reciprocal interactions between the person and his or her social environment.

Although a small-scale study with only four cases is limited in scope, studies of this type often do reveal useful data that can shed light on individual insights and experiences. The findings can also help identify issues worthy of further research.

**Procedures**

A purposeful sampling procedure was adopted to ensure that each athlete was a *nationally recognized senior elite sportsperson* whose careers reflect numerous sports achievements.

A total of four such sportspersons from different sports were selected for this study: table tennis, karatedo, squash, and billiards. Background information on the athletes is shown in Table 1. Interviewees were selected using various criteria including a successful transition from junior level to senior elite level, and achievements at international events such as the Asian Games, World Championships, and Olympic Games.

| Table 1: Background information on the four Hong Kong sportspersons. |
|------------------------|------------------------|------------------------|------------------------|------------------------|
| **Ann** | **Carman** | **Raymond** | **Michelle** |
| **Gender** | Female | Female | Male | Female |
| **Age** | 23 | 39 | 36 | 21 |
| **Gender** | Female | Female | Male | Female |
| **Sports** | Squash | Karatedo | Table Tennis | Billiards |
| **Education** | Studying a bachelor degree at a local university | Studying a bachelor degree at a local tertiary institution | Studying a master degree at a local university | Studying a foundation Dip at a local tertiary institution |
| **Number of years serving in sports** | 12 | 17 | 30 | 8 |
| **Age started playing sports** | 11 | 22 | 6 | 13 |
| **The highest performance achieved** | Women’s Singles 2nd 2010 Asian Games | 60kg Individual Kumite – Silver Medal 2002 Asian Games | Men’s Doubles – Silver 2004 Olympics Games | 1st Women’s Snooker 6-Ball Singles in 2010 IBSF World Snooker and 1st Women’s 6-Red Snooker Team, 2010 Asian Games |

Note. Names listed in the table are pseudonyms.

**Interviews**

Having obtained the written consent of the four participants, semi-structured individual interviews were conducted (see Appendix 1). The process allowed themes and additional lines of inquiry to emerge naturally (Padgett, 1998).

During the interviews, each participant was asked an identical sequence of opening questions. The language used by the interviewer and interviewee was Cantonese. Each interview lasted approximately 60 minutes and was supported by note-taking and audio-recording for later transcription.

**Data Analysis**

Each interview was transcribed verbatim, with all identifying information removed. Transcripts were analyzed following Stake’s categorical aggregation method (2005). Two independent
researchers read the transcripts to verify specific content, and to generate possible themes for later analysis and interpretation. Every effort was made later to minimize any bias in interpreting the data by having a third party check clarity and accuracy of any inferences or conclusions made.

**Ethical considerations**

The four participants in the study were informed of the details of the inquiry and assured of confidentiality. Participants were identified only by fictitious names on the transcripts: Raymond (table tennis), Ann (squash), Carman (Karatedo) and Michelle (billiards). They were told that all the data collected would only be used within the study and would be destroyed upon the completion of the study. All participants signed consent forms. Interviews were conducted at a time and venue chosen by the participants, and they had the right to withdraw from the study at any time.

**Findings**

Overall, the findings provide numerous insights into the talent development of these Hong Kong sportspersons. For example, they did not recognize themselves as having “innate talent” or “giftedness” in sport; rather, they believed that they have particular qualities that give them an advantage in developing a talent. They considered “hard training” and “practice” as necessary conditions for achieving high levels of performance.

The data also revealed that self-motivation (psychological factor), coaching, family, and school (social and sociological factors) were all important influences that had facilitated their development. There was no clear indication of which factor had the most powerful influence. All respondents agreed, however, that self-motivation was critical for them to reach and maintain high levels of performance and commitment. The data also showed that the demands of academic study and other pursuits had a negative effect on their athletic development. Such demands often consumed the time available for sports and conflicted with competing priorities.

**Research question 1**

One purpose of this study was to explore methods used to identify individuals with outstanding talent in sports. The data revealed that none of the participants had entered into any talent identification or screening programme. Michelle shared, “I learned the sport because I had a chance to see my father play in his own billiard room. He taught me how to play after school; that’s why I started playing the sport.” Carman explained, “I once participated in an extra-curricular activity organized by the school [and liked it]; therefore, I started playing the sport.”

In reference to recognizing their own talent in sports, all participants reported that they were attracted to the sport when they joined in specific activities but did not, at first, see themselves as “talented” or “outstanding.” They did not see themselves as athletes with “natural abilities.” Ann said, “I participated in a squash promotional programme at age 11 or 12 years, but I didn’t think of myself as a talented player until my coach told me that I had high ability in the sport.” Carman added, “I didn’t think I was sports talented. I would say that I attributed my performance to continuous hard training and practice, though I felt I was more vigorous than others; what’s more, I was not afraid of fighting or getting hurt. Perhaps this provided me with an advantage in playing the sport.”

When asked if they would choose to be naturally athletically talented, all reported that they would. Raymond elaborated, “Being naturally talented could provide a number of advantages to maximize my sporting performance and help me achieve a personal breakthrough. For example, talented players are able to acquire new techniques more easily and develop stronger confidence in playing sports.”

Carman believed that athletes with natural talent definitely have an advantage. She remarked, “If a talented player receives sufficient training, his talent will determine the extent to which he can enhance his personal growth, improve quickly, and succeed in high performance sports.”
Research question 2

In response to the question how elite sportspersons develop their talents to the fullest and what obstacles they encounter, Carman said, “It was very important for me to receive training from different coaches in order to improve my sporting skills and techniques. Finally, I was able to develop my own style, which helped maximize my sporting performance.” Raymond elaborated, “As top sportspersons, we needed to focus on training and competitions to develop our potential fully. I needed to sacrifice my leisure time and hobbies and also my social time with my peers.”

Regarding barriers to talent development, participants reflected that the most important obstacle was coping with adversity and the importance of self-determination for continued sporting excellence. Coping with adversity is reflected in how athletes regained confidence after losing a match or event. For example, Raymond admitted, “I didn’t win every time. Staying focused and remaining confident to excel at a higher level of achievement was not easy.” Michelle added, “I had to regain confidence quickly when I lost a game.”

A strong sense of self-determination is an important motive in striving for sporting excellence. Ann reported, “The most difficult thing was how determined I needed to be to sustain my performance and continuously reach higher levels in the area of sports.” Carman added, “I needed to be very determined to find ways to transform my ability into action, to help solve new problems and face new challenges in the pursuit of sporting excellence.”

It should be noted that common to all participants was the difficulty of striking a balance between studying and the demands of training. None of the participants found it easy to maintain both their studies and high-level sports training at the same time, especially when moving from junior to top athlete level. They agreed that athletes need to sacrifice sports training for academic success, foregoing sporting achievements. Ann reflected, “I thought education was more important than sports talent; however, if I had been unable to strike a balance, it would definitely have hindered my progress in sport.”

Research question 3

Role of personal motivation

All participants reported that personal motivation was necessary to reach the levels of commitment and hard work required for high performance. Participants expressed their views in the following ways.

Carman said: “I think I had strong motivation to achieve good results in competitions. My strong motivation could help me solve problems, and it could drive me to develop into a person with a good personality and positive thinking.” Raymond stated, “I had positive motivation which kept me striving for sporting excellence, gave me positive energy to face adversity, helped me to develop a positive attitude in sport and, overall, it gave me positive hope for the future.”

Role of coach

All participants reported that coaches were very important in providing sport-specific advice and emotional support for their development. Ann emphasized, “It was particularly important to me, because my coach provided emotional support when I was participating alone in competitions. He helped me evaluate my sports performance and gave me useful advice and even devised special training to address my weaknesses. I regarded my coach as my friend and mentor who stood by me throughout the years to motivate and encourage me when playing squash all over the world.”

Similarly, the other three participants endorsed the view that their coaches provided them with techniques, gave them timely feedback, and shared their own experiences of preparing for and playing in competitions. Raymond emphasized, “I thank my coach so much for spending lots of time with me discussing training and competitions. Under his guidance, I was able to realize my potential. He
helped me develop a positive personality and character and was an important contributing factor in the development of my talent.”

**Role of family**

Emotional support comes from the opportunity to turn to others for comfort during times of stress (Cutrona & Russell, 1990). Participants all reported that parents provided the most emotional support. Michelle said, “My father, being my first coach, played a very important role in my sporting life. When I saw him play in competitions, he was an excellent snooker player in my mind, so he could teach me skills and provide me with very important emotional support when I needed him. Without him, I may not have been nurtured nor well developed as a successful athlete.”

Most of the participants felt that providing emotional support has additional benefits. For example, Raymond confirmed, “Parents are an important influence in the development of talent. First, they are the decision makers who allow children and adolescents to develop talent in sports and provide positive encouragement towards sports development.”

**School influences**

School plays an integral role in guiding young performers through their critical years of physical and mental development. Participants acknowledged both the tangible and intangible support from teachers and principals, including arranging extra (catch-up) classes and tutorial support. Classmates and teachers also gave positive encouragement and praise.

Ann said, “My teachers and classmates would give me unfailing encouragement. For example, when I lost a match, they gave me comfort; when I was away for competitions, they would prepare class work for me; and, when I needed urgent help, they were always available.”

Two other participants endorsed the positive role of school in developing sports talent. Raymond commented, “We would not be able to succeed without the support of the school which provided me with an emotionally nurturing environment. For example, when the principal cheered the sportspersons in the competition, that was an important source of encouragement; it would reinforce their self-confidence.”

**Research question 4**

No consistent pattern appeared in the participants’ perception of other major influences in the development of their talent. This suggests that the “lived experience” of sports talent development may be unique and should be considered on a case-by-case basis.

Most of the participants also mentioned additional factors that had influenced their talent development. For example, Carman believed that an athlete’s personality is also important for talent development. “A successful player should have neither jealousy nor greed. They should be kind-hearted and have good self-management skills. A harmonious and kind personality can [also] help them achieve excellence.” Carman was obviously able to reflect upon her own personality, beliefs and attitudes, and how these had impacted upon her successful talent development. She was aware that sportspersons need to be mindful of their responsibilities and exercise appropriate self-regulation.

According to Raymond, “Good friends were [also] important to me. They gave me positive comments, encouragement, and advice to help me solve problems and rebuild my confidence.”

**Discussion**

None of the individuals who were interviewed perceived themselves to be naturally (biologically) talented or gifted. They felt they had some basic ability that they built on through hard work and opportunity—a view in keeping with Gagné’s (2009) model, where underlying ability can be developed through sustained personal effort and commitment. However, because, for some
sportspersons, natural ability enables them to succeed more quickly, early identification is important (Regnier et al., 1993).

When questioned about the early identification of their own talents, individuals revealed that they had not undergone any formal identification process. Only one sportsperson reported that her outstanding talent in sports had been identified first by her coach. All participants shared a view that, rather than formal identification, the reason they worked hard was that they were driven by the enjoyment derived from and achievement in sports activities. Nevertheless, participants recognized that, in many situations, talent identification programmes are important. This may be particularly the case in Hong Kong where there is no strong tradition of promoting sporting prowess in most schools. Thus, potential sports stars may easily be overlooked.

The four interviewees highlighted the need for continuous hard training and competition to develop their abilities. Inmate predisposition and aptitude simply are not sufficient on their own to reach high performance levels in sports. Research on skill development clearly supports a close relationship between training, practice, and skill perfection. Studies have suggested that it takes 10,000 hours of intensive training to progress from novice to expert in a given domain (Newell & Rosenbloom, 1981; Simon & Chase, 1973). Others have emphasized the role of practice in high-level performance (Baker et al., 2003; Ericsson et al., 1993; Howe, 2001; Starkes & Ericsson, 2003). These studies suggest that mere quantity of practice is unlikely to result in outstanding performances; it is the quality of practice that counts—with activities that are structured and goal-oriented and that require sustained effort. Many hours of training and engaging in such practice are necessary for success at the elite sports level; however, this training can, at times, cease to be enjoyable. Fortunately, unstructured “play” activities can also enrich an athlete’s overall development and maintain motivation (Memmert, Baker, & Bertsch, 2010).

The data from the four athlete respondents also revealed that talent development requires constant support from a coach, family, and school. Much of this social, psycho-social, and emotional support helps with motivation and is vital to high-level performance (Bloom, 1985; Lens & Rand, 2000; Moore et al., 1998). Numerous authors have attested to its centrality in the development of talent in all domains (Lens & Rand, 2000; Renzulli, 1986; Sternberg, 2000).

Not surprisingly, coaches are seen to be a very strong source of support, not only in specific skills training and feedback, but also in other areas of the participants’ lives, providing mentoring and encouraging commitment.

The role of parents in providing both emotional and tangible support for sportspersons has been identified already in the literature (e.g., Kirk et al., 1997; Monsaas, 1985). Participants in our study perceived their parents very positively in this respect, particularly in terms of emotional support. Most elite sportspersons mention their family when asked about those who have influenced them along their road to success (Baker, Horton, Robertson-Wilson & Wall, 2003). Parents are possibly an sportsperson’s primary source of emotional support because they have intimate knowledge of the sportsperson’s hopes, fears, and frustrations.

The data also showed that, for these four individuals, teachers and principals were perceived as important to their talent development. While the school curriculum in Hong Kong may not proactively pave the way for sports talent to develop, school personnel can show interest and provide encouragement, praise, and understanding.

The participants all acknowledged that, as well as extrinsic motivation provided by others, self-motivation is an essential ingredient of success. All athletes need to commit themselves completely and take full responsibility for their own development (Jonker et al., 2009; Taylor, Gould & Roloe, 2008). Under Gagné’s model, this drive is an intrapersonal factor that greatly influences talent development.
Finally, access to reasonable resources was also identified as a central factor by the four participants. This view matches findings from other studies of elite sportspersons (Baker & Côté, 2003). Resource provision could be regarded as one of the necessary environmental conditions under Gagné’s model; thus, provision for sports needs to increase in Hong Kong.

Regarding difficulties faced by young sportspersons in Hong Kong, a major problem is balancing academic and sports priorities. In Hong Kong, there is much pressure placed on students to obtain post-secondary qualifications. Parents hold high expectations for their children to complete higher education, and these pressures cause many young people to abandon their pursuit of sports. If this situation continues, it will deprive Hong Kong of an important pool of sports talent.

Conclusion

By focusing on the factors influencing talent development, this study revealed that innate abilities are only part of what is needed for sporting success. As Gagné (2009) suggests, developing talent in any domain takes place over a long period as a result of complex interactions between the individual and the environment. Parents, teachers, and coaches were perceived to play a critical role in the talent development of sportspersons in Hong Kong, providing social-emotional, financial, and logistical support. The provision of adequate resources and opportunities for a sportsperson is also vital.

Although often overlooked, socio-cultural factors are important potential influences on sports talent development. The significance that a country (or society) places on sports culture and the value it attaches to its elite sportspersons can have a dramatic influence on any success achieved.

In general, it was found that Gagne’s *Differentiated Model of Giftedness and Talent* provides a valid framework through which to explore aspects of giftedness and talent development in the sports domain.

Limitations

This study involved individual interviews with only four elite sportspersons in Hong Kong; therefore, the findings must be viewed as tentative. However, data obtained through interviews from these participants supports findings from other North American studies (e.g., Gulbin, Oldenziel, Weissensteiner, and Gagne, 2010).

References


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Appendix (1)

Semi-Structured Interview Guide

Introduction of Study
Thank you for agreeing to participate.
I am going to ask you some questions about your background and sporting career. Be assured
that your answers will remain completely confidential; feel free to discuss anything you regard as
important.

Interview Questions
I am interested in exploring your views and experiences while developing your own talent as a
sportsperson in Hong Kong. We will discuss how you have become a high-performance athlete in
your chosen sport.

Part 1: Beginning in Sports
• Could you look back, remember, and tell me how and when you got started in sports?
• Who got you started?
• What is the most important reason you decided to play this chosen sport rather than any other?

Part 2: Giftedness/Talent in Sports
• How did you find out you had high ability in sports?
• Would you consider yourself to be sports talented (possess natural outstanding ability)?
• What natural abilities did you possess from the start, for example, speed or endurance?
• Do you feel that you inherited natural abilities that had an impact on your talent development?
In other words, did genetics play a part?
• Do you believe there are benefits to being sports talented?
• If given a choice, would you choose to be sports talented?
• What problems do you experienced because of your talent/high ability?

Part 3: Intrapersonal Factor/Influences
• What specific psychological characteristics have contributed to your development?
• How do psychological factors such as motivation and attitude facilitate any sportsperson to
  strive for sports excellence?
• Do you feel you were born with strong motivation? If yes, what did it contribute to your talent
  in sports? If not, how did you acquire your motivation?
• What is it that helps you maintain your motivation to continue with your sport?
• Describe how motivation has helped you cope with problems along the way?

Part 4: Influences on Talent Development
We will look now at various factors that usually influence the development of sportspersons. How did these factors influence your own development of talent?

• Family Factors - Role of Parents
  Do you feel the influence of your parents was important in your talent development? If yes,
  what did they do; and how did it help or hinder you? What are the best examples you experienced?

• Coaching Factors - Role of Coaches
  Do you feel the role of a coach is important in influencing your talent development? What did
  they do? In what ways they have impacted on your talent development. Give some examples.

• School factors - Role of Teachers
  Do you feel teachers were an influence on your talent development? In what ways did they
  contribute to development in sport? Give some examples.
• Any others factors that you are aware of that significantly influenced your talent development? How did they impact your development? Any examples?

**Part 5:** Is there anything else you would like to add about your development as an elite sportsperson?

Thank you very much for your time and for your unique contribution to this study.

* * * * * * *

**Demographic Information**
Name:
Age:
Gender;
Place of origin:
Education level:
Sport you play:
Age at which you started to play the chosen sport:
Years participating in the sport:
Have you participated in Asian Championship/Games/Olympic Games? If yes, please give your achievement results.

END
School Transition and Mathematically Gifted Students

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Abstract
This study addresses school transition in New Zealand for 15 students identified as mathematically gifted and talented. The findings are drawn from a two-year study that included student, parent, and teacher perspectives, and an examination of school policies, programs, and practices. Students felt well prepared for the transition although not all students experienced a smooth transition. Some schools practiced *tabula rasa* or fresh start and this impacted on curriculum continuity, academic achievement, and social-emotional well-being. The main source of support for the transition was from their friends—commonly like-minded peers. School support systems were limited and students were not explicitly taught coping strategies. Several implications for managing successful school transitions are proposed.

Keywords: Transition; mathematically gifted; curriculum continuity; qualitative; parents; peers.

Students face a variety of challenges when they transition from one stage of schooling to another stage of schooling. These transitions occur at different times in a student’s school life and depend on a nation’s educational system. In making a transition, students face challenges at two levels: the macro level of the school’s physical structures and organization and the micro level in the classroom. Commonly, the first transition is from pre-school to a more formal system and the second transition coincides with the onset of adolescence. Students in New Zealand encounter either a two- or three-tiered structure: they move from a full primary (inclusive of intermediate Years 0-8) school directly into a secondary (Years 9-13) school or from a primary (Years 0-6) school to an intermediate (Years 7-8) school and then on to a secondary school. Each school transition means a break in the continuity of a student’s mathematics education. This means a new school, a new mathematics teacher, and a new teacher who may use different teaching approaches.

There is an expectation that schools will prepare students well for schooling in the next stage of the hierarchical educational system (Galton, 2000). Schools are held accountable for this preparation. In New Zealand, the Education Review Office (2006), the government body that evaluates and reports on the education and care of students in schools, found that there was a lack of focus on preparing students for the transition to secondary school. This is despite many schools having strategic plans with statements pertaining to successful entry and transfer to secondary school. The Education Review Office reported that for diverse groups of students, there were “limited or no opportunities to develop awareness of their strengths and abilities” and the students were “at risk of being unprepared for the transition to secondary school” (p. 2). This lack of focus on preparedness by teachers is supported in another New Zealand study by Hawk and Hill (2001) who found that many teachers were so focused on curriculum coverage that they did not take the time to prepare students for school transitions.

It is important that students receive support not just from the school but from significant others. The teacher’s role is seen as a “central transformative force in bridging the gap between primary and secondary school” (Pietarinen, 2000, p. 383). Parental interest and support is recognized as another factor that enables students to make successful transitions (Dauber, Alexander, & Entwistle, 1996). Mac Iver (1990) found that when parents were involved in the transition process, they tended to stay...
involved with their children throughout secondary school. Successful transition also occurred when reception schools made every effort to create a sense of community and belonging, and where students, parents, and staff were involved (Pietarinen, 2000; Smith, 2001). Friends also influence adolescents’ adjustments to school. Both the characteristics of the friends and the quality of the friendships affect this school adjustment. (Cantin & Boivin, 2004; Whitton & Perry, 2005). Research has also shown that friendship, peer acceptance, and group membership has an established link with students’ academic achievements (Wentzel & Caldwell, 1997). Mentors can also play a key part in the process and help maintain students’ interests, levels of satisfaction, and increased levels of achievement (Casey & Shore, 2000; Reis & Graham, 2005).

A focus is often placed on students’ academic achievements when they make the transition from primary to middle schooling and/or secondary schooling. The literature on school transition provides evidence of dips in student progress at each point, primary to middle school or middle to junior high (Anderson, Jacobs, Schramm, & Splittgerber, 2000; Galton & Morrison, 2000) and high school to college (Smith, 2006). Noyes (2006) raised the issue, specifically using the context of mathematics, of trajectories and how school transition acts like a prism diffracting the social and academic trajectories of students as they pass through it. According to Demetriou, Goalen, and Ruddick (2000) students showed signs of anxiety and excitement at the prospect of moving to a new school which is often a much larger school; some students expressed difficulties with sustaining commitments to learning and in understanding the continuities in learning. Gifted students may also experience the Big-Fish-Little-Pond Effect (BFLPE) where a student’s self-concept is negatively correlated with the ability of the peers in their school (Marsh, Chessor, Craven, & Roche, 1995). “The BFLPE hypothesises that it is better for academic self-concept to be a big fish in a little pond (gifted student in regular reference group) than to be a small fish in a big pond (gifted student in gifted reference group) (Zeidner & Schleyer, 1998, p.305).

The main problem that typically remains after a transition is a lack of continuity across the curriculum. Students may be faced with revision and a lower level of task demand which leads to boredom (Galton, Morrison, & Pell, 2000), decline in motivation (Anderman & Maehr, 1994; Athansiou & Philippou, 2006), and disengagement from school (Anderson et al., 2000). Athansiou and Philippou (2008) also highlight the developmental differences between the actual and preferred classroom environments in mathematics as perceived by students, pre and post transition. Some educators suggest that gifted and talented students should not experience the same subject matter as their average ability peers (Teare, 1997) whereas others suggest differentiating the content by providing more complex or sophisticated processing of the same subject matter (Tomlinson, 2001). Gifted students should also experience mathematics at a different pace and with a different scope (Colangelo, Assouline, & Gross, 2004). They work best if placed with like-minded students who are their intellectual peers (Assouline & Lupkowski-Shoplik, 2003). Another factor that contributes to potential lack of continuity in curriculum is the practice of tabula rasa or ‘fresh start’ (Galton & Hargreaves, 2002). The justification for this practice is that secondary school teachers believe that they are better equipped to make judgements about students’ abilities in subject areas such as mathematics because of a teacher’s specialist knowledge.

Studies report varying degrees of social and emotional impact from the change as students make the transition to a new school, but students who are independent, able to make friends, and deal with change usually manage a relatively successful transition (Jindal-Snape & Foggie, 2008). One of the few studies focusing specifically on transition for gifted students (girls) found that fitting in with gifted peers was easy and most comfortable. However, the participants found that social navigation with non-gifted peers was more complicated (Pepperell & Rubel, 2009). A recent synthesis by Topping (2011) confirmed the issue of transition as one of importance and neglect; a time when students, teachers, and parents have different concerns. The students are primarily concerned with peer relations, self-esteem, and external support networks; whereas the teachers with the attainment dip on entry to secondary school, curriculum problems, school strategies to ameliorate these and special groups of children. The difficulties are also greater for those children where parental support is lacking.
The focus of this article is on the transition of gifted and talented students in the academic domain of mathematics. The operational definition underpinning the study is that gifted and talented students in mathematics are those who have above-average ability and display specific interests, aptitudes (including problem solving ability and logical reasoning), and achievements in this domain. This definition has drawn on the broader concepts of Renzulli (1986), Gagné (1985), Gardner (1999), and also Krutetski’s (1976) definition of mathematical giftedness as “a unique aggregate of mathematical abilities that opens up the possibility of successful performance of mathematical activity” (p. 77). This article addresses one question from a larger longitudinal study set in New Zealand that focused on the education of fifteen students identified by their school and/or teachers as mathematically gifted and talented. The question posed was: How is a school transition managed for a mathematically gifted and talented student? The school transitions were examined from multiple perspectives and included transitions in a three-tiered system. To answer the research question, the focus was primarily on the students’ expectations and experiences in mathematics but included additional information from school documents, teachers, and parents.

Methodology

The research paradigm that guided this research was essentially interpretive although aspects of naturalistic inquiry were blended into the study. Research in the interpretive paradigm attempts to find out what meanings people construct, how they construct them, and how they guide their actions (Wardekker, 2000). The outcome is to develop an understanding of the interpretations of the participants. The researcher spent time in schools, with students, their teachers, and their parents to learn about their education. The data were collected on location, recorded, and reviewed with the researcher’s insights as the key instrument for analysis. The context was important; the situation for these students was best understood by observing them in the setting in which the learning occurred.

It is not possible in one article to describe or explain the context fully for this study but through naturalistic inquiry an attempt is made to acknowledge the setting, qualitative methods, purposive sampling, and case-study reporting mode (Bogdan & Biklen, 2007). The larger study from which this data are extracted was predominantly qualitative but was underpinned by an interpretive paradigm and influenced by a sociocultural philosophy of learning and teaching as theorized by Vygotsky (1986).

The learning of mathematics is essentially a process of active individual construction and a process of enculturation (Cobb, 1994). It is a cultural product, but it takes place within a social group; the discourses and learning conditions within the group are central elements of the learning process. “Analyses of learning developed within this theoretical tradition therefore account for learning by focusing on the process by which people become increasingly substantial participants in various cultural practices” (Cobb, 2006, p. 151). The learning and teaching contexts are not examined specifically from a sociocultural perspective, but from theories and models regarding appropriate provision in gifted and talented education. It is appropriate to use qualitative research in gifted education; in recent years this has become an accepted part of the literature (Coleman, Guo, & Dabbs, 2007).

The study was designed using multiple-case studies. Case study research methodology, with its study of the particularity and complexities of a case, combined with the personal views of the researcher, and the varying researcher’s roles, led to decisions throughout the research (Stake, 2005). The sample was limited to a manageable number of sites and participants to enable the collection of data during a two-year period. The original sites were chosen because the researcher was aware that the schools made provisions for gifted and talented students in mathematics.

The data gathering methods were predominantly qualitative and included student, parent, and teacher interviews, documents (school policies, teacher plans, student workbooks), and classroom observations. Together these multiple sources of data support triangulation in the inquiry process. The study began in three schools in a provincial town in New Zealand and included 10 students (two girls and eight boys) who made the transition from Years 6 to 7 (10 and 11 year olds) and five students
(two girls and three boys) who moved from Years 8 to 9 (12 and 13 year olds). Five Year 6 students were from a primary school (Years 1 to 6) where they were cross-class ability grouped for mathematics. Five Year 6 students were from another primary school where they were grouped within the regular class based on their mathematics ability and the other five students were Year 8 students from an intermediate school (Years 7 and 8 only) in a full time class for gifted students. The students came from a variety of cultural backgrounds, different educational and school settings, and did not represent a gender balance; however, given the sample size, these factors were not used in the data analysis. Pseudonyms are used for all the student participants.

The students had been identified by their schools as gifted and talented in mathematics (purposive sampling), based on the individual school’s policy and definitions. There is no national definition for gifted education in New Zealand and subsequently no standardized identification and program, but the term ‘gifted and talented’ is commonly used throughout the nation (Ministry of Education, 2002; Riley, Bevan-Brown, Bicknell, Carroll-Lind, & Kearney, 2004). The definitions used in the policies in this study were both conceptual and operational (Moon, 2006). Multiple methods of identification were used by the schools and included (according to their policies) parent, peer, self-nomination, observation, tests, and student work samples. A range of opportunities, including cluster grouping, withdrawal programs, competitions, and special classes, was provided in the schools.

After students made the transition they moved to nine different schools that included both single sex and co-educational settings. Of the Year 6 students, four moved to three different intermediate schools (one student was placed in a regular class and the other students in cross-class high ability groups for mathematics); five Year 6 students moved to co-educational Years 7-13 schools (high ability classes); and one moved to an independent Years 5-8 boys’ school. Of the five Year 8 students, two students moved to two different co-educational secondary schools where they were in high ability classes and the other three Year 8 students moved to a secondary boys’ school and were also placed in the high abilities class that provided an accelerated program in mathematics.

All of the students’ teachers and one parent of each child were also involved in the study. Fifteen parents (13 mothers, two fathers) participated in semi-structured interviews pre and post transition. The first parent interview was designed to gain information about their child’s mathematical abilities, school experiences, and factors influencing school choice for the following year. In the second interview, questions focused on school transition processes and parents’ perceptions of their child’s experiences in mathematics at the new school. Thirteen teachers were interviewed: four from the three sending schools and nine receiving teachers. Each teacher in the study was interviewed once to gain information on the school’s provisions and their perspectives on the transition process and programs for gifted students.

A variety of documents were gathered during the course of the study, including policies, student reports, and work samples. The students were observed in their classroom environments at both the sending and receiving schools. The documents and observations were conducted as part of the larger study, and mainly used to verify the student, teacher, and parent responses to interview queries.

The transition data were analysed according to a theoretical framework provided by Anderson and colleagues (2000). They suggested three major concepts for understanding and improving school transition and success. These concepts were preparedness, support, and transitional success or failure. According to Anderson et al., preparedness is multidimensional and includes academic preparedness, independence and industriousness, conformity to adult standards, and coping mechanisms. Support from others, be it informational, tangible (resources), emotional or social, facilitates successful transition. This support may come from peers, teachers, or parents. Transitional success or failure can be judged by factors such as grades, appropriateness of a student’s post-transition behaviour, social relationships with peers, and academic orientation. Using this framework, the focus was refined to the micro level to include systemic and academic preparedness, and support from peers, friends, parents, and teachers.
The researcher started with the initial code for the theme of transition. From this first level of coding, the next level used the conceptual framework of Anderson et al. (2000) and the categories of preparedness, support, and transitional success or failure. The third level of coding came from common threads in the participants’ accounts such as school choice, role of siblings, concept of the BFLPE, and fresh start. Each set of transcripts was revisited for the themes and tables were created for some of the pattern codes (Miles & Huberman, 1994) or sub codes (Bogdan & Biklen, 2007). Tables were also created specifically under each of the sub codes to give a better quantitative picture of how many participants referred to each of these.

Results
Preparedness

The move to a new school provides changes in school systems and structures. The students felt that they were prepared for the systemic and/or organizational changes through school visits to the reception school, prospectus information, or siblings answering questions. One student explained that the transition was relatively smooth and he was well prepared for the systemic changes because he had made a visit with his mother “to look around” and said that he “knew that it was a very good school, one of the best…and that they had very good teachers and a good library”.

I was prepared enough, I mean as much as anyone else…But not many things came as much of a surprise. I knew about most of the things, the changes….there was orientation night, an open night for parents and also the test that you did here, but that wasn’t a tour or anything, it was just a test….The only information they sent out was that I was in the accelerate class and no other information….they gave us a booklet on the orientation night….We didn’t really need much more information….On the test day they gave us paper with the timetable for the first few days with….they said where to meet for form classes and all that stuff. (Amir)

When a school used limited identification methods (for example, tests only), not all students experienced a smooth transition. Eric, for example, was not selected for the gifted and talented mathematics program in his new school. This intermediate school practised a ‘fresh start’ policy and did not refer to information from the sending primary school. The teachers from the other reception schools outlined liaison activities (such as school visits) and the sharing of records as part of their transition processes. All of the teachers from the sending schools passed on written information to the reception schools. The teachers from the reception schools were, on the whole, less interested in the transition process than the sending school, although the majority (seven out of eight) of the reception schools conducted interviews with teachers from the sending schools. One of the smaller schools followed this up with an interview with the student and parent, guided by a rigorous interview schedule that the principal completed to aid with student placement. Another school used two Placement Forms, one completed by the parents and one by the student. It seems, however, that not all messages from the sending schools were understood, trusted, or acted upon when you consider the placement results for one student. The identification and subsequent placement of gifted and talented students in classes is a key part of the transition process.

Academic preparedness assumes that students possess the knowledge and skills necessary to succeed at the next level. In the case of mathematically gifted students, it would be expected that reception schools would acknowledge the student’s level of mathematical knowledge and skills and place them in appropriate classes.

There was an expectation from parents and sending teachers that there would be an exchange of academic information between the schools that would aid the transition process. Most of the students sat tests, either on their visits to the school in the preceding year or early in the year at their new school. They were then placed in classes based on these academic results. There was hope from the parents that, given the students had come from enriched and/or accelerated programs in mathematics, they would achieve ‘good’ results in any pre-selection tests, and that special teaching programs would ensue. The parents expected a continuation of challenging programs, that their children would be seen as high achievers and continue to grow in their mathematical development.
Most of the students believed that academically they were well prepared, no gaps in mathematical knowledge had surfaced, and they were coping well with the class work. The teachers from the sending schools expressed clear expectations for the students in their new schools including a continuation of advanced levels in mathematics, open-ended topic work, and an encouragement for self-directed learning. The majority of the students anticipated the prospect of having more than one teacher with enthusiasm. Those students moving to secondary school, in particular, expressed a keenness for being taught by a mathematics specialist teacher. These students talked primarily about the subject, the teacher, and the level of academic challenge. Some of the students were concerned about subject continuity and how well prepared they felt in certain topics such as algebra and geometry. The teachers also expressed an interest in whether and to what degree students had covered particular topics in mathematics.

Many of the parents acknowledged how smoothly the transition to a new school had gone for their children in mathematics and that, from their point of view, their children were well prepared and no problems had arisen. A few parents also acknowledged the teacher’s contributions to a smooth transition. These included helping students develop skills in setting goals, maintaining consistent work standards, and clarifying expectations. However, three parents felt that the teachers had not prepared their children well for the transition. One parent felt that the school could have done a better job at getting the students ready for the transition. Two parents believed that their sons were not well prepared in mathematics for the year ahead. These parents explained that they felt that there were gaps in their children’s mathematics, particularly in algebra.

Some of the students were not prepared for being a little fish in a big pond. With a move, in most cases, to a larger school, the students found themselves in a bigger pool of mathematically gifted and talented students. This realization that they were among higher achievers than themselves was expressed by both the students and parents. One student explained that it was quite a lot harder and that she had gone from being in “the top group in the class” to a class where “I’m at the bottom”. Three parents recognized the pressure that their sons were now under at secondary school; they were with “the cream of the cream” and were under pressure to perform well and maintain their place in the high ability accelerated class. These were students who were used to getting very high scores in tests, and were very confident in their abilities in mathematics. Suddenly, their test results had decreased and they were with a wider pool of gifted and talented students.

**Support**

The support source cited most by students and parents was peers, specifically their friends. The majority of the students acknowledged the importance of having friends from their previous schools for support with the transition. Several students moved to their new school with fellow students they identified as not only their friends, but academic peers who shared their interest and high levels of achievement in mathematics. Bob is one such student; his mother explained the role of his friends in relation to the transition.

There were no problems because lots of his friends went with him and a few of his close friends and they are with him, in the extension class. He sees it as a status symbol to be in that class and is quite proud of the fact…He’s not seeing it as not fashionable or as a nerd. (Bob’s mother)

Three boys who went on to a secondary boys’ school, found themselves together in the high abilities accelerate class and all three commented on how important their friends were. Despite making some new friends, they still “stuck mainly with old friends”. Amir explained how his friends supported him with the transition process.

It [the transition] hasn’t had much effect, as most of my friends came to this school and two of them are in my class. So there wasn’t as much of a change as I thought. I thought that we’d be in different classes… It’s a lot better here if you’ve got them [friends] at a new school because they offer you that support, so it’s a lot harder if you don’t actually have any friends with you. So I think I’m quite lucky to have friends in my class. It’s just important to have them in your class and in your school. (Amir)
For two students the transition had not gone as smoothly because of the loss of friends from their previous school. As a consequence, one student, who had been unable to establish new friendships after the transition, sought help from school guidance staff. In contrast, two students were not concerned about making a move without their friends; one student felt friends were not that important and the other focused on making new friends. Five of the students made the transition to schools where they already had a sibling in attendance; both the parents and the students acknowledged that this helped with the transition, particularly with matters pertaining to the school’s organization, uniform expectations, and homework. Peers, in particular friends, other students in the school, and siblings helped many of the students in the study make a relatively smooth transition to their new schools. Other significant people who were involved in this process were the parents.

The parents acknowledged that with the move away from the primary school there was less parental involvement, but they also felt less informed about school programs. Several parents expressed a desire to be more involved, but accepted that as their children moved through the school system they had to take a more “hands-off approach” Their children were less interested in sharing school experiences and they also “want to do things on their own”. Most of the parents were keen to offer their children support with the transition, although in terms of mathematics at the new school their role as a content adviser in mathematics (especially for a topic such as calculus) diminished. The parents felt that their children could take greater responsibility for their mathematics learning in this new phase of schooling. Two students did not experience a particularly happy transition, but were well supported by their parents. One parent felt that he had “to do a lot of propping up” and such support was the school’s responsibility. This had involved providing positive encouragement and assurance that he could achieve continued success in mathematics. The child wanted to maintain a place in the high ability accelerated class. This parent believed that the students were placed under considerable pressure to maintain a place in the class which was regularly reviewed after internal examinations.

Seven of the parents acknowledged the positive support their children had received from the reception school and in particular the students’ general class and/or mathematics teachers. The parents appreciated approachable, supportive teachers who recognized their children’s talents. Not all of the parents felt that the school had aided the transition process; they were not impressed with the level of their teachers’ pastoral care and guidance for their children especially in relation to the accelerated programs. One parent felt that although the students were “doing serious level maths,” they were “tender in years in maturation” and so maybe there should have been more initial pastoral care to support the adjustment to secondary school.

Explicit school systems to help with the transition were limited. Peer support systems and vertical form classes (a homeroom of combined class levels of schooling) operated in one of the schools. However, the students at this school saw little to be gained from these systems once the initial phase of learning about organizational matters had passed. Mentoring was a strategy experienced by only one student in the study. This student, as part of a Year 9 group of gifted and talented students, met regularly with the Year 13 gifted and talented students. There were clearly different levels of support given to the students from the teachers and schools. The social-emotional support for a few of these students, from the teachers at the receiving schools, was given little attention. Once the students had settled in to their new schools, the parents were interested in monitoring their children’s academic progress. The level of preparedness and the support systems have the potential to impact on students’ academic progress in their new schools.

**Academic progress**

Parents were questioned about how they were informed of their children’s academic progress in their new schools and what communication there was between home and school. The schools all had regular reporting systems. Early in the year, for most schools, it was one-way information sharing, essentially a ‘meet the teacher’ opportunity. However, several parents commented that they felt comfortable about approaching the teacher or school if they had concerns about how well their children had settled in to the new school.
Five parents were not impressed with their children’s progress in mathematics at their new schools. They seemed reluctant to step in and question this lack of progress and the level of challenge in the mathematics programs. They were not acting as pushy demanding parents, but took a wait-and-see approach. This period of wait time was usually for the parent-teacher conferences later in the academic year where they felt they had an opportunity, supported by a written school report, to raise their concerns. These concerns were based on their children’s attitudes, and decreased levels of effort, motivation, and enthusiasm for mathematics. A few of the parents felt uninformed about their children’s progress and the curriculum as reflected in the following comments from one parent.

...he’s finding it less challenging and with us as parents not having that same sort of involvement, it’s sort of hard to know exactly what he means and the reporting process at [the school] is different… the parent-teacher interviews, there’s a three way conference with the children which is great…but the quantity of information about what they actually do is heaps less than we’ve had in the past….It tends to be more about goal setting for the future, as opposed to “Here’s what they’ve done this term”. (Martin’s mother)

All schools had systems in place to inform parents on a regular basis, but the quality of information communicated about students’ progress and the mathematics curriculum was limited. Formal written reporting occurred later in the year when teachers had accumulated a reasonable amount of assessment data. The parents wanted earlier opportunities to communicate with teachers and for this to be initiated by the school. Once the transition to the new school had been made, how far ahead were students, teachers, and parents considering the mathematics education pathway?

The sending teachers had clear expectations about their students and their move to a new school. They understood that there would be an information sharing process so the reception schools would know that the students had been identified as gifted and talented and would place them in appropriate classes. These teachers expected that the level of mathematics would be suitably challenging and the teaching approach would also encourage open-ended investigations. There was also an expectation, from these teachers, that the students would be encouraged to take greater responsibility for their learning and “keep on pushing themselves”. One of the primary school teachers explained:

I hope that there will be extension work for them and that they will be recognized as being proficient mathematicians and that possibly they get a little bit more say in what they do in maths. I think the better children can actually start taking a lot more personal responsibility for their maths and maybe they need to be given more of that open-ended topic work where they can do their own exploration… (Mrs N, Teacher)

Another of the primary school teachers was very clear about her expectations for the students. She explained that she articulated to her students that she expected them to be in accelerated programs at secondary school and that their pathway was to go on to university. This teacher saw her role as giving her students a good grounding and a kick start to secondary school, and they should have early entry or at least part-time entry to university. She also believed that these students had a vision for themselves.

I think too, some of the children then go on to study part-time at varsity through their sixth and seventh form equivalent years and I think that’s another opportunity for them. They can do more subjects, they can extend out, most of the kids are quite content to do that, it keeps them inspired….It gives them the tools, I suppose, so that they can choose the pathway, rather than have the pathway choose them. (Miss L, Teacher)

Not all of the schools informed the parents about the intended pathways for their children who were in accelerated programs or specially designated ‘extension’ mathematics classes. The Year 7 students and their parents assumed that the next transition would be in to high ability accelerated classes at secondary school. Many parents had no understanding of the intended pathway for their children after the immediate following year.

…I think [the School] themselves are still trying to figure it out. Once you’re trying to extend a class, do you extend it forever or do you then ultimately bring people to a point….In regards
to maths, I don’t think I’d have an answer, specifically what is going to happen. (Nardu’s mother)

The mother of a young student who achieved well ahead of his age peers in mathematics acknowledged that “he should provide challenges for the school if they are really going to meet his academic needs and continue the acceleration process”. However, his mother was also focused on his social activities and his wide-ranging extra-curricular activities. Ryan’s mother outlined the situation.

He’s already in the extension course, he’s obviously going to make it again next year...So I’m not quite sure how it’s going to work next year. Personally I do have some concerns…next year because he is going to be the top of the school….he’s a kid with high expectations of himself and he’s a perfectionist….he’s younger…so I really think if he can have a really good social year, if he can get involved in all the sports he’s playing…then that might be better for him than actually making him work academically really, really hard…so I don’t have a problem with him doing that. I mean he’s got a lot on his plate. (Ryan’s mother)

This parental concern about the social-emotional versus academic welfare was not raised by other parents. However, there was concern from those parents in the study who had children currently in accelerated secondary school programs. Questions were posed about what happens when they reach the end of secondary schooling. The secondary boys’ school had a system in place, but this had not been articulated to any of the students. One of the boys knew that they would sit a national examination early but the rest of the boys stated that they had no idea what happened in subsequent years. Likewise, the parents of students at the secondary boys’ school were not informed from the beginning about the school’s plans for the accelerated students. The parents who were aware of the intended pathway were informed only because of siblings who had been in accelerated programs at the same school.

…we wouldn’t know, except have a vague idea that they’d be a year ahead and the long term possibility of doing [university] papers…If this is their elite group of students then they should have some tight procedures and systems, and they should have a lot of communication with the parents. (Lewis’ father)

One student (Nina) was provided with an individualized program, which included acceleration. Her parents had worked very closely with the school right from the initial enrolment. The student’s father had been involved with the Head of Mathematics to plan a pathway, not only in mathematics, but in other curriculum areas. They had looked ahead to the following two years. Nina had also been involved in these discussions and was aware of the opportunity to sit national and international examinations earlier than was the norm.

The students were asked not only if they had knowledge of intended pathways in their study of mathematics, but also about their future aspirations. The reason for asking about their aspirations was to see if their future plans included mathematics, and if there was any commonality among the group as a whole. Five of the students (four boys, one girl) spoke of specific professions where a high level of mathematics would be needed. These included engineering, medicine, economics, veterinary science, and a computer-related profession. Three students wanted sports or art-related careers and one student wanted to be a zoologist. Three students wanted to do something that would require mathematics but had not considered specific careers, and the remaining three students were unsure of future careers. This was a topic that, according to the students, had not been given much attention. This was despite some of the secondary school teachers articulating aspirations for these students, and career education and guidance a mandatory component of the national curriculum.

Discussion

It is important to remember that this article reports on a case study where no attempt is made to generalize beyond this single case. However, it is hoped that from the findings, interpretations can be made that could be applied to, or inform people in similar settings or situations. Additionally, the parents of the student participants could be labelled a biased group as it is more likely that parents
with high levels of involvement in their children’s education would volunteer to participate in research in the first instance. The study was limited to a two-year period because of time constraints whereas a study of longer duration would have enabled tracking of students through further transitions (including class to class) with a focus on their continued study of mathematics and levels of motivation, interest, and achievement.

Different types of transition were experienced by students in this study. For ten of the fifteen students it was a move from primary school (Year 6) to either intermediate school (Years 7-8) or a school for Years 7 to 13, and for the other five students it was a move from Year 8 to secondary school. For each student it meant a move to a new school with different systems and structures, peers, and teachers. The students all changed from being the oldest students in a school to the youngest students in the new school. For the Year 8 students the move to secondary school was their third move in the schooling system. A three-tiered approach to a child’s schooling (primary-intermediate/middle-secondary) can be problematic (Galton, at al., 2000) and these systemic moves raise questions about the cumulative effect of transitions and age appropriateness (Galton, 2000).

Students were prepared for this transition in a variety of ways. The majority of the students had been given information about their new schools and some had attended an orientation visit. These visits, prospectuses, and discussions with peers, siblings, parents, and teachers meant that the students felt reasonably well prepared for the organizational aspects of the new school. The students knew to expect the systemic changes and possibly different teacher expectations. Those with siblings attending the same school were particularly confident. This supports the findings of other studies where the number of siblings having attended or attending the reception school was found to be positively related to successful systemic transitions (Anderson et al., 2000). The siblings clarified transition-related information that alleviated many anxieties associated with the unknown. They discussed with siblings matters such as uniform, hair length, textbooks, lockers, and other school routines and expectations. The students in the study all experienced some form of inter-school communication such as school visits, liaison visits by teachers, and information booklets, which all go some way towards enhancing the transition process.

The academic focus of ensuring curriculum continuity and the learning and development of individual pupils was not evident for all students in this sample. The practice of fresh start was evidenced in three schools that based placement on their own selection tests and did not take into account the previous schools’ records. This fresh start policy has been argued, according to evidence reviewed by Galton et al. (2000), on the reasoning that a secondary school’s objectives are more academically specific and the secondary specialist teachers can better ascertain a student’s ability in a subject such as mathematics. Galton and Hargreaves (2002) write that it is questionable whether curriculum continuity is taken seriously and is an achievable goal.

There was an expectation, by the majority of the teachers in the study, that as gifted and talented mathematics students they would be independent learners and therefore programs designed for these students would encourage independent work. Not all parents felt that the expectations were realistic and not all schools helped students, as part of their coping mechanisms, develop skills in self and time management, studying, gathering, and using information, communication, decision-making, and conflict resolution. There was little evidence, in this sample of students, that they were specifically taught skills for coping and being independent learners. These skills are recognized as making a transition across systems more successful (Schumaker & Sayler, 1995). This lack of focus on preparedness by teachers aligns with other studies (Hawk & Hill, 2001; Education Review Office; 2006) that report a lack of preparedness by schools to help students make a smooth transition to secondary education.

These gifted and talented students were supported in the school transition by three main groups of people (friends and siblings, parents, teachers) and the school system. The students acknowledged that friends were an important part of the support system for assisting a successful transition; this was confirmed by the parents. This result is not surprising and reflects other studies (Canton & Boivin,
in which parents and students saw the keeping of friends from the previous school, as well as the making of new friends, as contributing to the success of the new experience. The students expected, and wanted, to be with like-minded peers who had similar interests and abilities. This is an important component of suitable programming for gifted and talented mathematics students (Assouline & Lupowskiski-Shoplik, 2003).

The parents in this study, interviewed before and after the transition, showed interest and support for their children in ensuring a smooth move to their new school. Parental interest and support is also recognized as a key factor in enabling students to make successful transitions (Dauber, et al., 1996). Two parents had some reservations about the school to which their children were about to transition, but were prepared to take a wait-and-see approach. The parents all felt that they were less involved in the new schools and that it was part of the progression through the school system. However, one parent in the study had to take on an advocacy role as a consequence of the transition process. The parent had initially taken a wait-and-see approach, but seeing her child’s increasing dissatisfaction and boredom in mathematics eventually led to her intervention. As interested and supportive parents they are more likely to contact a school to influence placement decisions (Dauber, et al., 1996).

The school systems provided limited forms of support for these students. Only one school used a peer support and vertical class system and one school a mentoring scheme. These support systems are viewed as worthwhile practices (Casey & Shore, 2000) and culturally appropriate for our indigenous Māori students (Bevan-Brown, 1996). The message is sometimes conveyed that the post-transition year is a less important year (Demetriou, et al., 2000) compared to later years in schooling, and few schools have systems such as mentoring schemes in place for their younger students. The characteristics of good systems include collaborating with and considering information from all stakeholders (Leppien & Westberg, 2006). This was not evidenced in all cases in this study. The types, quality, and quantity of support from teachers also varied for the students. The parents and students articulated few comments specifically about support from teachers. Yet the teacher, as shown in other studies (Pietarinen, 2000), can be a “central transformative force in bridging the gap between primary and secondary school” (p. 383).

Students faced challenges in making a transition at two levels—the macro-level of the school’s physical structures and organization and at a micro-level in the classroom with a new teacher who is a subject specialist and who may use different teaching approaches. Successful transitions occur when reception schools make every effort to create a sense of community and belonging, and where students, teachers, and parents are involved (Smith, 2001). The majority of the students in this study were well prepared for the transition by teachers and parents, and reasonably well informed through school systems. They received support from peers, parents, and teachers. Two students did not experience a smooth transition. For one student it was the result of a lack of friends and for the other it was the policy of *tabula rasa* or fresh start. The level of support from reception schools was lacking for some students.

With their children moving to a new school, the parents wanted to monitor not only their children’s social-emotional well-being, but also their academic progress. This is most important given that the literature has shown that most students experience dips in achievement post-transition (Anderson, et al., 2000; Galton & Morrison, 2000). Most parents found this difficult; there was limited opportunity for communication, and progress reports and interviews came later in the school year. Some parents expressed concerns about children’s attitudes, efforts, motivation, and levels of achievement. The provision of academic continuity in pupils’ experiences is viewed as a vital component in a successful transition yet, it is disconcerting how many of the students and their parents mentioned the lack of challenge in their new programs. This result was also surprising given that the students were taught post-transition by teachers who had greater expertise in mathematics than their previous teacher. There were expectations from the parents related to identification and recognition of interest and abilities, a desire for a teacher who continued to challenge their children, and to be informed of their children’s progress.
Most of the students were unaware of the intended educational pathways in their study of mathematics. A few of the students knew the pathway for one or two years in advance and most parents had vague understandings. A few of the secondary school teachers and one intermediate teacher articulated clear views about their aspirations for the students; they would continue studying mathematics and continue on to university. Some of the students had considered future careers and for five students these required successful achievements at higher levels of mathematics. The students had not discussed future careers and pathways at school, although some parents were aware of their children’s aspirations. This result supports the Education Review Office’s (2006) findings that for diverse groups of students there were “limited or no opportunities to develop awareness of their strengths and abilities and of the possible educational pathways open to them” (p. 35).

Students experience several transitions during their years of schooling; each one of these is important. However, just because a student has successfully negotiated one transition does not mean that he or she will successfully negotiate the next one. The nature and extent of change is dependent on many factors as previously described. For the majority of students in this study, the transition was relatively smooth and unproblematic although there are several implications to be considered from the findings.

Implications

School transition can be a daunting process for any student; these gifted and talented students had high expectations in terms of teacher qualities and curricular challenge. Dips in academic achievement commonly occur post-transition and consideration needs to be given to those factors identified in this study so that schools eliminate any hiatus in progress. Aspects related to pastoral care could also be raised earlier in the school year rather than parents waiting until formal reporting systems later in the academic year. Students need to have opportunities to raise their concerns in a safe and supportive environment early in their days at the new school. Schools should also consider strengthening their contribution to a student’s transition with access to mentors and learning counsellors. An earlier three-way conference (student-teacher-parent) soon after the transition might go some way towards capturing sooner, concerns about students’ motivation, interest, and academic progress in mathematics.

It is important for sending and reception schools to consider preparedness, support systems, and other factors that contribute to academic and social-emotional success as part of the school transition process. The most successful transitions occurred when there were programs in place that explicitly addressed students’ preparedness, support systems, and academic orientations and when these programs involved an inter-related student, parent, and teacher focus. If we are to help our gifted young people sustain an enthusiasm for the learning of mathematics, confidence as learners, and a sense of achievement and purpose, then we should pay more attention to the transition process.

References


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Abstract
In this article, conceptions of creativity in giftedness and their implications for education are reviewed. First, the definition of giftedness is examined taking into consideration the difference between intellectual giftedness and creative giftedness and the difference between potential and talent. Second, the nature of creativity based on the multivariate approach is explored. Third, various measures of creativity are presented. Finally, the effect of different pedagogical methods and the influence of teachers on the development of creativity are examined.

Keywords: Potential creativity; EPoC, divergent-exploratory thinking; convergent-integrative thinking; giftedness, talent; evaluation.

The education of gifted children represents an important engagement of a society for its future development. Numerous conceptions of giftedness have been proposed. Most have focused on academic achievement and a superior level of intellectual ability, measured by IQ tests (Feldman, 1982; Lubart, 2006). However, there have been recent calls for an expanded view of giftedness, taking into account multiple facets of cognitive functioning, including creativity (Gagné, 2004; Gardner, 1983; Lubart, 2006; Sternberg, 1985). Professionals who work with gifted students recognize that creativity is a salient issue and creative thinking is often a major part of gifted educational programs. Four issues are examined in this article. First, the differences between intellectual and creative giftedness are addressed. Second, a multivariate approach to creativity is presented. Third, different measures of creativity are examined. Fourth, implications for education are exposed, with attention to the influence of teachers and pedagogical methods.

Creativity, Potential, Talent
Is creativity a part of intelligence and giftedness?
For some, intelligence is viewed as a general capacity (Binet & Simon, 1905; Huteau & Lautrey, 1999), others see it as a set of distinct capacities (Gardner, 1983), and finally some propose a system of capacities organized in a hierarchical way (Horn & Cattel, 1966; Gustaffson, 1984). In each perspective the question of creativity has been raised. For Binet and Simon (1905), imagination is a basic mental function. In their tests, they included a few open-ended items such as generating rhyming words or completing sentences to measure this aspect of intelligence. In the theory of multiple intelligence, Gardner (1983) distinguishes various intellectual abilities organized according to the type of cognitive stimuli. Each intelligence involves a particular cognitive content: linguistic, logical-mathematical, musical, spatial, kinesthetic, naturalist, intrapersonal and interpersonal. For Gardner, people may be creative in each of these intellectual domains and the nature of the creative intelligence depends on the domain of activity. Finally, Horn and Cattel (1966) make a distinction between fluid intelligence and crystallized intelligence. Fluid intelligence is the capacity for context-independent reasoning whereas crystallized intelligence is the use of acculturated, context-dependent learning. Creative intelligence involves both aspects of intelligence. Indeed, the search for new ideas relies on analogical thinking, evaluation and deductive reasoning; for crystallized abilities, domain-specific knowledge must be applied to select which information is relevant to understand and solve the problem.

Thus, most conceptions of intelligence suggest that creativity must be taken into account. However, intelligence tests almost never measure creativity. The first studies concerning gifted
children focused on intellectual capacities. Indeed, one of the first measurements used to identify gifted children was the Intelligence Quotient (IQ) equal or higher than 130 (Gowan, 1971). The use of IQ to identify gifted children has limits. The results with such tests (1) provide a measure of the success of the pupil at a given moment, (2) do not study talents which one could observe apart from academic success (Mulhern, 2003).

Many authors consider that creativity is a basic capacity for any form of high potential. In particular, Renzulli (1979; 1986) postulates that high potential in any field of activity stems from three components: (1) above-average general intellectual capacities, as measured by traditional tests of intelligence; (2) engagement in the task, which includes factors such as enthusiasm, interest, perseverance, eagerness, openness to criticism; and (3) creativity which includes fluency, flexibility and originality of thought, openness to new experiences, curiosity, risk taking and aesthetic sensibility.

Gagné (1983) has questioned this model. One of the issues is whether creativity is a systematic component of high potential for all fields or sub-fields of endeavor. For example, in the field of dance, a choreographer must be creative in order to propose new sequences, a new choreography, whereas the dancer, interprets this choreography; so the dancer is not necessarily creative, rather expressing best what is required by the choreographer. In sports, there is the example of Fosberry who invented a new way of executing the high jump; a creative accomplishment. However, most gifted and talented athletes who compete in the high jump for field and track seek to execute it as well as possible without any concern for creativity.

According to Maker (1993), intelligence and creativity are capacities that play different roles in the phenomena of high potential depending on the nature of the problem with which the individual is confronted. Different types of problems emphasize either intelligence or creativity. The problems that involve creativity tend to have a vague formulation, require a solution to be invented, and often do not have a single “right” answer. This position is consistent with the view that the distinction between intelligence and creativity is an artificial one; perhaps, there is a continuum from intellectual to creative giftedness which is more or less pronounced depending on the domain and the nature of the task in the domain (Runco & Albert, 1986). We will now examine the differences between potential and the realization of this potential.

**Differences between potential and talent**

It is one thing to have potential and another to express it, to put it to use effectively. For example, certain studies of children with a high IQ (Peters, Grager-Loidl & Supplee, 2000; Reis & McCoach, 2002) found that some do not show the expected academic performance. Rather, these children underachieve, showing low or failing grades, and clearly do not express their potential. According to Gagné (1983), the gift corresponds to a competence that is definitely higher than average in one or more fields of skills.

Talent is defined as a performance definitely higher than average in one or more fields of human activity. These definitions highlight that a person with talent is necessarily a gifted one. On the contrary, any child with high potential does not necessarily express this "gift". For Gagné (1983), motivation makes it possible to transform the gift into talent.

The phenomenon of "underachievement", the gap between giftedness and talent, is not limited to academic performance. Olszewski-Kubilius (2000) highlights the gap between children’s giftedness and their creative productiveness; different kinds of factors explain this discontinuity - environmental conditions in childhood and stable individual characteristics such as motivation and personality. However, Kim (2008) has questioned the possible link between underachievement and creativity as certain characteristics of children showing underachievement are similar to those of highly creative children. In the next section, the nature of creativity and the factors which can influence it are described.
The nature of creativity

Definition of creativity

Creativity can be defined as the capacity to produce something new and adaptive within the constraints of a given situation (Lubart, Mouchiroud, Tordjman & Zenasni, 2003). Thus a creative production must be original, at least to some extent. Is this creative capacity general or specific to each field? Although the debate is not settled, (see Lubart & Guignard, 2004), many authors support a rather domain-specific modular conception (Gardner, 1983; Feist, 2004). For example, a child may have a high creative capacity in the scientific field (mathematics, sciences) but may have difficulty inventing a story. Another child may be creative in verbal tasks (such as inventing a story) but have difficulties making an original drawing. Thus, creative abilities can differ depending on the field. These differences in creative performances can be understood within the multivariate approach.

Multivariate approach

According to Sternberg and Lubart (1995), different factors contribute to creative potential. The differences observed between individuals result from a combination of cognitive, conative and environmental factors (Lubart, Mouchiroud, Tordjman & Zenasni, 2003).

Cognitive resources and development

Cognitive factors refer to knowledge and information-processing abilities that facilitate inventive thinking. Creative performance is partly domain specific because individuals do not have the same level of knowledge in every field. In addition to knowledge, different intellectual abilities are required in the creative process, such as flexibility, divergent and convergent thinking (see Sternberg & Lubart, 1995).

Flexibility refers to the ability to find varied solutions to a problem, to change ones’ approach to solve it and to understand it from different angles (Georgsdottir & Lubart, 2003). Divergent thinking is the ability to generate many different ideas from a given stimulus or starting point. According to Guilford (1950; Lubart & al., 2003), divergent thinking is an essential ability for creative achievement. Empirically, the more ideas generated, the greater the chance to find at least one that is original. Creativity requires also convergent thinking in order to wean out the best ideas and improve them. The combined use of both divergent and convergent thinking seems essential.

Conative resources and development

Conative factors refer to traits of personality and to motivation. Some traits of personality, such as risk taking, openness, tolerance of ambiguity, are important to develop original thinking (Lubart & al., 2003). For example, in many schools, most of students do not take initiatives because the teacher decides what students should do. On the contrary, in Freinet’s alternative pedagogy (described in detail later in this article) children can choose their activities.

Moreover, children can suggest others activities like theatre. Sometimes, if a group of children wants to engage in a particular project, they have the possibility. For example, two girls in the 5th grade have suggested organizing a dance class; they proposed this to others, formed a group, prepared by themselves a choreography and finally, at the end of the year presented their show.

Motivation corresponds to the energetic strength with which an individual engages in performing a task. Two types of motivation are often compared for creativity (Amabile, 1996): intrinsic and extrinsic motivation. Intrinsic motivation comes from the inner needs of individuals such as curiosity drive, it focuses on the task and the enjoyment derived from solving the problem. Alternatively compensations, like material goods, money, award or social praise generate extrinsic motivation. Results of most research show that intrinsic motivation is positively associated with creative performance. A relationship between creativity and extrinsic motivation also exists but appears less obvious, varying according to the circumstances of the task and moderating traits of the individual (Amabile, 1996; Baer, 1998; Collins & Amabile, 1999).
Environmental factors

Environment influences not only the development of creative capacities but also the various forms that creative expression may take. The environmental influence occurs in different spheres: in the family, in the school or work environment and in the cultural context in which the person evolves. These various environments are embedded in each other.

The familial environment provides the cognitive and emotional bases for the development of creativity. Simonton (1984) showed that a familial environment full of cultural stimulation (books, arts...) favors creative development. Lautrey (1980) observed a link between children’s intellectual capacities and family structure; in more recent research, children living in families with "flexible" rules (for example, children must to go to bed at 8 p.m. if they have school in the morning; but on the week-end, they can stay up later to see television programs) for governing children’s activities showed higher levels of creative thinking than did children who lived in families with rigid rules (for example, children must always go to the bed at 8 p.m. regardless of special circumstances) (Lubart & al., 2003).

School and later professional environments have each an important impact on creative expression. Indeed, under some conditions, these environments can stimulate creative behavior whereas in other cases they hinder it. For example, aspects of a creative climate in work settings include (Crespo, 2004): time for ideas, freedom to create, humor, discussion, absence of conflict, openness, risk-taking, support for innovation and tolerance of differences. Concerning the school environment, the study of the development of creativity in children shows periods of stagnation and sometimes temporary decline of average levels of creative performance (Torrance, 1968).

The majority of the explanations for these results refer to the school environment because these slumps are found mainly at the time when children change school cycles (e.g., move from kindergarten to first grade) (Torrance, 1968). As we will see in a later section of this article, many studies concerning gifted children and schooling suggest the importance of the school environment for the development of talent (Baldwin, 1987; Kim, 2008; Landrum & Ward, 1993).

Finally, culture refers to the set of thoughts, traditions, values and symbols that structure the way in which a group of individuals interacts with the social and physical environment. The values transmitted through the social environment promote or inhibit creativity. This promotion depends on the field and on the culture. Ng (2001) suggested that if there is a difference in creative products between occidental and oriental cultures, it seems to be due, at least partly, to the dimension of individualism and collectivism. Indeed, there is a link between individualism and intrinsic motivation, which was already mentioned as an important factor for the creative product.

The combination of these different kinds of factors influences creative potential and its’ expression in different fields. It is possible to evaluate psychological profiles based on these factors to measure an individual’s creative potential. Consider in the following section, different kinds of tests used often to identify creative potential.

Measures of creativity

Numerous tools have been proposed to evaluate creativity. We will first examine divergent thinking tasks, then integrative-thinking tasks, questionnaire measures and finally parent and teacher appreciations.

These different kinds of measures of creativity can be categorized into two groups: measures of creative potential and measures of creative achievement. The first one evaluates creative giftedness (divergent thinking, productive-integrative tasks and out-of-school activity questionnaires). Evaluations by teachers or parents can us inform about both creative potential and actual creative achievement.
Divergent thinking tasks

Consider three tasks that come from the Torrance Tests of Creative Thinking (TTCT, 1976). These tasks evaluate the ability to generate many ideas from a given stimulus with verbal and graphic modes of expression. For example, in the “New uses of a cardboard box” task, we explain to children that a cardboard box can be used in many ways rather than being thrown away. Children must give as many original ideas as possible in ten minutes. In the “Improvement of toy” task, children must give as many ideas as possible to improve a stuffed animal. They have ten minutes. Even if proposed changes are costly, they can give all propositions. In the “Parallel lines” task, children must make as many drawing as possible based on sets of parallel lines.

For these kinds of tasks, different scores are calculated: fluency, flexibility and originality. For the graphic task, there is also an elaboration score. Fluency corresponds to the number of ideas given. Flexibility is the number of categories to which ideas belong. Originality is the statistical rarity of the ideas. Finally, elaboration, for the graphic task, is the capacity to develop and embellish the basic drawing. The score depends on the number of details used to develop the basic idea.

It is important to note that divergent thinking is only one part of creativity. So if a child obtained a high score in a divergent thinking task, he or she is not necessarily creative. However, it is easy to evaluate divergent thinking and the majority of indices are objective. So many studies use these kind of tasks.

Productive (or integrative) tasks

In contrast to divergent thinking tasks, productive integrative tasks require the conception and development of an idea. We will examine sample verbal and graphic tasks.

In one verbal creativity task, a story title is proposed, such as “the centipede’s sneakers” (Lubart & Sternberg, 1995). From the title, each child must generate and then tell aloud a short story. The story is recorded and transcribed. Every story is then evaluated by judges who each give a score between 1 (not creative at all) and 7 (very creative), and an average judgement score is calculated for each production. This consensual evaluation of creative productions using adult judges has been widely used (Amabile, 1996).

In a graphic creativity task, either a topic, such as “tension”, or a set of diverse objects is proposed (Lubart & Sternberg, 1995). The child can complete the drawing as he or she wants but must center the work on the provided stimuli. To evaluate the creativity of the drawings, judges evaluate the drawings on a scale of 7 points, as for the stories (1 = not creative at all; 7 = totally creative), and a consensus score is calculated for each drawing. It is important to have several judges, to reduce the subjectivity of the criteria employed. Indeed, usually each judge evaluates the production based on his or her own experience and criteria. Another possibility for judges is to propose several detailed criteria and each criterion is given points according to the rarity of the proposal in the population. This kind of task allows an evaluation of children’s capacity to produce something creative upon an external demand and is best considered a measure of creative potential.


The Evaluation of Potential for Creativity (EPOC; Lubart, Besançon & Barbot, 2011) is an up-to-date measurement-tool for children. The development of EPOC is based on two important ideas: first, it is possible to categorize the numerous micro-processes involved in the creative potential into two main sets, called divergent-exploratory processes, and convergent-integrative processes (Lubart, Besançon & Barbot, 2011). Divergent-exploratory mode of thinking refers to the process of expanding the range of solutions in creative problem solving and includes factors such as flexibility, divergent thinking, selective encoding, which are supported by personality traits, such as openness to experiences and intrinsic task-oriented motivation. Convergent-integrative thinking refers to the activity of combining elements in new ways (including associative thinking, selective comparison and combination allowing a synthesis of various heterogeneous elements to converge into a unique,
original production) which are supported by conative factors such as tolerance for ambiguity, perseverance, risk taking, and achievement motivation. Second, as creativity is relatively domain specific, it is important that measures of creative potential take into account the domain of creative expression. Consequently, EPoC measures both sets of microprocesses (divergent-exploratory and convergent-integrative, as opposed to previous measurement tools that typically measure a single component), based on diverse domains of expression, whereas the previous approaches of creativity measurement had rather a generalist approach (tending to generalize the observed results to any domain of creative expression).

EPoC includes two alternative forms (Form A and Form B) so that users can assess the progress made by children. Each of EPoC’s forms is composed of eight subtests which measure both the two types of thinking and two application domains (verbal and graphical). Thus, for each child, there are four measures of creative potential: Divergent-Exploratory Thinking in the Graphic domain (DG), Divergent-Exploratory Thinking in the Verbal domain (DV), Convergent-Integrative thinking in the Graphic domain (IG), and Convergent-Integrative thinking in the Verbal domain (IV). Results are interpreted in terms of efficiency and creative potential style, yielding an EPoC profile. These styles emphasize an individual’s “preference”, related to the likelihood to perform well in a particular domain (e.g. high score in DG and IG, suggesting a “preference” for the graphic domain across processes) or a specific mode of thinking (e.g. high score of IG and IV, suggesting a “preference” for the Convergent-integrative thinking mode across domains). These EPoC profiles thus provide useful insights to tailored creativity-based educational programs aiming to guide the development of creativity appropriately, or in a diagnostic perspective (e.g. for the detection of children with high creative potential in the four EPoC indexes).

To summarize, EPoC offers a creativity assessment that combines an approach by domain of creative expression and by mode of thinking, in order to capture the diversity of creative abilities of children. This up-to-date approach thus provides a broader vision of creative potential in children and proves useful as a monitoring tool to guide the development of creativity.

**Questionnaires of creative activities**

Different kinds of questionnaires exist. Notably, some extrascholastic-activity questionnaires measures related to creativity. Milgran & Hong (1999) developed and used a questionnaire (Tel-Aviv Activities Inventory) to evaluate the achievement in out-of-school activities in art, science, literature, and music. Children indicate their activities and if they have actually created something. This type of questionnaire measures the implication of children in several activity domains and the extent to which they engage in creativity relevant activities in these fields.

These questionnaires offer a comprehensive idea of children’s creativity-relevant work in different domains. However, the potential biases of self-report instruments may influence the data obtained.

**Evaluation by parents or teachers**

A last method often used to evaluate creative performance relies on parent and teacher ratings, indicating the extent to which children are creative at home or in school. These types of evaluation are potentially rich because they are based on different moments of observation. Notably, teachers can compare children who are in the same class. However, this evaluation can again be subject to bias, such as social desirability or halo effects in which creative ability is mixed with overall academic performance evaluation (see Noizet & Caverni, 1978).

**Creativity and education**

In the school system, three elements are interrelated: students, teachers and knowledge. These three elements form a teaching triangle which can be organized in many ways (Pelpel, 2002). A teaching method is a specific way to organize relations between the pupils, the teacher and knowledge. First, we will examine the influence of children, then different methods for educating the gifted child. Finally, we will study the specific influence of teachers on creative development.
**Influence of children's characteristics**

Diverse characteristics influence student achievement, including learning styles. (Dunn & Dunn, 1993; Gregore, 1982; Wintkin and Goodenough, 1981). For Dunn and Dunn (1993) environmental, emotional, biological, physical and psychological characteristics contribute to a student’s learning style (Dunn & Griggs, 1995). In one study, Karwowski (2008) examined students characteristics by preferences for a rational or an intuitive style. Rational-thinking-style-oriented students were significantly more conformist and less inclined towards a creative, heuristic behavior compared to those preferring the intuitive style. However, preference for the rational-thinking style was correlated significantly with school grades. In another study, Karwowski, Lebuda, and Wisniewska (2008-2009) found relations between stylistic measures, creativity and school performance, with results varying for public and private schools.

Research indicates in general that students and trainees learn effectively with a teaching pedagogy that matches their learning style preferences (Lee & Li, 2008; Zhang, 2008). In the next session the influence of different pedagogies is examined.

**Influence of different kinds of pedagogies**

Numerous studies have examined the influence of the school environment on gifted children. In traditional pedagogy, teachers generally use a method centered on their own role in the class. The teacher has complete control: he or she has the knowledge and knows how to transmit it. This method is founded on the performance of the teacher, which can be evaluated by an inspector. In this pedagogy, when children stray from the prescribed method or idea, teachers tend to put the pupils back on the right track. The teacher plays the role of the expert. Development of creativity is not a main objective. Additionally, large classes require that certain norms be maintained to allow the class to advance. The majority of teachers help children to follow the rules correctly. Consequently, children do not tend to practice taking risks and being independent. Pupils learn to depend on their teachers and to follow the system's norms.

However, autonomy and risk taking are important for creativity. For example, risk taking is inherently involved in creative thinking and production because one must break from what is known and comfortable, and move in a new direction. There is potential for success but failure may occur, with an idea that does not solve the problem well and/or is criticized by others. In a series of studies, Clifford (1988) examined the development of risk taking in children aged from 8 to 12. Clifford asked children to choose a problem in a list in which the difficulty of each problem was indicated for each school level (third grade, fourth grade and so on).

Results show that on average children chose problems that were relatively easy, corresponding to a lower school level than their own. The difference between the real grade level of children and the grade of problem chosen was greater and greater with age. With school years, children took less and less risks because they were afraid of failure. This attitude may promote good grades but does not foster creativity. On the contrary, generally in alternative pedagogy, teachers do not use grades. So children are less afraid of taking risks. Moreover, teachers allow children to choose their own activities.

Furthermore in traditional school, concerning cognitive abilities, mainly “right-answer” thinking is solicited. In fact, when a student is confronted with a problem, only one solution is generally possible. For example, teachers ask “what is the result of 7+7?”; and expect one right response “14”. However, teachers could ask “what makes 14?” For this question, different responses can be given, thereby involving divergent thinking. These two types of exercises differ on the nature of problem (Maker, 1993): the first is closed whereas the second is open, on a continuum from well-formulated problems with one right solution (closed problem) to problems that have less constrained formulations with various possible solutions (open problem) (Getzels & Csikszentmihalyi, 1976). In closed problems, all is known to the teacher, and the child does not know the response. On the contrary, for open problems, all the possible responses are not known and the formulation allows children to adopt different approaches and find several responses.
In classical pedagogy, pupils are often in competition. Indeed, with grades, children tend to compare their performance. This competition can develop perseverance and provide certain forms of motivation. Perseverance is important in creativity because the answer is not always easy to find. However, according to Conti and Amabile (1999), intrinsic motivation is most important for creative activity. Whereas extrinsic motivation from competition may contribute to creative production as well, it is intrinsic motivation that is most conductive to creativity.

In summary, classical pedagogy brings some elements, useful for the development of creative capacities, such as competition, motivation, convergent thinking and knowledge. However, as noted, classical pedagogy fails to develop fully the components needed for creativity, or is even antithetical to it in certain ways (Besançon, Lubart & Barbot, in press; Loi and Dillon (2006) propose a conceptualization of educational environments to develop creative abilities in children. For them, it would be important to foster certain intellectual abilities such as transference and synthesis in cross-disciplinary situations. Moreover, some gifted students, who are characterized by faster learning and by a desire for independence (Mulhern, 2003), are bored in traditional classrooms (Kanevsky & Keighley, 2003).

Some researchers and educators have sought a better school environment for gifted students (Coleman, 2003). Different methods of schooling for gifted children (grouping, enrichment programs, pullout programs and acceleration) have been tested and each one has its partisans (Lautrey, 2004). Consider each of these methods in terms of its relevance to creativity.

For the grouping option, children can be placed in groups according to their performance. Although this may seem to be a coherent approach, this type of program has been found to influence negatively the self-esteem of students who had an outstanding position in their original class and become, with this method, average or below average (Kulik et al., 1992). Another possibility is to group children of different grades only for one subject according their performance. In this case, creativity is not necessarily fostered: children are grouped according their performance in general fields and not according to creativity.

Enrichment programs and pullout programs propose to gifted children additional activities because they acquire the regular lessons more easily and quickly. There are various activities: development of creativity, problem solving, and development of individual projects. These programs can occur during the holidays (enrichment program) or during the school week, at certain hours (pullout programs). The effect of pullout programs suggests that school performance is sometimes enhanced and that performance on specific activities is better but the difference with other, control group children is not significant (Vaughn, Feldhusen, & Asher, 1991). In this type of activity, it is easier to improve creativity because there can be a focus on divergent thinking which is an element for creativity. Although certain factors can be improved and contribute to creative giftedness, it is not enough to focus only on certain abilities such as divergent thinking because as we indicated, creativity is influenced by a combination of several factors.

Acceleration allows gifted children to accomplish in a reduced time frame the regular school program; for example, children may follow a three-year program in two years. In this type of program, there are no discontinuities: gifted children cover the entire program during less time. On the contrary, when children skip a grade, there is a discontinuity and they do not study the entire program. In accelerated learning, creativity is not usually part of the curriculum, so children do not develop it.

Beyond classic approaches to gifted education, there is the possibility of alternative pedagogies. Indeed, several pedagogies (Montessori, Freinet, Steiner, Decroly, Ferrière) which emerged during the beginning of 20th century are centered on both on content and on pupils' action. Teachers have knowledge and transmit it, but children must actively seek to acquire this knowledge and integrate it. For example, Montessori (1992) suggested that to learn to read, pupils should learn to recognize letters actively, both by sight and with their hands: they move their fingers on letters made in different
textures. Teachers bring the material (knowledge) but children adapt it to themselves. For Freinet (Peyronie, 1999), individualized learning through a series of exercises that students accomplish at their own pace is considered important. In classical pedagogy, the whole class moves together; in alternative pedagogies, an individualized pace is possible. If children have a problem, the teacher is there to help them. So, the teacher is mainly a guide, facilitating for children their search for knowledge.

To identify clearly the best practices for educating creative gifted children, it would be necessary to compare all methods in the same study. In any case, there is agreement that it seems to be important to privilege individualized learning. As this proposition exists since the beginning of the 20th century with Montessori and Freinet, introducing this approach in the educative system for gifted would not be totally original! (Mönks & Mason, 2000). In addition to pedagogical orientation and different methods for educating the gifted child described here, the characteristic of the teacher who implements a pedagogy is important, and this point is treated in the next section.

Influence of teachers

Some studies have examined the influence of teachers on children’s creative performance. Indeed, teachers’ attitude, beliefs and classroom practices influence the development of creativity, notably in elementary school where children are confronted with the same teacher throughout the day. Wentzel (1993) examined the conception of American teachers: for them, an ideal student is a child who follows instructions, keeps quiet and does not ask many questions. Furthermore, a study of Finnish school teachers found a conception of the ideal pupil as honest, broad-minded, valuing self-respect, family security, true friendship and meaning in life (Verkasalo, Tuomivaara & Lindeman, 1996). A study of Nigerian teachers showed that they valued pupil characteristics such as industry, sincerity, obedience, courtesy, consideration, self-confidence, and health (Ohuche, 1987).

Other studies in Germany, Greece, India, the Philippines, Turkey, and the United States have shown that teachers favor quiet, conforming behaviors rather than intellectually provocative ones, which may question the teacher’s authority (Fasko, 2002; Strom & Strom, 2002). So these attitudes promote submission and conformism, which are adapted to disciplined school behavior but not creative behavior which thrives on curiosity and independence (Cropley, 1994; Sak, 2004; Wentzel, 1993). Newton and Newton (2010) explored teachers’ conception of creative thinking in primary school science. These results show that teachers’ conceptions tend to be narrow, focusing on practical, fact-based investigations. Although teachers are often encouraged to support creativity, their notions of how to accomplish this within specific school subjects may be inadequate. Thus, teachers may not recognize opportunities for involving creativity.

Working with teachers on their attitudes towards creative behaviors in the classroom is therefore important as teachers are in a privileged position to stimulate or stifle creativity. Teachers’ attitudes and values are learned and constructed over time. For current teachers these attitudes started to develop, probably, when teachers were themselves primary school students and then were confirmed during teacher training. It is important in teacher training and in-service programs to help teachers recognize what attitudes/values they have and to see the effects of these on students’ learning. Teachers must be open to the propositions of children, allow failure, and help pupils to overcome failures and frustration by supporting perseverance in their work.

Moreover, by favoring independent learning (each child works at his or her own speed) as well as cooperative learning between children (grouping children to do a particular task), teachers foster the development of creativity (Cropley, 1997). Moreover, for Sternberg (2003), teaching in ways that encourage creativity could also improve school performance in general.

Thus, there is an interaction between the characteristics of gifted children, teacher’s characteristics and the school pedagogical environment. So, not only the pedagogy but teachers also play a crucial role in fostering each component of creativity.

Discussion and Conclusion
We have seen that creativity is an important component for giftedness. Some authors think that creativity is the highest form of giftedness (Runco & Albert, 1986). Different measures of creativity exist to identify creative potential and creative achievement. If we use these techniques, we can begin to differentiate the academically gifted children from creatively gifted ones. Creativity needs to be valued at least as much as knowledge acquisition. Thus creativity needs to assessed and recognized through project work as part of school performance. Pedagogical practice is very important to improve creative potential or achievement in children. Indeed, schools can provide an environment that specifically values creative thinking, recognizes it in students and promotes it through teachers’ behaviors in the classroom.

Maker & Nielson (1995) have proposed the main features that must be modified to develop creative behaviors in the classroom. Notably, a school environment that favors creative giftedness is characterized by research of excellence, development of creativity, critical thinking, “real” problems, independence, individualized learning, encouragement of risk taking, and relatively less structured learning time compared to traditional classrooms. Teachers are informed and conscious of these principles, but their application can be difficult (Sak, 2004). Teachers need to be educated to understand creative development and ways in which creativity can be fostered or inhibited by school practices. Teachers need to be sensitized to creativity issues which are rarely part of their teacher training or priorities. If the formation of future teachers includes such information (about various techniques and the environment to improve creativity), application of such methods could be facilitated (Csikszentmihalyi & Wolfe, 2000). Moreover, alternative pedagogical methods exist since the beginning of the 20th century but few teachers use them; empirically the effects of these pedagogies on creativity, in particular for gifted children in school remain to be studied.

References


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The Netherlands

Abstract

This article describes a study on labour disputes of gifted people. Fifty-five gifted people, who have had one or more labour disputes, which resulted in their staying at home and filling out an online survey. Face-to-face interviews were held with seven respondents with more than two labour disputes. In this article, we describe the results of the interviews. There were two major differences between gifted people’s conflicts and those of the non-gifted. First, for the gifted people, the source of the conflict was a matter of job discontentment and/or unwelcomed open criticism about processes within the organisation. They saw what went wrong and talked about it. Second, the conflict developed over a long period of time in a more rational and non-emotional manner, comparable to the qualities of a cold conflict. Many respondents saw a clear relationship between their giftedness and their dispute(s) at work. More investigation is needed in order to compare these results to the results of non-gifted people and to further explore the relationship between giftedness and labour disputes.

Keywords: Labour disputes; gifted employee; job discontentment; cold conflict.

Introduction

Gifted employees are often thought to be difficult to work with; they don’t adjust very well and may experience conflict more rapidly, and perhaps more intensely. But is that really the case? Do they really have more labour disputes, and do these disputes have specific characteristics? Are there any recognisable differences between labour disputes for gifted and non-gifted people? No reliable literature on this subject was found to answer these questions and no study has been conducted about the labour disputes of gifted people. However, there is a lot of casuistic data within the community of the gifted (Nauta & Corten, 2002; Nauta & Ronner, 2007, 2008). Practical experiences among the gifted from mailing lists within Mensa, from workshops and other gatherings of gifted people indicate almost all labour disputes were with supervisors, and issues with the prevention and resolution of them. Also, these labour disputes have often led to extensive damage to the health, career and private life of individuals.

Noticing the large number of experiences and the serious consequences of them, provided an incentive to find out if gifted employees have structural problems regarding labour disputes and if so, could these structural problems be influenced in order to prevent them from happening? The results of a study on this subject could help gifted employees recognise potential conflicts at an earlier stage; thereby, preventing escalation, or, preferably, preventing a dispute altogether. The information gained from this type of study could give supervisors, HR managers and mediators a lot of relevant knowledge. The predominant research question was: What do gifted employees themselves have to say about the labour disputes which they have been through?

The current study was exploratory in nature, with no control group of non-gifted employees questioned. General knowledge on labour disputes was used, and prior to the study general information on labour disputes in The Netherlands was examined. A definition of gifted employees and why this group requires explicit attention was presented.
**Background information**

**Labour disputes**

The term ‘labour dispute’ means the following: “Two individuals, one individual and a group, or two groups within the confines of a labour organisation, have a labour dispute if at least one of the parties thinks that the other frustrates or annoys them. This may relate to job content, working relations, working conditions or working terms.” This definition was created by Van de Vliert (1989).

Reliable literature on the number of labour disputes in The Netherlands in general was not available. Most recent information was included in a publication by TNO (Van Putten, 1996). This publication states that approximately between 70,000 to 100,000 labour disputes occur per year. On the Internet, estimates can be found that around 90,000 people reported in sick per year due to a labour conflict. It was also reported that according to the Ministry of Social Affairs and Employment 3 to 4% of the people whose illness was a direct result of a labour dispute go on to receive a disability benefit. The source for these figures was not found; however, they were first mentioned in a 2001 speech by Minister Hoogervorst.

The financial implications for employers are extensive, especially if there is prolonged absenteeism and / or legal proceedings; pay-outs mentioned range from 45,000 to 50,000 euro.

Regarding the content of the labour disputes, a division into four conflict spheres as described by Ritsema van Eck and Huguenin (1993) was selected.

1. Job and organisation sphere;
2. Social emotional sphere;
3. Identity, vision and insights sphere; and
4. Interests sphere.

1. In the job and organisation sphere, the cause of the dispute may lay in the lack of organisation, too much or too little work, unclear structure, etc.;
2. Causes of dispute in the social emotional sphere lay in the interpersonal contact, like having different opinions on issues outside the direct working sphere, likes and dislikes between colleagues etc.;
3. The labour disputes occurring in the sphere of identity, vision and insights are mostly about a conflict in value systems, human nature; these cannot be solved rationally; and
4. Conflicts of interest will occur for example when existing (organisational) compromises in the cooperation no longer work and irreconcilable conflicts of interest arise.

Interaction and overlap occur between and amongst the different spheres of conflict, and it is usually difficult to understand in which sphere the labour dispute had initially risen.

In a study of types of labour disputes (Hubert and Veerman, 2002) no literature was found which was showing to what extent certain conflict issues occur more than others. Quote: ‘Occurrence of the different conflict issues is hard to determine, because a dispute is usually made up of different conflict issues. It is often not clear what the conflict is really about. Is it about the fact that someone is not being paid enough (interest in scarce resources), that he/she (the employee) doesn’t feel appreciated (identity sphere), or the fact that the employee feels that the boss is abusing his/her power (the sphere of social emotional conflicts). The unravelling of conflicts and resolving the disputes to the actual conflict issue is a difficult profession exercised by mediators.’

To clarify development of a labour dispute, the manifestation of the conflict was described. The manifestation can clearly and recognisably be described as a hot or cold conflict (Glasl, 1990). Hot conflicts are characterized by violent verbal outbursts, ‘rising temperatures’ and escalating behaviour. Cold conflicts often play off in the background, involve less visible emotion, are usually long and drawn-out, and are therefore a war of attrition, which will eventually lead to sickness.
Process: start a conflict

(Gifted) employee has vision on job content and/or organization

Employee communicates proposal to employer

Employer blocks proposal (without acceptable explanation)

Friction/irritation grows between employee and employer

Employee repeats the proposal several times

Escalation after several repeats of these steps

Conflict arises (cold/hot)

Damage
Gifted people

In this publication, the term ‘gifted’ means people who fit the description of the gifted in the so-called Delphi model of giftedness (Kooijman-van Thiel, 2008): ‘A quick and intelligent thinker who can handle complex cases; Autonomous, curious and passionate by nature; A sensitive and emotional person, intensely alive; He or she enjoys being creative'. This is an existential description for which no valid measuring instrument exists at this moment.

We therefore choose to compose the research group of people who are members of Mensa (they have scored in the top 2% on a valid IQ test which is the admission limit for Mensa) and non-members of Mensa who also scored in the top 2% on a valid IQ test. This group can be called "highly intelligent people" in the strict sense of the word.

Until ten years ago, hardly any attention was paid to gifted adults. It was thought that they were so smart that they would be able to look after themselves. For a large number of gifted adults this is true, but it turns out not to be the case for all of them. A child who never learnt to deal with his or her special qualities can’t be assumed to handle them correctly as an adult.

Many case descriptions (Nauta & Corten, 2002, Nauta & Ronner, 2007; Nauta & Ronner, 2008; Ronner & Nauta, 2010) report that gifted people can encounter all kinds of pitfalls and that a number of them need professional help to deal with those pitfalls. Many of these issues are comparable to what is seen in gifted children and are related to problems connecting with others and the fact that many facilities like schools and also jobs cater to people of average intelligence. Where a gifted child can become bored, a severe boredom and depression may develop, also known as bore out, similar to that of gifted adults. Where the gifted child can display behavioural problems, this can also be seen in adults, which can ultimately lead to conflicts. Some gifted adults may react by withdrawing and may exhibit stress-related complaints.

Being aware of one’s giftedness will lead to better connections with others and more happiness in life in many cases. Knowledge and skills in this area are also important for teachers and professional people, such as psychologists, labour and insurance physicians and mediators. Reliable quantitative research on gifted adults is not available. The University of Utrecht Work and Organisational Psychology has studied a large group of gifted people in the context of a study of work experience. The results of this study will become available in 2014.

Methods

A preliminary investigation based on an online written survey was used to gather general information about gifted people with one or more labour conflicts in which they reported in sick and stayed home. The results of this survey will be published elsewhere. A group of seven gifted persons with more than two labour conflicts were approached for a face-to-face interview, and the information gathered in these interviews was used for this article.

Questionnaire

The questionnaire was designed up by the first two authors based on the research question in order to gain insight into the frequency of labour conflicts, the kind of labour conflicts, and the question on whether there is a relationship between the conflicts and being gifted. The questionnaire contained questions about personal characteristics, and information about education and work, as well as questions about the number of labour conflicts experienced, the cause of these conflicts and the outcome. There were also a number of open questions in which the interviewees could elaborate on their experiences.
The link to the questionnaire was posted in LinkedIn groups of the Dutch Mensa group as well as in the ‘Discover your giftedness’ group in the spring of 2011. In total 41 members of Mensa and 11 others responded. The number of members of these LinkedIn groups was respectively 1000 and 500.

**Interviews**

The respondents selected for interviews had two or more labour conflicts in order to deepen the understanding of the research question. These criteria applied to nine respondents. With the information gained from these respondents, the study investigated the differences and similarities between the different labour conflicts.

The interview was semi-structured and consisted of an item list of basic questions to which the interviewee was asked to elaborate. The questions were mostly based on dozens of years of experience in mediation where all mediation efforts were preceded by an initial interview. Questions were posed about cause, consequence, systemic influences and special characteristics. The division into four conflict spheres by Ritsema van Eck and Huguenin (1993) was used, and a question was posed about the difference between a hot and a cold conflict, and the resulting escalation phase. The item list interviews are included in Appendix 1. The interviews were recorded, and completely transcribed, and were then analysed by the research team. The results of both studies were discussed in two meetings.

From September 2011 until March 2012 seven interviews were held. Two of the nine individuals approached did not respond to e-mail invitations and did not indicate why. The interviews were conducted by the first author and lasted on average over an hour. The interviews were recorded on a voice recorder and typed out verbatim by the third author.

The entire research team read the interviews and discussed the results in two meetings.

**Ethical issues**

We gave the interviewees full information on the study and the aims of this study. The interviewees all consented on the voice recorder that their interview was recorded. They all received the typed version of their own interview by e-mail and could react on it, which none of them did. We told them that we would use their data anonymously and that only the three researchers would see the whole interview and the names of the interviewees. We also offered to send them the articles about our study when ready.

**Study group**

The study group was made up of two men and five women, ages ranging from 35 to 63, and two of the interviewees had a managerial position. Of the seven interviewees six had IQ test scores in the top 2%, and the seventh interviewee identified himself completely in the description of a gifted person.

**Results**

The seven interviewees demonstrated characteristics that tend to come to the forefront mostly in conflict issues, the person whom the conflict is with, the development of the conflict, the communication and the nature of the conflicts. We also examined the outcome of the conflicts. An explanation of the various characteristics is included.

**Conflict issues**

The conflict of the interviewees almost always started in the same way. The gifted employee had an insight that he or she wanted to share with their supervisor. It was most often related to job content or an organisational matter where the employees felt, or rather was quite convinced, that their insight might help improve the organisation. The conflict was therefore placed in the realm of job and organisation.

*Who is the conflict with?*

In all cases the conflict was with the direct supervisor.
Development of the conflicts

The gifted employee’s insight was sometimes brought as a proposal, but sometimes postulated and communicated as a given. A different opinion was quite impossible from the viewpoint of the gifted employee because there could be no other opinion based on the facts. They were just very certain that this was the case and something needed to be done.

The interviewees indicated that in this phase they were met with a lot of incomprehension. Sometimes because of the way the subject was put forth, unfriendly or inappropriately, but also because the supervisor really did not understand what it was about. The employees felt as if they were swimming upstream. This struggle could create such a strong feeling of powerlessness for some interviewees that they searched for other ways of conveying their message. Sometimes a person at a higher level in the organisation was involved, or legal rules were used to force the issue. In these cases there was no longer any form of cooperation, but only forceful behaviour. And ultimately an impasse was created and with that a labour conflict was born.

Communication

What struck the most during the interviews were the passion, the intensity, and the conviction of the employee when it came to advising the organisation on the content. Intrinsic motivation seemed to be the source of the energy that presented these insights to the company. Therefore, all interviewees demonstrated a lack of understanding if their well-meant advice was ignored.

Kinds of conflict

The conflicts developed as cold conflicts for all the interviewees. They were long term conflicts that started out as business rather than emotional conflicts.

Results of the conflicts

Health issues were frequent: the seven interviewees named health issues as the explicit consequences of the conflict. The health issues mentioned ranged from burn-out, being emotionally exhausted, depression, stress complaints, lack of confidence and back problems.

As a result of the conflict, four out of the seven people were forced to stop working for the employer. They were either fired or quit themselves after realising the conflict would never be solved in a healthy manner. Also, four people, three of whom have stopped working for the employer, experienced a significant loss in their incomes.

At the time of the interview, three interviewees were on financial benefits, and two were forced to stop working and one resigned from his job.

Absence was also seen as a result. Three interviewees mentioned this as a result. Two of the people on financial benefits are currently in a situation of long-term absence, more than two years.

All seven interviewees were disappointed and felt discouraged about their paid work for an employer.

In summary, the consequences of the conflicts were considerable, both in private life and in health and income.

Quote

Some typical quotes from the interviews:

“I began to notice during work meetings that the things I said were completely ignored. There was just no response.”

An example comparing the conflict to a tennis game: “I confront people with their weaknesses. I just used to return all balls, causing the opponent to make a mistake and for me to win the game. The opponent didn’t think this was a proper game of tennis and refused to shake my hand afterwards.”

“The labour dispute builds slowly and continuously.”

“The feeling of injustice and the way things were done are things that are very important to me and to which I react very strongly.”
“I think I have a certain awkwardness. Not being able to manipulate very well or not manoeuvring well in social interaction.”

“I always end up in a conflict with supervisors.”

“I notice something and say something about that. In my view I tell them in a gentle way first. Then after that, I tell them maybe in a way that is too direct and which creates a conflict.”

“Yes, it builds up. Initially unknown makes unloved, but at a certain point, if you’re not careful, you become the one that is always on the barricades or giving criticism or telling them you know better.”

**Discussion**

This survey was conducted to gain more insight into the labour disputes of gifted employees. The interviewees were suited to an exploratory survey, and for a qualitative study, the number of seven interviewees was sufficient. The focus was on people with multiple conflicts which resulted in them staying home sick, which made the problems for these people all the more important.

Some of the research team had knowledge and experience with giftedness, and some of them had none. Many discussions on the results led to an agreement on the pattern that was discovered. A follow-up study will be necessary to indicate if this is consistent with the findings of other researchers.

Although the study was exploratory and descriptive in nature, the question still arises whether differences can be seen between conflicts of gifted employees compared to conflicts of employees who are not gifted.

As a full-time employment mediator, the first author has decades of experience with hundreds of labour disputes. After comparing his experiences and the results of this study, the research team thought that the content of conflicts and the structure of conflicts for gifted employees are markedly different from average employees. Much was written about labour disputes in general by Kenneth Cloke, Director of the Center for Dispute Resolution (see for instance Cloke & Goldsmith, 2011). In our opinion this supports our conclusions.

The highly motivated and consistent giving of unrequested task-oriented or organisational advice is rarely seen as the basis of a conflict in the mediation practice. It was also striking that gifted employees mainly have cold conflicts in which emotions are less in the forefront. This can be explained because the conflicts are mostly about the content of the work and the employment was never in question. Many of the participants in the study reported they remained calm for a very long time. The research team found this to be a very interesting finding in relation to the average employee.

**Conclusions and recommendations**

The main question of this survey: “What do labour disputes of gifted employees look like?” was answered based on written questionnaires and oral interviews by recognising characteristics of gifted employees in the research group. The characteristics seen in the interviewees were examined closely and were confirmed.

In short, the gifted employees that were surveyed picked up very quickly what was not working efficiently in their organisation, or which tasks were not being executed correctly, and this gave the gifted employee an unstoppable urge to make this known. Apparently this was expressed very ineffectively, too intensely and too passionately, because in this group of surveyed employees it led to one or more conflicts.
The World Council for Gifted and Talented Children

The content and the course of the conflict of this group of gifted employees was remarkable when compared to what is known about labour disputes in general. An additional model is presented to illustrate the development of labour disputes of gifted employees noted in this study.

1) Process: Start of conflict;
2) (Gifted) employee has an insight into a task and/or organisational area;
3) Employee communicates a proposal for change to his/her supervisor;
4) Proposal is blocked by supervisor, without satisfactory justification;
5) Friction/irritation is created between supervisor and employee;
6) Employee repeats the proposal several times;
7) Escalation after several repeats of proposal;
8) A conflict starts (cold/hot); and
9) Repercussions (damage).

These conclusions led to the following recommendations:

**For gifted employees**
- Recognise the outlined patterns and recognise the pitfalls you’ve fallen into based on your strengths/weaknesses. Learn to communicate in a different, more effective way. For example:
  - Ask more questions and don’t present a conclusion and solution immediately; this allows you to follow the thought process of the other person and assess whether there is effective communication.
  - Avoid the role of the expert and only making statements; reacting to statements or to someone in an expert role doesn’t leave the other person much room for his or her own reaction. The communication will shift from the content to the relationship (social and emotional sphere).
  - Give others the space and time to follow your train of thought; the other will need time to assess the issue on its merits. Unnecessary pressure will often result in a negative reaction that is not on topic.
  - Prevent loss of face or loss of reputation of the other person; in all cultures this is a serious issue and the working relationship can suffer irreparable damage by this.
  - Ask for help if necessary. Through coaching on the job and a lot of practice you can learn more effective behaviour.
  - Make sure that a budding conflict doesn’t escalate. Rather, try to prevent the conflict. Be aware that a conflict is costly to all parties, both in the material and immaterial realm, so ask for help in time.

**For supervisors**
Based on the pattern of conflict described in this study above you could possibly recognise gifted employees. Further research needs to be done, because based on this study it cannot be said conclusively that the pattern we signalled was exclusive to gifted employees. If you believe your employee could be gifted, it is wise to keep this in mind during discussions, and if necessary get help from someone who knows more about giftedness. Gifted employees can be extremely valuable to an organisation. They are often creative and innovative (Corten, Nauta & Ronner, 2006), but in order to bring these talents to the forefront and make them blossom some work environments are better suited than others.

**For mediators**
If you recognise the pattern described in this article in a labour dispute, then you could consider if this could be a gifted employee and point this out. If possible find a professional with expertise in this area.

Having more information about the labour disputes of gifted employees can help in reducing the number of conflicts these employees have, and reduce the escalation, and hopefully also prevent the occurrence. This will be of benefit to all parties involved. Both in terms of welfare and well-being and also in material aspects. Moreover, the talents of this group of employees can be used more effectively, and this can benefit all of society.
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Appendix (1)

**Item list/ Interview questions for gifted employees**

1. Can you briefly explain more about each of the conflicts that we will discuss in this interview? Who were the people involved (or who was involved) and what were the consequences (for each conflict)?

2. What started the conflicts in your opinion?
   a. Reason?
   b. What is the first (in)tense feeling you can remember about this conflict?
   c. Has anything happened previously that is related to the conflict?

   *Classification of type of conflict: job and organisation sphere/social emotional sphere/identity, vision and insights sphere/interests sphere (Ritsema and Van Eck, 1993)*

3. Can you tell us something about the structure and or development of the conflict? (For each conflict: escalation phases, cold or warm conflict?)

4. Do you see similarities and/or differences between the conflicts?

5. Looking back to your childhood and education for example, do you see characteristics or events that could have influenced the conflicts mentioned before?

6. Can you explain which characteristics of being gifted have played a role in the conflict? What is different from people who are not gifted?

7. What do you think are the repercussions? (in your private life and at work)?

8. What do you think should have been done to prevent or solve the conflicts?

9. What did you think of this interview?
   a. What did you learn from this interview?
The Effect of Journal Writing on Mathematics Achievement among High-Ability Students in Singapore

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Abstract
This study examined the effect of journal writing on mathematics achievement in high-ability students in Singapore. It assessed both the cognitive benefits of journal writing (as evidenced through gains in math test scores) and the socio-affective benefits of journal writing (as demonstrated in their personal reflections) as the students learned algebra. Fifty-four 13-year-old boys from two Secondary One classes in Singapore (Control and Experimental groups) participated in the study over a six-week period. A t-test (p = .05) was conducted to demonstrate the changes in the Control and Treatment group’s mathematical test scores as a result of journal writing. An online questionnaire was also administered to obtain descriptive data regarding students’ attitudes towards and difficulties in the implementation of the journal writing exercise. Results revealed that journal writing has a significantly positive effect both on gifted students’ mathematics performance and their attitudes and dispositions towards mathematics learning. Implications are discussed for gifted education practices, especially in mathematics.

Keywords: Journal writing; mathematics; secondary gifted education.

Introduction
In 2000, the National Council of Teachers of Mathematics (NCTM) highlighted the significance of mathematical thinking through mathematical communication. NCTM guidelines (NCTM, 2000) encouraged teachers to provide students with opportunities to communicate their mathematical thinking to peers and teachers and use the language of mathematics to assist them in expressing mathematical ideas.

Many of the recent changes in the mathematics curriculum were brought about by the realization that, while many students can provide the correct answer, they are unable to demonstrate the underlying mathematical processes that support their answer (Kostos & Shin, 2010). As early as 1991, the NCTM published the Professional Standards for Teaching Mathematics, which also addressed how teachers can promote communication while engaged in math and suggested some tasks that would challenge student thinking. Increasingly, there is an even greater need for students to clarify the mathematical concepts both orally and in writing – primarily because high-stakes testing now require students to demonstrate their ability to communicate their mathematical thinking. According to Kostos & Shin (2010, p. 224), students “seemed to have a difficult time transforming their long possessed ‘getting the right answer’ mindset to a newly introduced ‘focusing on the process’ mindset.”

Much attention has been devoted to the effect of journal writing on mathematics achievement (Jurdak & Zein, 1998), student perceptions, feelings and attitudes about mathematics (Borasi & Rose, 1989) and to conceptual understanding and problem solving (Grossman, Smith & Miller, 1993). Very little research has addressed the impact of journal writing on mathematics performance involving students coming from a different cultural background, particularly among high-ability learners from Singapore.
According to the Singapore Ministry of Education’s 2007 Mathematics Curriculum Framework, other than the acquisition and application of mathematics concepts and skills, the aims of mathematics education include development of pupils’ mathematical problem solving, as shown in Figure 1.

![Figure 1: Framework of the Singapore mathematics curriculum.](image-url)

In order to fully develop one’s problem solving ability, students need to develop positive attitudes towards mathematics, develop the ability to reason logically, communicate mathematically, and regulate one’s own thinking (MOE, 2007). Empirical studies conducted in the Singapore context have found that journal writing provides information about students’ thinking processes during problem solving, which help teachers improve mathematics instructions (Chai, 2004). These studies, though, have mainstreamed students as respondents rather than specifically targeting high-ability learners.

Gifted education researchers concur that, for mathematically talented students, procedural fluency and automatic execution of algorithms should be de-emphasized to allocate more curriculum time for problem solving and verification (Johnson, 2000; Matthews & Farmer, 2008). Despite the empirical evidence, which largely supports the benefits of journal writing, this practice is not well integrated into the mathematics curriculum for gifted students.

The prime objectives of the current study are twofold: (1) to examine the effects of journal writing on the mathematics achievement of high ability students, and (b) to explore the benefits and challenges of incorporating journal writing in their mathematics instruction.

**Relevant literature**

Mathematics instruction in many countries is said to emphasize procedural fluency and automatic execution of algorithms, with less instruction time allotted to problem solving. Thus, according to Kagesten and Engelbracht (2006), many students tend to regard mathematics as a “mechanical subject in which you do calculations and manipulations and there is very little explanation” hence the growing emphasis in Swedish universities for students to be able to “speak mathematics” (p. 705).

This view of most students that math is a mechanical subject contradicts the recommendations of gifted education researchers who advocate that mathematics instruction for gifted students should stress mathematical reasoning and develop independent exploratory behaviour (Johnson, 2000;
Matthews & Farmer, 2008). The mathematically gifted require cognitive challenges as well as attitudinally and motivationally enhancing experiences. When these needs are not met, they can lose interest in learning, become behavior problems in the classroom, and eventually become underachievers (Johnson, 2000).

O’Boyle (2008) reported that the brains of mathematically gifted children are quantitatively and qualitatively different from those of average math ability (they are “wired” differently). Mathematically gifted children exhibit signs of enhanced right-hemisphere development and, when engaged in thinking, tend to rely on mental imagery. O’Boyle (2008) further recommended that flexible methods of assessment be implemented, given that mathematically-gifted children are unlikely to use the same types of cognitive strategies as non-gifted children. Interactive class discussions also appear to be correlated positively with mathematics achievement, while chalk-and-talk lectures are found to be negatively associated with achievement (Matthew & Farmers, 2008). Despite this research, very little attention has been focused on the use of journal writing and high ability students’ subsequent cognitive and socio-affective gains in learning mathematics.

**Journal writing and the learning of mathematics**

Journal writing in mathematics refers to structured writing tasks with specific questions to elicit students’ conceptual understanding of given topics (Chai, 2004). It is different from journal writing in English Literature where students are often allowed to express themselves freely on self-selected topics. What is similar, however, is the emphasis on students’ self-reflections and metacognition.

**Academic gains through journal writing in mathematics**

According to Baxter, Woodward, and Olson (2005), engaging in a process of active construction of knowledge requires students to “express their mathematical ideas, explain their solution strategies, and question the comments of others” (p. 119). The opportunity to reflect on their responses helps students develop a deeper understanding of the mathematical concepts and also exposes gaps in their knowledge (Kagesten & Engelbracht, 2006). Towndrow, Tan and Vethan (2008) found that the number and quality of students’ questions expressed in their journals increase over time. Mason and McFeetors (2002) found that students develop more precise use of mathematical vocabulary and enriched conceptual understandings of the topic. Just as in the acquisition of a foreign language, immersion is necessary to develop fluency, so too in mathematical fluency (Thompson & Rubenstein, 2000). Further benefits of journal writing include the enhancement of students’ critical thinking capacities (Goulet, Penkava, & Smith, 2002) where they make the transition from viewing mathematics as a mere calculation procedure to seeing it as a science that demands critical thinking about the mathematical elements being manipulated.

Journal writing also enhances students’ meta-cognitive processes. Students’ usual headlong rush into calculations is moderated by the need to stop and write what they have done and, thus, forces students to think more analytically about each step of the process (Williams, 2003). Another advantage of journal writing is the capacity to develop multiple representations of mathematical ideas. Ma (2000) stressed that the ability to move from one representation to another leads to a deeper understanding of concepts. The central characteristic of mathematically gifted students is their advanced capacity to reason both analytically and spatially (Diezmann & Watters, 2001). Journal writing, which encourages diagrams and visualisations, may be an appropriate instructional strategy for these students.

**Socio-Affective gains in journal writing**

Journal writing provides an avenue for students to express their doubts and frustrations about learning (Hamdan, 2005; Towndrow et al., 2008). In studies involving primary-school learners in Singapore, students were found to be generally receptive towards journal writing because it provided a means of communication with the teacher (Chai, 2004; Fan & Yeo, 2000). In a study involving nine mathematically gifted eight-graders enrolled in an accelerated algebra course, Sriraman (2003) reported that they showed great perseverance and curiosity and were motivated to pursue the
problems and reflect on them over an extended period of time. Other benefits of journal writing include the ability of teachers to encourage students for their effort or for an original approach using a private communication channel (Baxter et al., 2005). In this way, potential ability or status differences in a mixed class could be overcome.

Journal writing can also minimize the “dumbing down” phenomenon, whereby gifted children intentionally score below their potential on mathematics exams and other evaluative measures just to fit in better with their less talented classmates (O’Boyle, 2008). Journal writing also provides teachers with a more complete picture of the students’ depth of understanding and thinking processes (Baxter et al., 2005).

Hamdan (2005) noted that while assignments and tests reveal only some of the students' problems and difficulties, journals provide the instructor with a wealth of information about both students and the course that cannot otherwise be elicited from informal conversations with the students.

The challenge of incorporating journal writing into mathematics instruction

Unlike common English, which students use in their daily lives, the language of mathematics is limited largely to schools. Consequently, some students may have difficulty communicating using mathematical terminology. Teachers need to be sensitive to many issues related to the language of mathematics and students’ growing fluency with it (Thompson & Rubenstein, 2000). For example, Baxter (et al., 2005) recognized that some students cannot describe their mathematical reasoning coherently. This may be the case because, while most school mathematics syllabi aim to develop students’ ability to communicate mathematics in both verbal and written form, students are typically never formally taught or examined on the correct use of mathematical language or expression (Kagesten & Engelbracht, 2006).

Towndrow (et al., 2008) stressed that inexperienced journal writers may have difficulty finding things to write about. One encouraging finding by Habre (2002) is that, although most students initially reject the idea of writing in mathematics, their attitudes change significantly over time, and they conclude that journal writing is essential in mathematics learning.

Quinn and Wilson (1997) investigated teacher beliefs and practices on the use of writing in the mathematics curriculum. A total of 84 teachers from five elementary, five middle, and four high schools in the United States were provided with a questionnaire to measure their attitudes and beliefs on the importance of writing activities in math classes and their actual practices. Results revealed that, although teachers have favourable attitudes toward the use of writing in teaching mathematics, “...they are not putting those beliefs into practice” (Quinn & Wilson, 1997, p. 19). Teachers use writing activities less than once a week, and many found it time-consuming to write individual responses to students’ entries (Baxter, Woodward, Olson, & Robyns, 2002). Teachers also found it intimidating to respond to student writing, as most do not know what to say or how to respond (Mason & McFetors, 2002).

Significance of the study

In 2007, the Trends in International Mathematics and Science Study (TIMSS), in comparing 58 countries, reported that Singapore was among the top three to perform well in mathematics, (http://nces.ed.gov/pubs2009/200901.pdf). Xu (2010) observed that, since the 1990s, the world has begun to pay greater attention to how Chinese students learn mathematics, given their outstanding performance in mathematics in international tests like TIMSS, IAEP and PISA. There is even a phenomenon referred to as the Paradox Chinese Learners which noted that Chinese students are passive in learning mathematics and that most of their skills and strategies are limited to imitating, drilling, and memorizing (Zheng, 2001). Moreover, Western scholars also believe that “the learning of Chinese students is too mechanical [because]… they perceive memorization and understanding as a dichotomy, and perceive repetition as mechanical learning” (Xu, 2010, p. 132). While Singapore is a multicultural society, a large percentage of their population comes from Chinese ancestry. The latest
census in 2010 indicates that 74.1% of residents are Chinese (Department of Statistics, Ministry of Trade & Industry, Republic of Singapore, 2010). Thus, it is critical for educators to take note of some of the progressive practices that affect the learning of high-ability students in mathematics which, in turn, effects their academic performance. Research findings would help contribute to best practices in mathematical instruction for educators around the world.

**Methodology**

This inquiry was part of an action research project in which the teacher participated as the researcher (the first author). Mills (2003) defines action research as “any systematic inquiry conducted by teacher researchers… to gather information about… how they teach and how well their students learn” (p. 5). The objective is to obtain insights to help teachers develop a more reflective practice to improve student outcomes, and, in this case, to improve mathematical instruction and understanding in the secondary-level classroom. This kind of insider insight by a teacher-researcher procedure has similarly been followed by Kostos & Shin (2010) as they investigated how math journals served to enhance second graders’ communication of mathematical thinking. According to the authors, “[the teacher-researcher] …was able to utilize the insights that can only be obtained as an insider to the setting. This insider insight helped the researcher capture the students’ thinking process more closely and gather and analyze the data more in-depth” (Kostos & Shin, 2010, p. 226).

The current study also made use of a mixed methodology with qualitative and quantitative approaches (Creswell, 1994) so that a more substantive and in-depth understanding could be obtained of how math journals can benefit students, based on their own reflections.

**Participants and setting**

The independent secondary boys’ school selected for the study had an enrolment of about 1,500 students. The Secondary One cohort (13 years old) consisted of 12 classes of about 30 boys per class. The boys were among the top 25% of the national cohort in Math, Science, and English. The students with the highest score were streamed into the top two classes. These are the students identified as gifted within the school’s selection criteria for the Talent Development Program. These two classes have enriched curricula for Mathematics, Science, and English.

For this study, 54 male students (27 from the Control group and 27 from the Experimental group) selected from the top 10% of the Secondary One cohort participated in the study. About 81% of the respondents were of Chinese ancestry, while the remaining 19% were from Indian and Malay background. Consent forms were administered to the participants and ethics approval was secured from the school administration.

The students in the two classes selected for this study shared similar academic profiles; they were of average or above average in mathematical abilities. To control for teacher effects, the same Mathematics teacher (the first author) taught both groups. This procedure was also used by Jurdak and Zein (1998) in their study investigating the effect of journal writing on achievement and attitudes of students toward mathematics (Zein was the common teacher in the study’s two groups).

Each class in the current study had four Mathematics periods of 50 minutes each per week. A verbal check with both classes also revealed that the students had not been introduced to journal writing in mathematics during their primary school education experience.

**Procedure**

The two classes of 27 participating students each were randomly assigned to the Journal Writing Group (JWG) and the No Journal Writing (NJW) group, with the study lasting for a total of 6 weeks.
**Pre-intervention phase**

The two chapters of Year-One Algebra were taught using traditional classroom teaching strategies with pen-and-paper assessments. All 54 student-participants took a 35-minute pre-test. Concepts that were covered in Year-One Algebra were: (1) simplifying algebraic expressions, (2) factoring techniques, (3) solving linear algebraic equations, (4) making substitutions in formulae, (5) changing the subject of formulae and (6) solving word problems. The pre- and the post-tests were created by the same Mathematics teacher. The pre-test consisted of six algebraic questions covering the above-mentioned concepts. The structure of the post-test was identical to the pre-test with six algebra questions covering the concepts taught previously. Both tests were 35 minutes long and the wording of the test questions was kept as identical as possible.

The first author and two Mathematics teachers evaluated the test questions and found that they had satisfactory content validity and met the requirement of the teaching objectives. Students’ mathematics pre-test scores confirmed that there were no significant differences between the two groups prior to the administration of the intervention.

**Implementation of the journal writing program**

Both the JW and the NJW groups were assigned a weekly worksheet with practice exercises. Questions were similar to what one typically finds in standard mathematics assessments, testing students’ ability to apply both procedural and content knowledge of algorithms (See Appendix B for sample items). After the worksheets were marked, they were returned to the students for corrections. If the majority of the students made certain common mistakes, the teacher explained the concept to the whole class. For individual mistakes made by various students, the teacher wrote the feedback on the student’s worksheet.

The experimental group was assigned a writing task every week in addition to the worksheets. Students were given 5-10 minutes to read and raise any query about the task. They were then allowed to complete the worksheet at home to be submitted to the teacher the next day. An example of a cognitive prompt given to the students would be: “What are the steps in the ‘algebraic method’ of solving word problem?” (See Appendix C for additional sample items of cognitive prompts for the journal-writing task). A socio-affective prompt might be: “Write a reflection of your difficulties in using this method and what you did to overcome your difficulties.”

Within two days of the worksheet collection, the teacher would reply to individual student’s concerns to provide timely feedback. Teacher’s responses included providing clarification of certain misconceptions, further probing to examine students’ understanding, and offering brief practical advice with regards to study techniques.

**Post-intervention phase**

After the experimental group had completed their journal writing tasks and both groups have completed their practice worksheets, a post-test was administered to both groups in the same week. This was after all journal entries and worksheets were marked and returned to the students, which took place about six weeks after the pre-test was administered.

**Online questionnaire**

An online questionnaire was administered to the JW group to collect data on their journal writing experience. It consisted of five items using a 6-point Likert Scale format (Strongly Disagree = 0; Strongly Agree = 6). Open-ended items were also included in the online survey to determine the students’ qualitative feedback regarding their experience. Items were discussed extensively among the researchers and were pre-tested for clarity. (See Appendix A for the items found on the online survey).
Results

Effects of journal writing on mathematics achievement scores

Pre- and post-test results of the experimental and the control groups were analyzed by employing t-tests. Table 1 shows the changes in student achievements between the pre-test and post-test on the algebra concepts taught in the Secondary One Mathematics Curriculum.

Table 1: Pre-test and post-test scores of the experimental and control groups.

<table>
<thead>
<tr>
<th></th>
<th>Pre-test Scores</th>
<th>Post-test Scores</th>
<th>t-value</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Experimental (n=27)</td>
<td>14.19</td>
<td>3.36</td>
<td>18.37</td>
<td>4.71</td>
</tr>
<tr>
<td>Control (n=27)</td>
<td>13.98</td>
<td>3.35</td>
<td>16.31</td>
<td>4.71</td>
</tr>
</tbody>
</table>

*p<.01

Results indicate that there are significant differences between the pre- and post-test performance levels for both the Experimental group, t (27) = 6.09, p<.01 and the Control group, t (27) = 2.87, p<.01, which may be attributed to the administration of worksheets throughout the six-week period or test sensitization effects.

One-way ANOVA was performed to examine whether there was a significant difference between the overall improvements of the Experimental group as compared to the Control group. Results indicated a significant difference in the post-test gains between the Experimental group and the Control group, t (27) = 2.33, p = .014. Thus, the above results provide evidence that journal writing has a significant impact on improving gifted students’ mathematics achievement in algebra.

Results from the online survey

A total of 93.1% of the gifted students in the Experimental group agreed/strongly agreed that journal writing is useful in improving their understanding of the algebra concepts. 89.7% felt that journal writing allowed them to reflect on their mistakes effectively, 79.3% noted that journal writing has improved their rapport with the teacher, and 89.65% stated that the feedback through journal writing had been useful for their learning. Finally, 82.76% agreed/strongly agreed that journal writing helped them to monitor their own thinking through the selection and use of problem-solving strategies.

Students also recommended that journal writing be used for future mathematical exercises. Approximately 72.4% of the gifted students in the Experimental group agreed/strongly agreed that they would like to continue journal writing for other topics in mathematics. 86.2% noted that they would like to recommend journal writing in the teaching of algebra, and 75.9% claimed that they would like to recommend journal writing for the teaching of other topics in mathematics. All of these responses indicated that gifted students are receptive towards journal writing and would like to implement it as a regular feature in the mathematics classroom.

Benefits of journal writing cognitive gains

Conceptual understanding. A total of 93.1% of the gifted students indicated that journal writing had been useful in improving their understanding of the algebra concepts. One student noted, “Mathematics is not a subject where you just memorize formulae, but you actually need to understand why you have to solve the sum that way. If you understand everything and know how to explain yourself, you will do just fine.”

Procedural knowledge. A total of 89.7% of the students also realized that journal writing helped them to reflect on their mistakes and recognize that they may not have understood certain concepts as well as they thought they did. One student admitted: “I know how to do all the questions and use the formulas, but I can’t really explain why it’s like that.”
Mathematical communication. Many gifted students found journal writing to be an effective revision method as it allowed them to identify their doubts and clarify them with the teacher. Another benefit cited was that it gave them the freedom to express themselves through words instead of just numbers and symbols. As one student put it, “I like explaining the various ways to factorize, solve, and so on. It helps me refresh my memory.”

Problem solving. A total of 82.8% of the gifted students commented that the writing prompts helped to monitor their thinking and made them realize that “actually there are many ways of doing algebra [problems]” and that “there are many ways a question [can] be posed.”

Socio-Affective aspect. Students shared that they realized Mathematics is neither a reproduction of algorithms nor a blind application of procedures. The improved rapport with their teacher also encouraged them to be more confident, independent learners. An example of this can be seen in one student’s entry in his journal:

“At the beginning, I used to forget the first step and I used to do every calculation mentally, even though there was a calculator right beside me. In addition, I also used to make a lot of calculation errors. Sad, isn’t it? Soon I realized that I had to take my mathematics studies seriously or else…I would DIE! Since that day onwards, I took pride in my studies and with the help of a wonderful teacher, Mrs. X, I thoroughly improved my steadiness in solving these types of questions. I got more and more confident in myself, with each practice worksheet I did. Thank you very much, Mrs. X!”

One of the difficulties mentioned by the students in their journals was the need for more time to reflect. Other students felt that the journal writing should not be added to their homework load and preferred to be given time to complete the journal writing activity in class. Some realized that, while they often encounter terms like “solve,” “substitute,” and “simplify” in the practice exercises, they had some difficulty using this terminology to explain their procedures and solutions meaningfully.

Discussion

This study investigated the effects of journal writing on the mathematics achievement of gifted students. Quantitative analysis of students’ pre- and post-test scores suggests that both journal writing and practice exercises can significantly improve mathematics achievement scores. Qualitative analysis of the students’ feedback show that gifted students would like journal writing implemented as a regular feature in the mathematics classroom. While there were difficulties experienced in completing the writing activities due to poor language proficiency or gaps in conceptual understanding, the students reported positive gains from the journal writing exercise. The findings of this study were in line with previous Singapore studies which reported positive effects of journal writing on mathematics learning (Chai, 2004; Fan & Yeo, 2000; Ng, 2004) as well as international studies that demonstrated the effectiveness of journal writing on mathematical problem solving (Bell & Bell, 1985), achievement (Borasi & Ross, 1989), and conceptual understanding in math (Grossman et al., 1993).

A study conducted by Jurdak and Zein (1998) found that journal writing had a positive impact on students’ conceptual understanding, procedural knowledge, and mathematical communication as measured through the Mathematics Evaluation Test. However, journal writing was not found to improve school mathematics achievement scores since “school tests normally measure instruction-specific achievement of mathematical content rather than general abilities such as procedural knowledge and conceptual understanding” (Jurdak & Zein, 1998, p. 418).

These research findings run in contrast to the present study, which clearly indicates that school mathematics achievement scores improved after an implementation of journal writing in mathematics instruction. Qualitative feedback from the students likewise revealed cognitive gains (i.e., problem-solving and mathematical communication) through the process as well as socio-affective gains (e.g., rapport established with teacher).
Limitations

One clear limitation of this study is the absence of standardized test instruments that would specifically measure test achievement scores with validity and reliability scales. Moreover, there were only 54 students in the study which might make drawing generalizations problematic. However, this research signals the start of further studies designed to investigate the impact of journal writing in classrooms which take into account mathematics test results as well as student insights about journal writing.

In action research, teachers are also keen to discover more incisive pedagogical tools to further assist their high-ability learners. In the words of Goldsby and Cozza (2002), research on the use of mathematics journals in classroom also provides a “window into the mind of the student who is engaged in mathematical activities, providing the opportunity to ‘see’ the why, not just the how, of the student’s thinking and enabling the student to clarify and extend that thinking” (p. 520).

Recommendations

Based on the findings of the research study, two recommendations are made. First, Mathematics teachers should consider implementing journal writing as a regular strategy in the gifted classroom. Evidence suggested that self-reflection in journal writing improves students’ level of metacognition and builds their self-confidence in becoming independent learners, which is consistent with what empirical evidence says (Williams, 2003). The personal touch of teacher’s individual responses motivates students and engages them in the learning process—factors which are considered to be important in mathematics education (Baxter et al., 2005; Chai, 2004).

Secondly, the language of mathematics is an important component of mathematics instruction since vocabulary learning and mathematical understanding are intertwined (Mason & McFeeters, 2002). Thus, teachers should model the use of accurate mathematical terminology.

This study demonstrates that, beyond rote memorization of concepts and repetition of arithmetic drills, teaching mathematics successfully to gifted students requires determined efforts to investigate higher-level analysis and deeper demonstration of conceptual knowledge, which journal writing can elicit. Critical thinking, the presence of met-cognition and problem-solving strategies are also evident in the students’ qualitative notes and feedback, providing an even more substantive mode of assessment to mathematics educators who wish to track their students’ progress. This runs in contrast to the usual claim and traditional notion that Asian students’ learning in mathematics is too mechanical and focuses on mere repetition and memorization (Xu, 2010). Reflective notes from the students clearly indicate that there appears to be a genuine desire to go beyond drills and acquire a deeper understanding of mathematics.

References

Goldsby, D. S., & Cozza, B. (2002). Writing samples to understand mathematical thinking. Mathematics Teaching in the Middle School, 7(9), 517-520.

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## Appendix A

**Students’ Feedback on Journal Writing (Mathematics) (Sec 1)**

### 1) Benefits of Journal Writing

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The journal writing is useful in improving my understanding of the algebra concepts.</td>
<td></td>
<td></td>
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<tr>
<td>The Journal writing has allowed me to reflect on my mistakes effectively.</td>
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<tr>
<td>The journal writing has improved my rapport with my teacher.</td>
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<tr>
<td>The feedback given to me through journal writing has been useful for my learning.</td>
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<tr>
<td>Journal writing has helped me monitor my own thinking such as the selection and use of problem-solving strategies.</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

### 2) What I like about the journal writing exercises:

### 3) What I think can be improved about the journal writing exercises:

### 4) On reflection, the journal writing has helped me to discover that:

### 5) What are the difficulties I faced in writing the journal entries:

### 6) What I did to overcome my difficulties in writing the journal entries:

### 7) Recommendations

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would like to continue journal writing for other topics in mathematics.</td>
<td></td>
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<tr>
<td>I would like to recommend journal writing in the teaching of algebra.</td>
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<tr>
<td>I would like to recommend journal writing for the teaching of other topics in mathematics.</td>
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</tr>
</tbody>
</table>
Appendix B
Sample Items in Algebra Exercises:

Simplify $8x^3y^4 + 2\frac{2}{5}xy$.

Factorise the following:

a. $9xy^2 - 3x^2y + xyz$  

b. $ax + bx - 4a - 4b$

Solve the following equations:

a. $2x - \frac{x}{4} + \frac{3x}{5} = 14 + \frac{7x}{3}$

b. $\frac{x - 3}{5} = \frac{2x - 7}{8}$

Make $x$ the subject of the formula.

a. $2x + 3y = 4y + 5x - 3$.

b. $(2y)^2 = \frac{4}{x + 1}$.

A man bought $x$ apples and twice as many oranges. He also bought 5 pears fewer than apples. Apples cost 40 cents each, oranges cost 30 cents each and pears cost 80 cents each. If the man spent a total of $77, find

(a) The value of $x$

(b) The amount he spent on pears

Appendix C
Sample Cognitive Prompts:

1. Your friend has chicken pox and missed all the lessons on factorization. Can you explain to him what factorization is about?
   i. Explain in details the methods of factorization; illustrate your explanation with a suitable example.
   ii. Explain the difference between factorization and expansion.

2. Explain the difference between “substitution in formulae” and “subject of formulae”?
   Provide a sample question of each to illustrate your understanding of their difference.
The Influence of Family Relationships on Creativity in the Workplace

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Abstract
The article is rooted in the thesis that good family relationships foster creative behaviour in those responsible for the management of an organization. An underlying assumption of the study is that creativity is vital in any leadership role or managerial position requiring interaction with groups of people. Furthermore, it is assumed that creative energy is susceptible to various impediments, a risk potentially causing both personal loss and loss to the organization with which the administrator is associated. Creativity for the purposes of this study is considered the capacity to find and solve problems in innovative ways in order to achieve personal and organizational benefits. It describes four statistical methods for the examination of conditions salient to creativity, specifically relating to people in administrative positions. A sample of 300 Polish managers in various settings was used. The sample was divided by means of Popek’s CBQ into high and low creativity groups. These two groups were examined by way of the 8 factors found in the PAFS Questionnaire adapted by Fajkowska. Analysis of data showed that high creativity was unlikely to be found where poor relationships in the family existed. The study suggests that past and present family dynamics can determine whether or not individuals function creatively in the workplace.

Keywords: creative behaviour; innovation; problem solving; family dynamics.

Introduction
For a number of years, the first author was the first to focus on the impact of family relationships on the creativity and creative thinking of people, especially managers, in places outside family circle. He recognized the many practical and emotional benefits experienced when individuals are afforded opportunities to develop and apply optimal levels of creativity in either their personal or professional lives. Over the years, he has become increasingly concerned with the vulnerability of creative people and their creative energies. In his opinion, this vulnerability represents a potential, real and serious multi-faceted loss for all people.

The article offers readers insights into family dynamics gathered via research conducted specifically in Poland. In terms of the practical aspect of his interest, the author continues to lead workshop activities in Europe, particularly in Poland and the Ukraine dedicated to the amelioration of troubling personal issues which potentially impair healthy emotional development, exploit an individual’s vulnerability and undermine the growth of creativity. The author’s extensive clinical experiences and observations have stimulated this more empirical exploration with respect to the influence of family relationships on creativity in the workplace. It was decided to employ four analytical methods involving a large sample of managers (N=300) in an effort to discover what factors might be of statistical significance in terms of the strength or nature of relationships and level of creativity, e.g., high or low.

Creativity in the context of the study
The growth of interest in creativity as a construct has spawned many attempts to define exactly what it is by noted psychologists worldwide (e.g., Csikszentmihalyi, 2001; Kaufman, 2009; Lubart,
2004; Moran & John-Stiener, 2003; Nęcka, 2001; Piirto, 1992; Popek 2001; Runco, 2004, Sternberg, 1999, Sternberg, 2002). In the context of his specific work, the author favours Runco’s (2004) ideas regarding creativity and sympathizes with the notion of creative potential as being separate from creative performance. Even so, he is aware of the on-going debate among researchers in this field and recognizes that many questions remain unanswered regarding the origin and nature of this very human capacity, meaning whether it is domain-specific or more general, simply personal, spelled with a big “C” or a little “c”? Such questions excite – and maybe even confuse - the mind and give rise to many books on the subject. For the purposes of this study, the construct is perceived as a general mental disposition expressed in actual behaviour and evident when diverse and beneficial innovations are recognized and celebrated for their transformational qualities.

Based on personal experience in the working world and close psychotherapeutic engagement with managers, leaders and others charged with responsibility for making decisions, it seems evident that human beings are generally genetically disposed towards creativity – as Runco (2004) writes: “Everyone has creative potential” (p. 28). The author concurs, but recognizes that levels of creativity, for a variety of reasons, differ quite widely among people.

His teaching and psychotherapeutic work over the years has been with professionals already in positions of responsibility or in training for a business career, and first author was the first to discover that typically these people have shown relatively high levels of ability and creative potential. He has also discovered that these individuals experience varying degrees of success. His focus over the years has been on those whose chance of success is in jeopardy and who are seriously at risk, both professionally and psychologically. He has found that these individuals often strive hard for success in their professional capacity but constantly encounter intrinsic barriers such as low self-esteem, inhibitions and difficulties in building and or maintaining relationships.

There is inherent risk in such conditions. Most authors are convinced that these individuals and their capacities are clearly vulnerable and have been from a young age, especially due to reasons concerning family dynamics. For example, as Bugelova and Kuchtova (1998) note, “family economic situations influence self-confidence in children” (p. 22). The family situation determines children’s development progress and the choice of their career path. Wallerstein and Blakeslee (2003) also note: “Divorce may interrupt your child’s developmental progress. Many children get stuck temporarily at the time of the breakup because they are exhausted by what is happening at home ... they may become listless and unfocused ... sometimes their anger can stall their developmental progress” (p. 32).

A student’s self-perception of creativity and their family environment that promotes creative thinking can predict increased levels of entrepreneurial intention (Zampetakis, Moustakis, 2006, pp. 413-428). According to the OECD Report (2004), a young person’s motivation to start their own businesses may be stimulated by their parents. Parents who are successful in conducting their own business activity have a positive influence on their children with respect to perceptions regarding starting one’s own business as an alternative form of employment (OECD, 2004). As (Renzulli et al., 2000) put it: “(…) there is a positive relationship between the entrepreneurial family tradition and the intention to start a business.”

Kidane and Harvey took from the list of Forbes’ 400 wealthiest Americans thirty-five self-made billionaires who in 2006 were under 51 years old. They employed stepwise regression analysis taking the variables implied in the survey as having impact on success. The conducted analysis identified years of business operation and family impact as significant contributors to success for these entrepreneurs. These two variables accounted for 31.1% of the variation in net value (Kidane, Harvey, 2009, pp. 55-65).

Beugelsdijk and Noorderhaven in their analysis show that entrepreneurs are more individually oriented than the rest of the population. Individual responsibility and effort are distinguishing characteristics. When asked about important qualities that children can be encouraged to learn at
home, entrepreneurs answer that it is important to teach children an ethic of working hard (Beugelsdijk & Noorderhaven, 2005, pp. 159-167).

There is evidence to suggest highly able children may be no more susceptible to problems than other children—perhaps even better adjusted and able to handle difficulties (Neihart, Reis, Robinson & Moon, 2002). However, in another place, Neihart observes, “I do personally believe that highly creative kids are probably more vulnerable” (Olszewski-Kubilius, 2010). A colleague of this author’s in the United States who worked in the field with many highly able people with the potential of gifted creative behaviors found this to be true (Tebbs, 2010; 2011). While particular circumstances, characteristics and personality may ultimately determine outcomes, overall he has found that difficult home dynamics can and do severely impede emotional and educational progress in children, especially potentially creative children. When parental issues are exacerbated by difficult educational conditions, the potential of highly able and creative children, e.g., in leadership (Marland, 1972), is at risk. Sternberg (2003, p. 98) notes that creativity may be a characteristic difficult to find in older children and adults because of the repression of creativity in schools. When such situations arise, potential growth and many beneficial innovations are in danger of being lost, whether they be personal, professional or psychological, that might reasonably be expected of creative thinkers and which enrich the community.

The well-known exponent of critical and creative thinking, Edward de Bono (1992), also offers a thought which is believed to be germane to this discussion. He believes that before innovative thinking can take place, individuals need to divest themselves of old ideas. For the authors, it is this particular context of the dynamics peculiar to an individual’s family that presents a worthwhile phenomenon for study, as these appear to contribute significantly to the development of a specific configuration of personal characteristics, including the level of an individual’s creative potential.

With this in mind, it is important that factors associated with family relationships are identified and, if possible, it must be determined how such factors might either support a positive enhancement or negatively influence a manager’s or leader’s ability to engage his or her creative potential from day to day.

Methodology

Sample

The sample was comprised of 300 individuals (N= 300; 146 females; mean age =39.97 and 154 males; mean age = 39.84) working as managers in various organizations. The largest sub-group featured service managers (37.0%), followed by managers of educational institutions (31.3%), production managers (16.3%) and managers of tourism and agro-tourism (15.3%). The service managers worked for state and private organizations, including building, commerce and design. Managers in education were employed mainly in state institutions and enjoyed different levels of responsibility. Production managers were involved in the production of food, drinking water, furniture and clothes. The managers of tourism represent travel agencies, transport services and agro-tourism. Research was preceded by prior contact, directly or by telephone. Completion of the survey took approximately 90 minutes of serious effort and concentration by the managers. Respondents were individually informed about the subject and the goal of the research and could take part or refuse to participate. People who agreed to participate in the research received a direct copy or were mailed the questionnaire, which they individually filled out.

Data collection

After careful consideration with respect to the suitability of available research instruments given the problem to be explored and their statistical limitations, the following were selected:

1. The Creative Behaviour Questionnaire (Popek, 2000). This instrument was used to determine high and low creativity.
2. The Personal Authority in the Family System Questionnaire (Williamson, Bray, Harvey, & Malone (1999) adapted by Małgorzata Fajkowska-Stanik, 1999). This instrument was used to identify factors of the significance in the nuclear family and the family of origin.

The Creative Behaviour Questionnaire (CBQ)

The CBQ has been used in numerous studies as a tool for differentiating subjects in terms of levels of creativity (Bernacka, 1999, 2001; Gawda, 1996; Puflal-Struzik, 1999). Its reliability and validity have been confirmed by Popek (2000, p. 31-32). The questionnaire consists of 60 items. Each item is in the form of a sentence relating to human behaviour in learning and task performance. Examples:
- I like to explore a variety of phenomena. I do not need outside inspiration to delve deeper into topics that interest me.
- Usually I try to initiate new tasks and ways of performing them, anticipating the actions of my supervisors.

Explanation of terms

The CBQ questionnaire is based on the assumptions that creative behaviour has two distinct components, i.e., a) cognitive skills, and b) personality characteristics. Depending on how these characteristics are combined, individuals may be referred to as having either a conformist or non-conformist attitude. Particular behaviours, such as Algorithmic or Heuristic, in combination with either a conformist or non-conformist attitude, may further distinguish individual personalities or dispositions.

- **Conformity**, or the conformist attitude, is defined as submissiveness, subordination, lack of self-reliance, dependency, passiveness, inability to adapt, conformity to stereotypes, weakness, apprehensiveness, inhibition, defensiveness, low resistance and stamina, irresponsibility, lack of criticism, intolerance and low self-assessment.
- **Non-Conformity**, or a non-conforming attitude, is defined as independence, domination, high activity, vividness, adaptation flexibility, originality, consistency, courage, self-organization, spontaneity, expressiveness, openness, stamina, high resistance, self-criticism, tolerance and high self-assessment.
- **Algorithmic behaviour** is presented as a tendency to replicate and may be recognized by a direct line of observation, mechanical memory, imitative imagination, convergent thinking, imitative learning style (precludes understanding and logical analysis), intellectual rigidity, cognitive passiveness, copying, low efficiency in information processing, lack of artistic and technical ingenuity and a low level of reflection.
- **Heuristic behaviour** is presented as observational self-reliance, logical memory, creative imagination, divergent thinking, learning by reasoning, reconstructive learning, intellectual flexibility, cognitive activeness, high level of reflection, intellectual self-reliance, verbal, constructive and artistic creativity.

A combination of a non-conformist attitude and heuristic type behaviour reflects characteristics typically ascribed to creative individuals by the researchers. Conversely, the combination of a conforming attitude and algorithmic thinking distinguishes individuals who are more imitative than creative.

The Personal Authority in the Family System Questionnaire (PAFS-Q)

This instrument is based on the intergenerational system theory (Fajkowska-Stanik, 1999). Central to the PAFS-Q theory is the notion of an optimal balance between one’s sense of self (self-differentiation) and intimacy with close family members and other relationships. According to this theory, a balance must be established before individuals properly engage in life, make good decisions, act appropriately and prosper while at the same time draw strength from their own mental resources (Williamson, 2001). For example, certain topics may only be discussed with parents if emotional intimacy with them exists in balance with a certain degree of autonomy (Bray & Harvey, 1992).
The authors operationalized questionnaire concepts associated with system theory as follows:

- Personal Authority
- Spousal Intimacy
- Integrative Intimacy
- Spousal Fusion
- Intergenerational Fusion
- Nuclear Family Triangulation
- Intergenerational Triangulation
- Intergenerational Intimidation

These terms, as applied in the context of this study, are understood in the following way:

- Overall personal authority indicates internal strength and decision-making capability (Stoner, Freeman, & Gilbert, 1997, pp. 346-361) probably initiated without a great number of external resources and/or attributes of power (Popitz, 1992, p. 109).
- Individuation takes place when a person no longer regards other, more powerful individuals fully responsible for any given situation, and thus becomes more autonomous in his or her actions, thoughts and feelings. In terms of a personal authority continuum, Individuation of self stands at one end while Fusion stands at the other.
- Fusion at an interpsychological level has largely to do with interpersonal relationships that result in a loss of self. Any such imbalance in a dyadic relationship may be restored by a state of fusion involving a third party.
- Intimacy is the intentional closeness which preserves clear boundaries of the self and is characterized by mutual respect, trust and reliance. The polar opposite is represented by isolation. A separate scale estimates the degree of intimacy in spousal relations which are not reliant upon contacts with parents for any level of satisfaction.
- Differentiation at the interpsychological level is the ability to correctly discern between what is emotional and what is intellectual. At an interpersonal level, differentiation implies the ability to separate oneself from others.
- Triangulation can be found between the partners and their children or between a given person and his or her parents.
- Intergenerational intimidation is opposed to personal authority, connects with lack of individuation, immature intimacy and poor self-reliance. The relationship with parents is characterized by hierarchic relations and fear of the withdrawal of parental support.

While three versions of the questionnaire exist, it was decide that only versions A and B would be used:

A. 132 test items, used with adults aged >25 with children; and
B. 124 test items, use with adults aged >25 without children.

The validity and reliability of the questionnaire have been confirmed and described in detail elsewhere (Fajkowska-Stanik 1999, p. 257-268). The author maintained all the methodological procedures required for the adaptation of the test. She carried out additional research and statistical calculations for eight factors to identify cultural differences in the functioning of the family.

**Procedure**

The research study was conducted at the end of 2001 in Poland. The data are not devaluated as the issue of family relationships and management have a universal character. As the results of the panel research show, (Social Diagnosis, 2011) concerning the conditions of life in Poland show that the value system of Poles is very stable. As in all previous years, most often this value is indicated as health, followed by a successful marriage (slight decline), children and work; the least are liberty and freedom, strength of character, education, kindness and respect for the environment (Social Diagnosis, 2011).
In many cases, the whole procedure was diagnostic. It provided a significant amount of additional information not only about the managers’ creativity but also their time-management skills, communication styles and even reliability in keeping their word! Some subjects constantly failed to meet deadlines for submitting the questionnaire and some lost these forms completely.

It needs to be emphasized that the research was by no means neutral. The fact that family problems were possibly connected with managing the business proved both interesting and surprising. There were times when requiring subjects to only read the survey forms was enough for them to flatly refuse to participate in the study. Apparently, attempts to answer the questions might elicit emotional responses too painful to contemplate. It is commonly understood that separately undertaking family relationships and management behaviour in research is hardly ethically unquestionable. Research concerning the connection between family relationships and management is relatively new and very seldom taken into consideration. The connection between these two fields creates more effective possibilities for managerial counselling.

Direct contact with the subjects made it possible to complement and supplement the more rigid survey procedure with anecdotal and observational information, meaning subjects’ statements regarding their activities introducing or implementing certain innovations in the context of their area of expertise, workplace and community. For example, owners of agro-tourism businesses, very capable of developing creative ideas, told how they tended not to limit innovation to their own companies. Rather, they introduced them to their neighbours and thereby stimulated development of local communities by, for example, initiating the installation of telephone lines in a village, building decontamination plants or local roads.

Results

With an interest in finding statistical evidence for the existence of a dynamic between creativity and the quality of family relationships, four methods of data analysis were applied to determine and describe the interrelations between the two variables:

1. Correlations between the two variables;
2. Regression analysis;
3. Cluster analysis; and
4. Canonical analysis.

Correlations between the two variables

To identify relational strengths between creativity and the quality of family relationships in the examined group, the Pearson product-moment correlation coefficient ($r$) was used. Interrelations between creativity and the quality of family relationships were observed in five PAFS-Q factors (Spousal Intimacy, Spousal Fusion/Individuation, Intergenerational Fusion/Individuation, Intergenerational Intimidation and Personal Authority). In three PAFS-Q factors (Spousal Intimacy, Nuclear Family Triangulation, Intergenerational Triangulation), no interrelation was observed. The dependencies obtained are illustrated in Table 1.

<table>
<thead>
<tr>
<th>PAFS-Q</th>
<th>N</th>
<th>Pearson’s $r$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spousal intimacy</td>
<td>292</td>
<td>0.120</td>
<td>0.04</td>
</tr>
<tr>
<td>Spousal fusion/individuation</td>
<td>291</td>
<td>0.211</td>
<td>0.001</td>
</tr>
<tr>
<td>Intergenerational fusion/individuation</td>
<td>291</td>
<td>0.227</td>
<td>0.001</td>
</tr>
<tr>
<td>Intergenerational intimidation</td>
<td>264</td>
<td>0.200</td>
<td>0.001</td>
</tr>
<tr>
<td>Personal authority</td>
<td>295</td>
<td>0.285</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Source: Author’s personal investigation.
Despite the fact that the correlations are low or very low, they are statistically significant. They therefore suggest that Spousal Intimacy is positively correlated with a manager’s creativity ($r = 0.12$, $p < 0.04$), as is Spousal Fusion with Individuation ($r = 0.21$, $p < 0.001$), meaning the preservation of one’s identity with respect to both spouse and parents in conjunction with a lack of intimidation coupled with internal strengths resulting from autonomy. Higher levels of Individuation ($r = 0.21$, $p < 0.001$) in managers also appears to favour creativity. This suggests an ability to separate themselves from certain contextual relationships associated with the spouse and/or parents, meaning more autonomous thinking and action.

Absence of Intimidation ($r = 0.20$, $p < 0.001$) flags a mature closeness with parents. The fear that parents may withdraw their support no longer exists and the manager is able to shape reality in ways different than his parents.

The highest correlation observed is between creativity and Personal Authority ($r = 0.29$, $p < 0.001$). It indicates a manager’s ability to direct his or her own thoughts and opinions while taking personal responsibility for all experiences, including the treatment of others (including parents), which is quite important in terms of creativity in the workplace.

During data analysis, questions arose, for example: are the observed correlations independent or perhaps due to intercorrelation between the individual CBQ factors, or do they partially overlap? To find answers, regression analysis was used to establish the percentage of creativity variance as explained by family conditions.

Regression analysis

Step-by-step regression analysis was used to establish the percentage of creativity variance explained by the variables measuring the quality of family relationships. A three-factor model was obtained, which included the variables: Personal Authority, Intergenerational Intimidation and Intergenerational Fusion/Individuation. It explained 14.2% of the variance and was statistically relevant ($F = 10.72$, $p < 0.001$). The given raw weights served the purpose of equalizing the regression, while the standardized weights allowed comparison of the influence of each individual factor separately.

The first variable entered was the Personal Authority factor. It explained 7.2% of the variance. The second was the Intergenerational Intimidation factor. It explained 4%. The third factor, Intergenerational Fusion/Individuation, explained a further 3.1% of the dependent variable variances.

Evidently, the most accurate prediction with respect to creativity would be obtained by combining three factors, meaning Personal Authority, Intergenerational Intimidation and Intergenerational Fusion/Individuation. Based on this premise, a linear regression equation was formulated, where creativity = $0.30 \times$ Personal Authority + $0.13 \times$ Intergenerational Intimidation + $0.40 \times$ Intergenerational Fusion/Individuation – 21.25 (See: Tables 2 and 3).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Raw weight</th>
<th>Standardized weight</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable</td>
<td>21.25</td>
<td>-</td>
<td>-3.22</td>
<td>0.002</td>
</tr>
<tr>
<td>Personal authority</td>
<td>0.30</td>
<td>0.23</td>
<td>3.43</td>
<td>0.001</td>
</tr>
<tr>
<td>Intergenerational intimidation</td>
<td>0.13</td>
<td>0.19</td>
<td>2.90</td>
<td>0.004</td>
</tr>
<tr>
<td>Intergenerational fusion/individuation</td>
<td>0.40</td>
<td>0.18</td>
<td>2.64</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Source: Author’s personal investigation.

$R = 0.38$.  $R^2 = 0.14$.  $F_{(3, 194)} = 10.72$.  $p < 0.001$
Table 3: Summary of step regression calculated by the progressive step method.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Multiple R</th>
<th>Multiple R²</th>
<th>R² Change</th>
<th>F – Lead out</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal authority</td>
<td>0.27</td>
<td>0.07</td>
<td>0.072</td>
<td>15.16</td>
<td>0.000</td>
</tr>
<tr>
<td>Intergenerational intimidation</td>
<td>0.33</td>
<td>0.11</td>
<td>0.040</td>
<td>8.67</td>
<td>0.004</td>
</tr>
<tr>
<td>Intergenerational fusion/ individuation</td>
<td>0.38</td>
<td>0.14</td>
<td>0.031</td>
<td>6.98</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Source: Author’s personal investigation.

The statistical results noted above support the following proposal: creativity is most likely evident when an individual enjoys a degree of self-reliance and, although maintaining a mature closeness with parents, has a discrete sense of self and thus also possesses emotional and intellectual independence.

Cluster analysis

Using the Cluster Analysis technique, observations may be divided into subsets comprised of similar and potentially linked elements. This technique was used to construct a model describing the smallest and greatest differences within and between two groups, i.e., the degree of creativity and the quality of family relationships. Our first cluster comprised of seventy-six less creative managers. Their mean value with respect to creativity was 0.62. A more creative second cluster comprised of seventy-two subjects with a 29.63 mean value for creativity.

Three PAFS-Q factors, meaning Intergenerational Intimacy, Nuclear Family Triangulation and Intergenerational Triangulation offered no differentiation of the subjects’ results. However, the remaining factors emerged as two parallel upper and lower ‘tracks.’ This pattern revealed higher than average results in all factors except Intergenerational Triangulation.

Managers occupying a ‘lower track’ with respect to family relationships appear to experience reduced levels of closeness with their partner. They also tend to live their lives and make choices in greater deference to both spouse and parents. They appear to depend upon, and actually need, their real parents or some symbolic replacement to confirm the appropriateness of their actions (Ulrich & Dunne, 1996).

Conversely, managers with higher levels of creativity move along ‘the higher track of family relationships.’ Specifically, while they are involved more intimately with their spouse, a strong Personal Authority factor indicates this closeness and is combined with a discrete sense of self in terms of their relationships with spouse and parents. This suggests the ability to establish an intellectual and emotional independence from parents and the ability to take responsibility for what they experience themselves.

All of the foregoing information suggests that managers with low levels of creativity may be rather submissive individuals who require outside resources to bolster their own strength.

Canonical analysis

Canonical analysis allows exploring a series of traits or characteristic behaviours whose sum describe a set of complex relationships. In this study, connections were explored between the existing eight factors measuring the quality of family relationships and four factors describing the especially complex structure of creativity. Data analysis identified four uncorrelated canonical factors, which offered an explanation for the variability of the two series of variables (See: Table 4).

Based on this canonical analysis supported by the regression analysis, apparently the traits comprising the first element, meaning “Intimacy but with preserved boundaries” may be responsible for higher levels of creativity in our managers. Creativity in the context of the study appears to coexist with inner strength. More capable and creative managers may possess a greater ability to discuss
challenging subjects and issues with people with whom they are closely bond, such as a spouse and/or parents, without damaging the discreteness of the relationship.

Table 4: Connections between the quality of family relationships and creativity.

<table>
<thead>
<tr>
<th>Group of variables I</th>
<th>Canonical variables</th>
<th>Factor 1***</th>
<th>Factor 2*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spousal fusion/ individuation</td>
<td>0.51</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Nuclear family triangulation</td>
<td>0.18</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>Intergenerational intimacy</td>
<td>-0.06</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>Intergenerational fusion/ individuation</td>
<td>0.56</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Intergenerational triangulation</td>
<td>-0.06</td>
<td>-0.88</td>
<td></td>
</tr>
<tr>
<td>Intergenerational intimidation</td>
<td>0.66</td>
<td>-0.00</td>
<td></td>
</tr>
<tr>
<td>Personal authority</td>
<td>0.47</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group of variables II</th>
<th>Canonical variables</th>
<th>Factor 1***</th>
<th>Factor 2*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformity</td>
<td>-0.92</td>
<td>-0.38</td>
<td></td>
</tr>
<tr>
<td>Algorithmic behaviour</td>
<td>-0.80</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>Non-conformity</td>
<td>-0.00</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Heuristic behaviour</td>
<td>0.05</td>
<td>0.17</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s personal investigation.

The two strongest factors, meaning Factor 1 (Family relationships) & Factor 2 (Expression of creativity) show a canonical correlation of $R = 0.52$, $p < 0.001$ and $R = 0.32$, $p < 0.05$, respectively. These two factors explain 12% of the variability of the CBQ’s data.

Table 5: Traits associated with the quality of family relationships and their impact on creativity.

<table>
<thead>
<tr>
<th>Traits Leading to Higher Levels of Creativity</th>
<th>Summary of Traits</th>
<th>Trait Impact on Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spousal Fusion/ Individuation</td>
<td>Intimacy but with preserved boundaries</td>
<td>Less conformity</td>
</tr>
<tr>
<td>2. Intergenerational Fusion/Individuation</td>
<td></td>
<td>Less algorithmic behaviour</td>
</tr>
<tr>
<td>3. Intergenerational Intimidation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Personal Authority</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Traits Leading to Lower Levels of Creativity</th>
<th>Summary of Traits</th>
<th>Trait Impact on Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nuclear Family Triangulation</td>
<td>Entanglement</td>
<td>More algorithmic behaviour</td>
</tr>
<tr>
<td>2. Less Intergenerational Triangulation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s personal investigation

Conversely, traits comprising the second element, meaning Entanglement, may lead to lower expectations, such as less creative, less innovative and more imitative behaviours. For example, let us take Nuclear family triangulation - a temporary coalition perhaps formed by a child with a parent in a conflict situation. This is a symptom of poor relationships in a marriage. In general terms, triangulation offers an indirect way of resolving marriage conflicts by engaging the children in the conflict. When one partner looks for support, he or she tries to create at least some dyadic stability in the relationship. Such conditions usually testify to limited communicative competence in family relationships and poor intergenerational intimacy. In any case, this may lead to a rather rigid, step-by-step algorithmic approach to problem solving as opposed to a more “out of the box” approach espoused by more creative individuals.

Discussion

Results obtained from the four different analytical processes used to explore the various relationships between creativity and the quality of family relationships lead to the following conclusions:

- Low correlations (but statistically significant) exist between some of the factors measuring the family relationships of the managers, meaning Spousal Intimacy, Spousal Individuation,
Intergenerational Individuation, Intergenerational Intimidation, Personal Authority and their creativity.

- Two characteristic profiles of family characteristics of managers are distinguished after cluster analysis, specifically:
  - Managers with higher levels of creativity tend to have good family relationships, displaying greater intimacy, independence and autonomy.
  - Managers with low creativity live in poor intimacy with their spouse and their relationships in general are distinguished by dependence and emotional submissiveness.
  - By using four different statistical methods, it was not found if low scores in any of the eight factors occurred together with high creativity.
  - The low statistically significant results in terms of autonomy and intimacy created a constellation of personality traits important for bringing new and valuable changes: faith in achieving their personal goals in life (self-confidence), perseverance in striving to achieve the goal and finding strength within themselves (Szopiński, 2007).
  - Moreover, it was stressed that even deeply penetrating into the research of one domain is not as efficient as penetrating many domains together. Creativity is a complex trait, and therefore its prognosis increases when studies take into account more areas. Good family relationships form a basis from which personality traits, social and occupational functioning grow.

Using a large sample of data on European managers has helped us obtain an analysis which reveals negative and positive statistically significant relationships between particular familial customs and the way managers function at work. Changes which disintegrate the family weaken managers’ creative abilities. From a positive perspective, it appears that individuals who have formed and/or maintain satisfying family relationships may be able to play a more creative and beneficial role in the context of business activity. This in turn suggests how vital human energy, as represented in its deepest and most intimate dimensions, is understood, nurtured, engaged and encouraged, not only for the benefit of the individual him or herself but for the community he or she serves. The information obtained by the author via this study underlines the importance of providing continuing opportunities for therapeutic workshops dedicated to the release of diverse and creative energies (Santorski, 2002, p. 15).

**References**


About the Authors

Józef Szopiński is a psychology professor at the University of Economics and Innovation in Lublin. He has his doctorate in Social Psychology from the Catholic University of Lublin, Poland. He has also received training as a group trainer at the Workshop Institute for Living-Learning International in Switzerland. He received his habilitation with his book *Creativity in Managers* (2011) in Presov University in Slovakia. He is known for his *Marriage Bond Scale* (1980) published in Polish and German. This scientific and practical instrument has been used by many students and doctors for research in Poland and elsewhere (See: Blum, Mehrabian 1999; Eysenck, 1980). For many years, Szopiński has been actively working in two areas: psychotherapy and adult education. He gives lectures and leads psychological workshops for various professionals and other groups of people, for example, business owners or managers, clerks, tradesmen, clergymen and monks. He also works with individuals who are unemployed. In addition to his group work, Józef Szopiński spends much of his time teaching students at various universities within and outside the borders of his native Poland – specifically, though not exclusively, in Slovakia and the Ukraine; for example, he has given talks in Germany, Switzerland and the USA. He has been a lecturer at Maria Curie – Skłodowska University, the John Paul II Catholic University of Lublin, Warsaw University and the University of Rzeszów.

Tomasz Szopiński is a Doctor of Economic Sciences, involved in academic and didactic work at the University of Finance and Management in Warsaw. He is a graduate of the Faculty of Economics from the Catholic University of Lublin. In 2011, he defended his doctoral dissertation at the Collegium of Management and Finance of the Warsaw School of Economics. Previously, he worked in the private sector. He is the author of over a dozen articles on economics, including such areas as marketing services, e-business and marketing research.

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Services Provided to Military Dependents Who Are Mentally Gifted in the US Department of Defense (DoDEA) Schools

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Abstract
The US Department of Defense Education Activity (DoDEA) is a federal agency that provides educational services to military dependents in 12 foreign countries, seven states, Cuba, and Puerto Rico. Perhaps due to its restricted audience, the general public has limited knowledge of DoDEA services; moreover, empirical information about these services is missing in conventional data bases. The first purpose of this article was to summarize key essentials about this program in one document and provide the reader with a comprehensive overview of DoDEA’s gifted services. The second purpose was to determine the empirical findings of these programs using the built-in evaluative mechanisms of the Research and Evaluations Branch (REB) of the DoDEA.

Keywords: Gifted education; gifted programs; Department of Defense Education Agency.

Introduction
The US Department of Defense Education Activity (DoDEA) is a federal agency that provides educational services to military dependents throughout the world. DoDEA consists of two branches: the Department of Defense Dependents Schools (DoDDS) and the Domestic Dependent Elementary and Secondary Schools (DDESS).

Historically, these branches were separate agencies with different missions. DoDDS was created in 1946 to operate schools in foreign countries that were occupied by the United States after World War II - Germany, Austria and Japan. DDESS, formerly known as Section 6 Schools, was established by Congress in 1950 to address the issue of segregated public schools in southern states. In 1994, Public Law No. 103-337 replaced Section 6 legislation and renamed the school system the Department of Defense Domestic Dependent Elementary and Secondary Schools, or DDESS (DDESS/DoDDS – Cuba History, 2009). The number of DoDDS schools was also reduced and combined with DDESS to form the Department of Defense Education Activity. As shown in Figure 1, DoDEA provides services in 12 foreign countries, seven states, Cuba, and Puerto Rico (DoDEA Facts, 2010).

DoDEA gifted services
DoDEA is committed to providing an “...exemplary education that inspires and prepares all students for success in a dynamic, global environment”. To accomplish this goal, DoDEA provides a comprehensive pre-kindergarten through 12th grade curriculum that is comparable to school systems in the United States (DoDEA Community Strategic Plan, 2008).

DoDEA is supervised by the Department of Defense rather than the Department of Education (Lee, 2009). Regardless, it receives federal funds and provides special education in accordance with
Federal law, as do the other 50 States in the US. DoDEA also provides services to military dependents who are mentally gifted (MGT) even though there is no Federal requirement to do so.

<table>
<thead>
<tr>
<th>DODDS</th>
<th>DDESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahrain</td>
<td>Alabama</td>
</tr>
<tr>
<td>Belgium</td>
<td>Georgia</td>
</tr>
<tr>
<td>England</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Germany</td>
<td>New York</td>
</tr>
<tr>
<td>Guam</td>
<td>North Carolina</td>
</tr>
<tr>
<td>Italy</td>
<td>South Carolina</td>
</tr>
<tr>
<td>Japan</td>
<td>Virginia</td>
</tr>
<tr>
<td>Korea</td>
<td>Cuba</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>Puerto Rico</td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1:** Locations of DoDEA (DODDS and DDESS) schools.

Perhaps due to its restricted audience, the general public has limited knowledge of DoDEA services. Although descriptive information regarding DoDEA’s gifted program, such as the organization's history, mission, curriculum and types of services, can be found on-line at www.dodea.edu, there are numerous DoDEA websites and obtaining this information can prove to be a cumbersome process even for parents.

Regrettably, empirical information about DoDEA gifted programs in conventional data bases is non-existent. A November 2010, ERIC search using the designators DoDEA Schools, DoDDS Schools and DDESS Schools, along with gifted students or gifted services, failed to locate a single study. This search was expanded to include reviews of the of the Gifted Child Quarterly, the Journal for the Education of the Gifted, and the Journal for Advanced Academics from the year 2000 to the present, but likewise yielded no results.

To insure that no means of obtaining empirical information was overlooked, the author conducted a third search using the Research and Evaluation Branch (REB) of the DoDEA’s own Data Center. According to the Center’s website, the REB publishes the Postsecondary Plans and Graduation Report, surveys such as the biennial Customer Satisfaction Survey, report cards and specific ratings for each of its schools (www.dodea.edu/datacenter/index.cfm).

Consistent with previous efforts, nothing could be found on this website about the performance of gifted programs or students. However, the REB allows any person to request federal agency records or information through its Freedom of Information Act (FOIA) office unless the information falls within one of the statute's exemptions. Such requests must be made in writing.

**Purpose**

This article was written with a two-fold purpose: 1) to summarize key essentials about this program in one document and provide the reader with a comprehensive account of DoDEA’s gifted services; and 2) to determine the empirical findings of these programs using the built-in evaluative mechanisms of the DoDEA (Research and Evaluations Branch and Freedom of Information Act).

Several articles / sources involving gifted evaluations were located in the literature and were viewed as having relevance for this study. Herrmann and Nevo (2011) described the status of gifted education in German-speaking countries (Austria, Switzerland and Germany) based on four main questions: 1) How is “giftedness” defined in German-speaking countries? 2) How are gifted children identified? 3) What gifted education programs are there? And 4) What are the empirical findings on these programs? The design and methodology used by these authors was adopted for this study and is described in further detail in the next section of this article.
Based on the initial dearth of empirical data through conventional sources, other means of evaluating gifted programs were located and used as a “back-up” to assess the quality of DoDEA’s gifted services. The first was a Davidson Institute for Talent Development (DITD) study that categorized the extent that states were “gifted friendly” using the criteria of a required mandate for gifted services, as well as the extent of funding provided to gifted programs. Each of the 50 States were then placed into one of the following five categories: 1) Category #1) gifted programming mandated / program fully funded by the state; 2) Category #2) gifted program mandated / program partially funded by the state; 3) Category #3) gifted program mandated / no gifted funding is available; 4) Category #4) gifted programming not mandated / gifted funding is available; and 5) Category #5) gifted programming not mandated / no gifted funding is available (DITD, 2012).

The second source was the Pre-K-Grade 12 Gifted Education Programming Standards published by the National Association for Gifted Children (NAGC). Providing “…important direction and focus to program development”, these Standards included: 1) learning and development; 2) assessment; 3) curriculum planning and instruction; 4) learning environments; 5) programming; and 6) professional development (www.nagc.org/ProgrammingStandards.aspx, undated). This source was supplemented with the collection of position papers also published by the NAGC that represent NAGC’s official stance on topics such as acceleration, assessments, competencies needed by teachers, differentiation of curriculum and instruction, grouping and educational opportunities. (www.nagc.org/positionpapers.aspx, undated).

Viewing this information, there is some overlap not only between both sources, but with the areas investigated in the Hermann and Nevo study as well. To develop an additional means of evaluating DoDEA’s Gifted program, information that was largely designed to address the first purpose of this study was supplemented with that used by the Davidson Institute and National Association of Gifted Children. This will be explained in greater detail in the next section of this article.

Method

To address the first purpose of this article, to provide a comprehensive account of DoDEA’s Gifted Services, this study used a revision of the four questions from the Hermann and Nevo paper. The types of available programs was maintained as an item of inquiry; however, gifted definition and identification were consolidated into one question and teacher qualification and certification was added as important descriptors of gifted services.

Borrowing from the DITD survey, a question to determine the legal and financial requirements of the DoDEA Gifted Program, was likewise included. Herrmann and Nevo’s question on empirical findings became a separate question and the secondary purpose for the article.

These revised questions were stated as follows: 1) What are the legal and financial requirements for these services? 2) What is the process used by DoDEA to identify students who are gifted? 3) What types of services are available for gifted military dependents in DoDEA schools? And 4) What are the qualifications of the DoDEA teachers who serve these students? Objective determinants to better measure each of these four research questions were developed as listed in Figure 2.

To address the second purpose of article, to determine the empirical findings of these programs using the built-in evaluative mechanisms of the DoDEA (Research and Evaluations Branch and Freedom of Information Act), a written request was made on-line to FOIA asking for the following: 1) any specific reports concerning the performance of gifted students in DoDEA; 2) the percentage of gifted students identified for DoDEA services; 3) budgetary figures from the MGT Program; 4) results of any internal / external audits / monitoring of its gifted programs.
1. What are the legal and financial requirements for these services?
   - Is gifted programming mandated within the DoDEA?
   - To what degree does the DoDEA fund its programs for gifted students?
   - Are gifted and talented students in DoDEA schools entitled to individualized education plans?
   - Are DoDEA schools required to have gifted education program plans approved by the DoDEA?
   - Does the DoDEA audit or monitor the gifted programs in its schools?

2. What is the process used by DoDEA to identify students who are gifted?
   - What is the actual process of identifying students who are gifted?
   - What aspects of giftedness are included in the DoDEA definition?
   - What percent of the DoDEA student population is identified as gifted and talented?

3. What types of services are available for gifted military dependents in DoDEA schools?
   - Does the DoDEA provide differentiated instruction and a host of program options to meet the needs of gifted students?

Figure 2: Objective determinants to the four research questions.

Results

Purpose # 1 – To provide the reader with a comprehensive account of DoDEA’s gifted services. What are the legal and financial requirements for these services?

In DoDEA, all schools are required to “…identify outstanding intellectual/academic performance and potential among students K-12…” (DoDEA Regulation 2590.1, 2006, p. 2). DoDEA schools must provide its identified MGT dependents with an appropriate education as well.

In a telephone conversation on September 15, 2010, Dr. Christine Hill, Coordinator for GE/AP Programs, stated that the DoDEA MGT Program was “completely funded”. Because of their status as a “governmental agency”, she was not permitted to disclose the specific dollar amount spent on programs for the gifted. However, Dr. Hill’s assertion could not be substantiated because the FOIA request for budgetary information went unanswered.

Though DoDEA Regulation 2950 requires its schools to develop a plan for providing gifted education services, nothing was mentioned about submitting the plan to DoDEA or an intermediary authority for review. Similarly, Section 5.3.7 of DoDEA Regulation 2590.1 requires DoDEA Superintendents to “conduct monitoring and evaluation activities in their own area of responsibility” (p. 4), but no information was unearthed to indicate that the level of this activity was conducted by the DoDEA.

Moreover, no empirical information was provided by FOIA in the form of official reports from external audits or monitoring of the gifted program. And while Hoagies’ Gifted Education Page (March 13, 2010, p. 4) indicated that DoDEA is “developing” gifted IEPs, these plans are not yet required by the agency.

What is the process used by DoDEA to identify students who are gifted?

DoDEA identifies students who are intellectually or academically gifted (I/A). The Gifted Education Program Guide (2590.2-G, January, 2006, p. 8), stated that “…(t)he goal of the DoDEA Gifted Education program is to identify students with high potential and exceptional performance and to develop challenges that match their strengths and needs”.

200 Gifted and Talented International – 28(1), August, 2013; and 28(2), December, 2013
The Identification Process consists of the following four steps (An Educator's Tutorial on DoDEA Gifted Education Identification Procedures, 2006):

1. **Student Referral** - students are considered based on screening results (Terra Nova), the result of transfer / relocation of the military family, or nominations. Anyone with knowledge of the student’s ability (teacher / parent / student) can make a nomination.

2. **Assessment** - using multiple criteria, K-12 students with extremely strong learning profiles in intellectual ability and academic achievement are evaluated by a Gifted Review Committee (GRC). Composed of an administrator (or designee), an educator with expertise in gifted education, and someone with knowledge of the unique social and emotional needs of these students, the GRC reviews information on students who have been referred (DoDEA Information Sheet for Principals, 2006).

Routinely, this information comes from student records. Should the GRC feel additional documentation is required, other data such as criterion referenced tests, record of accomplishments, portfolios and / or observations may be gathered (Educator’s Tutorial, 2006). In addition to multiple criteria (Indicators) during assessment (see Figure 3), the GRC searches for “… a documented need for modifications in the student’s instructional program to ensure continuous academic challenges and supporting services” (Gifted Education Program Guide, 2006, p. 12).

<table>
<thead>
<tr>
<th>Eligible students demonstrate more than one of the following indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Qualitative data (observations, anecdotal evidence, narratives, interviews) indicative of highly unusual ability or achievement.</td>
</tr>
<tr>
<td>• A total battery score at or above 97th percentile on a nationally normed achievement test.</td>
</tr>
<tr>
<td>• A total score at or above 95th percentile on a group ability test.</td>
</tr>
<tr>
<td>• An average rating scale score of 40 or higher from two or more educator raters and specific evidence of gifted behaviors in written narratives.</td>
</tr>
<tr>
<td>• Very strong indicators of gifted behaviors as noted in parent or self-ratings and Narratives.</td>
</tr>
</tbody>
</table>

**Figure 3:** Multiple criteria (indicators) used by the gifted review committee.

3. **Eligibility Decision** - GRC members individually review the folder of information on a referred student and meet to decide on eligibility. A student may be determined to be eligible, ineligible, or be placed on monitored status.

   Students determined to be eligible for gifted services will be discussed in the next section of this paper. If a student is found to be ineligible, the Gifted Review Committee believes that the student’s strengths can be accommodated within the regular school program without extraordinary measures of differentiation. If a student is placed on monitored status, MGT services are not provided but the Gifted Review Committee automatically re-evaluates the student’s record during the following semester.

4. **Recommendation** – after reaching consensus, the GRC decides what services will be recommended for the student. Services continue unless the parent withdraws permission or the Gifted Review Committee seeks a reevaluation. A parent or guardian may file a written appeal to the school principal if they are in disagreement with the committee’s decision.

   The Gifted Review Committee searches for “…scores or indicators of student potential equivalent to the top 3 to 5 percent of students of similar age in a particular area or areas of ability or achievement”. The percentage of students identified as “Gifted” in DoDEA Programs was confirmed as 4.5% as of September 30, 2012. In fact, this was the only information provided by FOIA to the author’s official request.

   Whereas gifted services are guaranteed to MGT students who transfer from one DoDEA school to another, this consideration does not apply to MGT students who participated in a non-DoDEA gifted program. These students are reviewed by the GRC, and a recommendation is made as quickly as possible (DoDEA Gifted Program Guide, p. 13).
What types of services are available for gifted military dependents in DoDEA schools?

For students who are determined eligible for gifted education services, the GRC decides on a minimum of two options for service delivery. (DoDEA, Curriculum, Gifted Education, undated). A continuum of gifted services is available at each school; however, the types of gifted services and programs “…vary from school to school and are based on student need, community and school resources…” (DoDEA Curriculum, Gifted Education, p. 1). Specified in the Program Guide (p. 71), a listing of program options are depicted in Figure 4.

<table>
<thead>
<tr>
<th>Elementary School</th>
<th>Middle School</th>
<th>High School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular classroom with differentiation of instruction</td>
<td>Regular course with differentiation of instruction</td>
<td>Regular course with differentiation of instruction</td>
</tr>
<tr>
<td>Regular classroom with cluster grouping and differentiation</td>
<td>Regular course with cluster grouping and differentiation</td>
<td>Regular course with cluster grouping and differentiation</td>
</tr>
<tr>
<td>Regular classroom with grade acceleration of specific content</td>
<td>Interdisciplinary course</td>
<td>Interdisciplinary course</td>
</tr>
<tr>
<td>Resource sessions outside the Classroom</td>
<td>Grade acceleration for specific content</td>
<td>Advanced Placement and honors courses</td>
</tr>
<tr>
<td>Grade acceleration for specific content</td>
<td>Grade acceleration</td>
<td>Individualized Services</td>
</tr>
<tr>
<td>Grade acceleration</td>
<td>Individualized services</td>
<td>Additional opportunities</td>
</tr>
<tr>
<td>Individualized services</td>
<td>Additional opportunities</td>
<td>Additional opportunities</td>
</tr>
</tbody>
</table>

Figure 4: DoDEA gifted education program options.

As can be seen in Figure 4, numerous program options are available to gifted students in DoDEA schools. For example, both enrichment and acceleration are available at the elementary, middle and high school levels. In fact, three different arrangements exist regarding acceleration alone (regular classroom with grade acceleration of specific content, grade acceleration for specific content, and grade acceleration). Moreover, both of these options are enhanced through DoDEA’s use of “cluster” or ability grouping in its classes. At the secondary level, Advanced Placement (AP) courses are available that can be taken for college credit.

As part of its mission to provide “…exemplary educational programs that inspire and prepare students for success in a global environment…”, DoDEA also offers a fully-accredited Virtual High School (DVHS) that allows students to take classes they need regardless of their location and learn in ways that utilize 21st century technology. (www.dodea.edu/virtualSchool/, undated). A variety of distance learning courses, including advanced placement, is provided with the same level of rigor and to the same standards as those in the traditional DoDEA curriculum. In 2010, the DVHS became a fully-accredited high school by AdvancED, and in 2012, it graduated its first students.

One program option that is not available through DoDEA is early admission to kindergarten and first grade. Entry into these programs is based solely on age rather than ability level. Admission into a half-day pre-kindergarten program is possible in DDESS ONLY schools if the student is four years of age by September 1. (DoDEA Early Childhood Age Change, FAQs, undated).

What are the qualifications of the DoDEA teachers who serve these students?

In DoDEA, all teachers must be licensed. According to the DoDEA Human Resources Regional Service Center (2010), a major in gifted education is required of teachers of the gifted, or a
minimum of 15 semester hours in gifted education. Courses such as nature and needs of gifted students should be included, and a supervised practicum or fieldwork in gifted (student teaching) is required. More about teacher certification will be covered in the next section.

**Purpose # 2** - To determine the empirical findings of these programs using the built-in evaluative mechanisms of the DoDEA (Research and Evaluations Branch and Freedom of Information Act).

Nothing was provided by FOIA regarding the request for information on the performance of gifted students, official reports from external audits of the gifted program, and budgetary figures. In every instance, the answer returned was “(a) search was conducted by the Department of Defense Education Activity Education Directorate. However, no records were found responsive to your request” (Letter from the Department of Defense Education Activity dated November 6, 2012). Obviously, this very limited response made to a formal request for public information limited this study’s ability to determine any empirical findings regarding the DoDEA Gifted Program.

Nevertheless, based on “back-up sources”, as well as descriptive information outlined previously, some evaluative information could be determined. For example, according to the criteria specified by the Davidson Institute of Talent Development, DoDEA could be classified as either a Category 1 or Category 2 State. Were these programs to be “fully funded”, as attested to by Dr. Hill, DoDEA would be identified as Category 1 along with Georgia, Iowa, Mississippi and Oklahoma. This status reflects a substantial commitment to gifted education and would place the DoDEA gifted program in the top 9.8% of those offered in the US. Unfortunately, although we know that DoDEA provides some degree of funding to its Gifted Programs, we cannot be certain of the amount. And without corroborating information, the best that can be said is that DoDEA is more “gifted friendly” than 21 other States (Figure 5).

<table>
<thead>
<tr>
<th>Category #1</th>
<th>Category #2</th>
<th>Category #3</th>
<th>Category #4</th>
<th>Category #5</th>
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</thead>
<tbody>
<tr>
<td>Georgia</td>
<td>Arkansas</td>
<td>Colorado</td>
<td>Alabama</td>
<td>California</td>
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<td>Iowa</td>
<td>Missouri</td>
<td>Oklahoma</td>
<td>Oregon</td>
<td>Delaware</td>
</tr>
<tr>
<td>Mississippi</td>
<td>Arkansas</td>
<td>Colorado</td>
<td>Nebraska</td>
<td>Vermont</td>
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<td>Oklahoma</td>
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<td>Utah</td>
<td>New Mexico</td>
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<td>Texas</td>
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<td>West Virginia</td>
<td>Alaska</td>
<td>Washington</td>
<td>Wyoming</td>
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<td></td>
<td>Wisconsin</td>
<td>North Carolina</td>
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<td></td>
<td>Louisiana</td>
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<td></td>
<td>Hawaii</td>
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**Figure 5:** Classification of states by DITD according to mandate for services and level of program funding

“Back-up” information regarding programming, assessment, curriculum planning and development, and professional development, provided additional, but limited, evaluative data on DoDEA Gifted Services.

**Programming and Planning:** Other than mandating that Gifted students receive services, programming and planning does not seem to be a strength for DoDEA. Viewing Category 1 States as a benchmark in determining quality, other States have more stringent requirements regarding gifted education plans. Both Iowa and Oklahoma require gifted education plans to be submitted to the State, whereas Georgia and Mississippi require State submissions only if changes to the previous plan have occurred. Additionally, all Category #1 States engage in state-wide monitoring, whereas DoDEA does not.

**Assessment:** DoDEA appears to have an excellent assessment plan. More specifically, it requires the use of multiple criteria to identify gifted students, rather than relying on one singular determinant. DoDEA also allows for automatic review of non-eligible (“monitored”) students on an annual basis which is not available elsewhere. There is also a ready-made provision for MGT students.
to transfer from one DoDEA school to another and receive similar services irrespective of location. This routinely does not happen between states in the continental US.

Conversely, DoDEA reported the lowest percentage of students identified as gifted (4.5%). This is in comparison to the following percentages for the other Category #1 States obtained for the school year 2008-2009: Georgia – 10%; Iowa – 9%; and Oklahoma – 17% (NAGC, Gifted by State, 2008). The Department of Statistics and Research from the Mississippi State Department of Education provided a figure of 7% via a telephone call on September 20, 2010.

Curriculum Planning and Instruction: Another plus for DoDEA Gifted Programs are the extensive options available in all schools and at all levels, particularly in the area of acceleration. Whereas other States offer similar options for gifted students, the nature of these services is often left up to the individual school district, and the extent of these options and can vary dependent on local philosophy or affluence. DoDEA’s Virtual High School with on-line AP courses should also be acknowledged.

Professional Development: DoDEA may have the most stringent certification requirements of any of the Category #1 States. For example, Georgia’s gifted certificates are either “consultative” (enabling the holder to serve as the gifted education partner in the Collaborative Teaching model) or in a specific academic area. These certificates are issued based on 15 semester hours of college coursework, or 25 Professional Learning Units (Georgia Department of Education, May 15, 2009). Iowa teachers can earn an endorsement to serve as a teacher or a coordinator of programs for the gifted and talented from the prekindergarten level through grade twelve. Program requirements include “…the completion of 12 semester hours of course work in the area of the gifted and talented to include the following: Psychology of the Gifted; Programming for the Gifted; Administration and Supervision of Gifted Programs; or Practicum Experience in Gifted Programs” (Iowa Department of Education, undated). Mississippi gifted certification consists of between 12 to 15 semester hours in courses such as Psychology of the Gifted, and an Internship. However, the number and types of courses differ by university (Wade, 2009). Finally, Oklahoma no longer requires special certification to be a teacher of the gifted. Any one possessing a valid certificate may instruct these students (Phone call to Sara Austin Smith, OSDE, 2010).

With more than 60,000 teachers on a waiting list (Lee, 2009), DoDEA has an extensive pool of teacher applicants to draw from, and may be able to employ the best available teachers for its gifted programs.

Discussion

DoDEA’s contention that its gifted program is both "exemplary" and “comparable” to school systems in the US seems to be true, at least in the areas of assessment, curriculum planning / instruction, and teacher qualifications. Unfortunately, the lack of empirical data on student performance, as well as budgetary information, prevents DoDEA’s Gifted Services from earning top honors. This is indeed regrettable, because other determinants found hint at an excellent program overall.

FOIA’s inability or unwillingness to disclose information about DoDEA’s Gifted Program must be considered a limitation to this study. In an age of data-driven decision making, it also appears to be somewhat confusing for a number of reasons.

First, this position seems inconsistent with its commitment to increased accountability and program improvement. As stated in the DoDEA Assessment Program website, system Assessments are designed to fairly measure student achievement in different academic subjects. The testing information is used to help determine how successful DoDEA schools are. This information is used:

- To help teachers determine the strengths and needs of students in order to work with them to improve their individual academic skills;
- To let parents know how their children scored in different academic subjects; and
To provide accountability for DoDEA schools.

Second, it appears that the Research and Evaluation Branch has the means to collect and disaggregate data specifically on gifted students. As seen in the following paragraph, it already does so for students with disabilities and limited English proficiency.

In accordance with the Individuals with Disabilities Education Act (IDEA), reference (a), all DoDEA students in the grades identified for system assessments will be included in the program. Those students who have been identified as having disabilities or are Limited English Proficient will participate, using either the standard DoDEA assessments, with or without reasonable and appropriate accommodations, or through the use of the DoDEA Alternate Assessment.

Third, one wonders how any program can legitimately be evaluated without objective data of student performance, especially where the agency conducts no external audit or monitoring of its programs. DoDEA may want to consider these items for the future. Not only would they make responding to requests for information easier, but they would facilitate meaningful improvement to the Gifted Program.

Finally, the Agency may also want to examine its reluctance to disclose budgetary information to the public. The amount of money provided to DoDEA schools through the Department of Defense is certainly more federal money than any of the other 50 States receive. Additionally, the manner and extent that DoDEA provides financial support to its Gifted Program may provide suggestions to, and be appreciated by, States, local school districts and Superintendents.

Summary

The US Department of Defense Education Activity (DoDEA) is a federal agency that provides educational services to military dependents in 12 foreign countries, seven states, Cuba, and Puerto Rico. Supervised by the Department of Defense rather than the Department of Education, DoDEA offers a comprehensive pre-kindergarten through 12th grade curriculum that is comparable to school districts in the United States, to include gifted education.

Perhaps due to its restricted audience, namely, DoDEA personnel and parents of military dependents, the general public has limited knowledge of DoDEA services. Moreover, empirical information about these services is missing in conventional data bases. Consequently, the first purpose of this article was to summarize key essentials about this program in one document and provide the reader with a comprehensive overview of DoDEA’s gifted services. The second purpose was to determine the empirical findings of these programs using the built-in evaluative mechanisms of the Research and Evaluations Branch (REB) of the DoDEA.

Descriptive information obtained from the DoDEA websites indicate a quality gifted program, especially in the areas of assessment, curriculum planning / instruction, and teacher qualifications. Unfortunately, the unavailability of information on student achievement and program efficacy, along with budgetary figures, prevents a comprehensive evaluation of the gifted program.
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www.gapsc.com


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Telephone call to Sara Austin Smith, Oklahoma State Department of Education (OSDE) September 20, 2010.


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Issues of Identification of Giftedness in Turkey

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Abstract
The purpose of the study, giving rise to this article is to highlight factors that play a role in the identification of gifted students through analysis of literature and current issues in Turkey. The article points out differences between what is typically found in literature and what occurs in Turkey. It is based on a review of definitions and data presented by national institutions and programs in addition to available results of research studies. Reviews show that while many issues presented in the literature are similar, many contextual issues pertain to Turkey and other collectivist, highly populated countries, which subscribe to an understanding of education which is uniform and reliant upon high stakes examinations.

Keywords: Gifted education; international perspectives; issues; identification.

Introduction
Looking at giftedness in different countries opens up the possibility of comparing various cultural conceptions and concerns present in the field. The aim of this paper is to understand the issues particular to the identification of gifted students as presented in literature and compare them with the issues of giftedness in Turkey.

Culture and giftedness
Written definitions of giftedness reflect existing cultural understandings of giftedness. They can be both formal, e.g., publicized and accepted nationally, or informal such as those used by professionals of the field, and, or based on perceptions held by the society.

Not surprisingly, giftedness is defined worldwide in a number of ways and for various reasons. Foreman and Renzulli (2012) claim certain cultures have historically valued abilities consistent with beliefs about moral components of giftedness. Persson (2012a) claims the possibility and benefit of having a universal and culture-free definition of giftedness is questionable. This paper maintains giftedness is culture-bound with definitions, practices, and issues about gifted education rooted in a cultural context.

Nuanced definitions of the construct reflect prominent milestones observed in the process of establishing who is, or is not gifted, determining indicators or subconstructs of giftedness, e.g., creativity, and issues to do with measurement of giftedness including the selection of suitable instruments that might facilitate measurement. In this context, it is interesting to note that some claim definitions shape such instruments while others claim instruments shape the definitions through the operationalization of the variables (Heller and Schofield, 2000).

While examining the definitions of giftedness in nearly 90 countries, Beranek (1993) found cultural differences. The study provides a global picture of various perceptions of giftedness, e.g., national exclusivity with respect to a definition, no special definition but one accepted by most educators, no national definition and no special provision for the gifted. Clearly unique contexts are important factors in shaping giftedness. It is not surprising, therefore, to find identification, the practical situation and any restraint impacting identification procedure, is also culturally dependent. (Hany, 1993; Hernandez de Hahn, 2000; Persson, 2012).
Defining giftedness in Turkey

Beranek’s (1993) results with respect to Turkey indicated the absence of a national formal definition. However, an official definition of giftedness in Turkey can now be found which reads: “A highly talented individual is the one who displays higher performance than peers in intelligence, creativity, arts, sports, leadership capacity, or special academic areas” (MEB, 2012). This inconsistency is explained by the fact that a formal definition is relatively new.

In Turkish, there is not one single word for gifted individuals. Using a word for word translation some scholars use the term “üstün zekali” meaning “highly intelligent”, “armağanlı” meaning “gifted.” Others use “üstün yetenekli” which means “highly talented.” In addition to these terms, Şahin and Düzen, (1992) found that Turkish teachers include logical thinking, quick understanding, and intellectual curiosity when they think of the defining characteristics of gifted students.

Giftedness in Turkey from a historical standpoint

Giftedness has been recognized in Turkey since the 15th century when Murat II founded Enderun, the school that raised many statesmen of the Ottoman Empire. His aim was to train young Christian boys who were adopted, trained as pages (devşirme) and later given advanced positions in the administration of the country. A distinctive feature of the Enderun and the basis for characterizing it as a school for gifted individuals is the highly selective way students were selected. In addition to requirements that included inherent beauty and physical health (Akarsu, 2001), acceptance as a gifted individual depended upon a measure of talent and capability (Akarsu, 1991). The curriculum included such areas as liberal arts, physical education, vocational education, music, integrating music and mathematics, and integrating living and education (Akarsu, 1991). Curricular options, which were related to the pages’ characteristics and strengths, were allied to fields of interest and ultimately their professional aspirations. The criteria for success were high (Akarsu, 1991). As time passed, the quality of education deteriorated by reason of the degeneration in the selection procedure and Enderun was closed.

After the collapse of Ottoman Empire and the establishment of independent Turkish Republic in 1923, a special law was established in 1947 supporting young and talented citizens who would ultimately introduce Turkey to the world (Altar, 1987). Two musicians Suna Kan and Idil Biret were the first individuals to benefit from this law. In areas other than the arts, in 1960 gifted children benefited from the first attempt to establish special classes. The first of such classes was opened in Ergenekon Primary School in Ankara. Students were selected on the basis of a score of 125 or more on an intelligence test. However, the attempt did not last too long (Akarsu, 2001).

The launch of Sputnik in the 1960s was significant. It underlined the importance of educating children to become scientists. At that time Turkey’s first science high school was opened in Ankara. It can be seen as the start of advanced science education at high school level. In 1964 the first students graduated. The school selected students with particular gifts in science and mathematics. Instruction was carried out by teachers from Middle East Technical University (METU or ODTÜ) in Ankara, Turkey’s capital city and from USA with the help of Bronx Science High School in New York (Akarsu, 2001).

Science high schools still exist in Turkey. Students are chosen according to results from a nationwide multiple-choice exam. Rather than simply providing an enriched curriculum, these schools promote acceleration with the aim of preparing students for careers in medicine, engineering and other sciences.

In 1990, İnanç foundation was established for the aim of opening a school to serve financially disadvantaged gifted and talented students. This foundation opened the boarding school Private İnanç Lycee with capacity to serve 300 children in 1993, after three years of preparation (TEVITÖL, n.d.). Later, due to financial problems the foundation financially supporting this school became Turkish Education Foundation (TEV). The name of the school was changed to Türk Eğitim Vakfı İnanç.
Türkeş Özel Lisesi (Turkish Education Foundation İnanç Türkeş Lycee [TEVİTOL]). TEVİTOL is still a high school for gifted students although it no longer serves economically disadvantaged pupils. It is not offering free tuition for all students and, in fact, tuition costs are very high. Most students get partial scholarships but only a few receive full scholarships.

In 1995, the first center for out-of-school enrichment activities for gifted students, i.e., the Science and Art Center (Bilim ve Sanat Merkezi-BILSEM), was established in Ankara. Today, there are approximately sixty BİLSEMs in different cities of Turkey offering enrichment activities in mathematics, science, and arts to selected students at preschool and primary school level. Admission to a BİLSEM is offered to primary school students based on age and according to students’ IQ scores.

Conservatories provided opportunities for students gifted and talented in the arts. After completing their first five years of primary school, musically talented students can take advantage of an education in public conservatories affiliated to universities. Admission to such schools is dependent upon success in special talent examinations. Regular education opportunities for gifted students have been provided since 2002 at the Beyazıt Ford Otosan Primary School, a project school under the auspices of Hasan Ali Yücel of Istanbul University’s Faculty of Education and Department of Gifted Education. Students attending Beyazıt classrooms represent equally those identified as gifted and those unidentified and registered by regular means (Davaslıgil and Avcı, nd).

As a weekend enrichment program, Üstün Yetenekliler Eğitim Programları (Education Programs for Talented Students [EPTS] or [ÜYEP]) is functioning since 2007 in Eskişehir as part of the Anadolu University Faculty of Education Department of Gifted Education. ÜYEP accepts twelve and thirteen year-old children attending seventh or eighth grade. The curriculum includes mathematics, science, and a character education program as well as summer programs for computer design, creative writing, creative drama and visual culture (ÜYEP, 2007).

**Issues of identification of giftedness in the literature**

Issues about the identification of giftedness in the literature are numerous but may be summarized under four headings:

- Underlying conceptualizations of giftedness
- Measurement process for identification purposes
- Profile of people identified
- Contextual factors

**Underlying conceptions of giftedness**

How giftedness is perceived in one country can be effective in shaping identification. For example, where giftedness is conceptualized as possessing levels of high intelligence, several theories of intelligence, e.g., Guilford's Structure of Intelligence Theory (1959), Gardner's Multiple Intelligences theory (1985), and Sternberg's Triarchic Theory of Intelligence (1985) are supportive of the concept. Each theory leads to a different framework for identification. Hany (1993) stated that placing the individual's developmental potential at the center of education is a reflection of the Western philosophy of education.

**The measurement process**

All is not well in this department. Sources of data are the main concerns in the identification process as well as the instruments. For example, Feldhusen and Jarwan (2000) claim the instruments and identification processes are reasons for unsatisfactory results such as underrepresentation of some subgroups within the population.

**Sources of data**

Collecting data from different sources is important for comprehensive conclusions about the students’ level or potential. Collecting data from only one source, i.e., testing via a single intelligence...
test, provides only a unidimensional measure which may, for example, favor stereotypical talents versus diverse talents. The application of multidimensional measures i.e., collecting from more than one source of evidence, appears to avoid such problems.

The instruments

Instruments are tools designed to facilitate examination of an individual’s operationalization of his or her potential for gifted behavior and there are measures considered appropriate for diverse cultural and economic groups, e.g., Kaufman Assessment Battery for Children and Raven's Progressive Matrices (Fraiser, 1993). However, measuring complex constructs associated with gifted behavior, for example, intelligence or creativity is not so easy. The task is made more difficult when the theoretical framework associated with the instruments leads to measures not representative of the norms of the culture. In this particular case, to rely heavily on IQ scores without due regard to the historical or cultural content of the test is to risk systematic discrimination against certain groups in the population (Goldstein, Haldane, & Mitchell, 1990).

Validity of any test, i.e., “the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests” (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 1999, p.9), is an essential element expected of quality instruments. Any significant differences between the cultural contexts in which the test is produced compared to those where the test is implemented are likely to impact validity negatively. In order to administer assessments standardized in a country other than that for which they were originally developed, adaptation is necessary. It may include translation and cultural modification which would be followed by a study of its propriety for the target culture (Deniz, 2007). For example, Peters (2011) suggests the validity of instruments should be subjected to statistical and subjective analysis for cases where different subgroups systematically show lower test performance.

Profile of gifted people

When levels of intelligence in human beings are of particular interest, it is generally assumed they will be dispersed along a continuum in a recognizable pattern. In theory, these levels spread out in both directions further and further above and below the mean around which most scores are clustered (64%). On the basis of this pattern and in the context of giftedness, individuals with higher levels of intelligence become less and less prevalent in a population. For example, only two percent of a population may be expected to possess extremely high levels of intelligence. Furthermore, within the gifted population considerable diversity may be found not only in terms of intelligence levels but also underrepresented groups. According to Feldhusen and Jarwan (2002) such groups or special populations may include handicapped gifted (better known as twice exceptional gifted), gifted underachievers, gifted females, and minority and other disadvantaged students.

Special populations

Feldhusen and Jarwan (2002) adopted the National Association for Gifted Children (NAGC) committee’s definition of Special Populations broadly defined to include individuals who, traditionally, have not been well represented. According to the NAGC’s Special Populations Network, (NACG, 2008) the population includes those whose circumstances or characteristics interfere with academic achievement, social or emotional growth, and optimal development of their potential, e.g., children with either culturally, linguistically or ethnically diverse backgrounds; gay, lesbian, bisexual, transgendered; highly and profoundly gifted and those impacted by geographically-related issues.

Twice exceptional gifted

Being twice exceptional infers an individual possesses both the characteristics of giftedness and some disability (Clark, 1992). Statistically speaking the probability is low with only four who are twice exceptional out of every 1000 gifted individuals. Identification of this group does present interesting problems whether the effort is to identify gifted people among those with disabilities in the general population or those with disabilities in a population of gifted individuals.
Twice exceptionality can present various reasons for underrepresentation. For example, handicapped people may be overlooked in any identification process and dismissed because of their disability; the superior ability of a gifted student, i.e., someone not typically expected to have a disability, may be masked by some disability; superior ability may mask some disability; or both the disability and the high ability masking each other. In any case, expectations by others of the child may not coincide with student's actual potential.

**Gifted underachievers**

Although there is no consensus of opinion regarding the definition of gifted underachiever, discrepancy between actual performance and the students' potential is a powerful indicator (Reis & McCoach, 2000). Identifying giftedness among students who did not perform well in school is a prominent issue. If achievement is a requirement of the identification procedure, then students who are, in fact, gifted, but for some reason are not high performers, may not be identified. Similarly, if the dominant perception of a gifted student is as a high achiever, then low achieving students may not even be referred for identification.

**Gifted females**

The fact girls take fewer places in higher levels of schooling, professions, and achievement in mathematics and science is another pressing concern (Gallagher, 1988). Bias, for example, seen in stereotyping a gifted person automatically as a male, provides both the reason for, and the result of underrepresentation. Such issues raise the question whether or not instruments used for identification are in biased and gender-fair.

**Minority and disadvantaged students**

The issue of underrepresentation of minorities in gifted programs appears especially pressing in the literature perhaps due to the fact that the majority of field-related literature emanates from the US - a multicultural country whose citizens come from various ethnic backgrounds. Two pertinent and typically well correlated issues in this context are having minority status and being disadvantaged. Historically, minorities were forced to take lower paid jobs that often resulted in limited access to social security and other financially related benefits. This in turn led to less social expectations, opportunities and ultimately reduced likelihood of children being identified as gifted. In addition to these issues, use of stereotypical notions taken from mainstream society and, in general, the culture-fairness of the instruments may cause additional problems.

**Context-related issues**

It is important to examine context-related issues impacting identification because every culture has unique features. As Hany (1993) suggested, the practicalities resulting from these features play a role in the identification of gifted people.

**Issues of identification in Turkey**

In addition to the universal issues discussed above, Turkey has its own issues, which are context-related. Those to be considered specifically include:

- Uniform understanding of education;
- Objectivity in assessment;
- Limited availability;
- Understanding the gifted child as an exceptional individual;
- Teacher training; and
- High stakes entrance examinations.

Differences between issues found in literature and what is observed in Turkey will be discussed and context-related issues will be elaborated in this section.
Underlying conceptions of giftedness

In Turkey, the formal definition of giftedness includes personal qualifications (e.g., intelligence, creativity, or leadership capacity) or specific interests (e.g., interest in arts, sports, special academic areas) (Milli Eğitim Bakanlığı [MEB], i.e., Turkish Ministry of Education, 2012). On one hand, on the basis of this definition, it is possible to estimate and incorporate into an identification process all of the above as well as other field-related measures. However, on the other hand, the definition does not take into consideration development over time. This can lead to an identification process that relies only on measures taken at one given moment in time. This can lead to the perception that giftedness is an entity that one either has or does not have.

Measurement process

Analyzing measurement processes as observed in countrywide identification and admission to individual programs reveals a holistic picture of conditions in Turkey. Guidance and Research Centers (Rehberlik ve Araştırma Merkezi [RAM]) provide countrywide service for identification of students with special needs. As of 2011, there are 205 RAMs in Turkey all associated with one center: MEB, under General Directorate Special Education Guidance and Counseling Services, Department of Guidance and Research Centers (MEB, 2012). These centers collect measures through referrals from parents or teachers (or other professionals in the field) and general screenings performed within school districts located in their area of responsibility (MEB, 2009) Each student has access to RAM’s identification services through general screenings even if they were not referred to RAM.

With a broad range of responsibilities and a limited number of personnel, RAMs prefer practical ways of measurement. In addition to identifying gifted students, RAMs also diagnose children with other special needs such as mental retardation and learning disability. They also provide guidance for all students in their district. In 2010, only 1,037 counselors worked in RAMs yet 36,599 students were identified as benefiting from special education services (MEB, 2012). Standardized tests are often used for identification purposes due to high workload in RAMs.

The specific programs for gifted are Beyazıt Ford Otosan Primary School, BİLSEMs, ÜYEP, and TEVİTÖL and each follow a different procedure for accepting students. For example, to apply for the Beyazıt Ford Otosan Primary School, applicants are required to obtain an intelligence test result evaluated by RAMs. A selection committee consisting of members of the department of Gifted Education Department in Istanbul University conducts several interviews with applicants. A list of eligible candidates is composed after initial and subsequent interviews with successful applicants are conducted (“www.beyazitk12.tr”, nd) Students selected for the BİLSEMs, i.e., afterschool enrichment programs, are referred by their teachers according to “Observation Form” criteria developed by MEB. Nominated students are evaluated by a group test followed by an individual test (Baykoç, Uyarolu, Aydemir, and Seval, 2012; MEB, 2007). Students wishing to attend BİLSEMs are also expected to hold a minimum GPA at school.

Admission in ÜYEP relies upon a combination of results taken from Mathematical Ability Test, Scientific Creativity Test and the mathematics and science achievement scores in their schools (Sak, 2011). Admission to TEVİTÖL follows three stages consisting of a general test, i.e., a countrywide multiple choice test measuring knowledge and aptitude to science and mathematics, an individual interview and an observation conducted at school (“www.tevitol.k12.tr”, nd).

An IQ test requirement is a common practice for applications to many gifted programs. Not surprisingly, common practice for nationwide identification shaped around this requirement. This way, measure of individual’s intelligence is placed at the center of identification procedure. This practice of placing individual’s capacity at the center of identification process reflects a Western understanding of education. However, as Turkish culture is a group-oriented culture, this practice may not be a good fit for Turkey. Taking needs of the society as well as individual’s potential can be a balanced approach for contemporary Turkish culture. All in all, measurement process is as an issue in Turkey.
Sources of data

Individual programs in Turkey seem to employ multidimensional measures to avoid favoring or overlooking some groups. Utilizing information from various sources is expected to portray students’ potential better. As mentioned above, RAMs and individual programs utilize different sources. Identification in RAMs depend highly on intelligence test scores whereas individual programs incorporate individual and group tests, referrals, school achievement, and take observations into account. Some programs utilize intelligence scores in addition to other sources.

Instruments

RAMs use instruments provided by Department of Psychological Measurement functioning under MEB. This department determines, obtains, reproduces, and distributes the instruments, and other tools and techniques. Some instruments require special expertise and certification for administration. Individual RAMs use different tests depending on qualifications of their employees. Wechsler Intelligence Scale for Children-Revised (WISC-R) and Stanford-Binet Intelligence Scale are commonly used in Turkey (Düzen, Şahin, Raven, and Raven, 2008). However, these instruments have not been developed in the Turkish context. Unless two or more trained and qualified professionals administer the WISC-III, the reliability of the instrument is significantly impacted.

Profile of gifted people

Special populations

Descriptive data about people identified as gifted does not yet exist in Turkey. There is a need for such information. Until such times as this information is available how they are represented in various groups of people will remain a mystery.

Twice-exceptional gifted

To enable the identification of gifted people among the disabled in the general population, data regarding people with disabilities should be examined. The “Turkey Disability Survey conducted by the State Institute of Statistics (̄[SIS] or Türk Istatistik Kurumu [TÜİK]) in 2002 (SIS, 2002) is the first and broadest information source about nationwide statistics on Turkish population with disability. Disability types examined in this study were orthopedic, visual, audial, and speech related. Other types of disabilities (e.g., learning disability, emotional and behavioral disability, autism) were not included. Overall the statistics portray a relatively wide picture of people with disabilities. If the range of examined disabilities were to be widened, it would increase the probability of identifying twice exceptional people.

Discussions about potential obstacles hindering identification of people with disabilities provide alternative solutions. Three main obstacles appear to impede identification: (a) access to identification procedures, (b) sources of data, and (c) nature of instruments. Although each student may expect access to RAMs’s services, appointments are accepted through referrals mostly from parents or teachers and rarely a professional in the field. RAMs need to administer general screening, because unless teachers and parents learn about twice-exceptionality, they may overlook potential especially if they only see signs of disability. If this happens, no referrals are made and no identification opportunities are offered.

In cases where students with disabilities do have access to identification, information collected about the student is crucial. During general screening held by RAMs, students with disabilities may not be provided with reasonable accommodations necessary to perform on the individual and group tests held by individual programs. To provide students special accommodations, institutions must have information about students’ disability prior to the screening, in order that they, for example, recruit enough personnel to administer test appropriately. In the absence of such attention a student’s potential may not be fairly represented.

Identifying disabilities among those identified as gifted is another way of looking at this issue.
From this perspective, statistics such as the proportion of people with disabilities among those identified as gifted would be informative. Because such statistics don’t exist, arguments about possible obstacles that can hinder gifted students from being identified with a disability can be helpful. Again teachers and parents of gifted students should be knowledgeable that they can still observe signs of disability in their children although he was identified as gifted. Sources of information collected can be also important. Both intelligence tests offered by RAMs, as well as individual and group tests offered by individual programs focus on students’ intellectual potential. Relying information only on students’ intellectual development may overlook any behavioral or emotional problems students are experiencing.

Identifying twice-exceptional individuals through general screenings or by measures done by individual programs is an issue in Turkey. This issue stems from limited range of recognized disabilities, utilizing teacher and parent referrals, and relying uni-dimensional measures.

**Gifted underachievers**

Three of the individual programs in Turkey (TEVİTÖL, BİLSEMs, and ÜYEP) require academic achievement as a criterion for selecting applicants. There is high demand and limited availability in these programs. The belief is that academic achievement is an indicator of students’ potential to perform well on forthcoming challenges and thus benefit from the program. However, setting only this criterion for identification can potentially lead to gifted students being overlooked because of low performance at school. Clearly identification of gifted underachievers is an issue in Turkey.

**Gifted females**

Gülgöz and Kağıtçıbaşı (2003) summarized the results of standardization of tests measuring intelligence commonly used in Turkey (Düzen, Şahin, Raven, & Raven, 2008). Tests included WISC-R, Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R), Analytical Intelligence Test, and Standard Progressive Matrices. Due to lack of data no evidence was found to suggest consistent gender difference, i.e., no evidence to support or reject underrepresentation of gifted females. Therefore, a balanced gender distribution is expected in the gifted population. Nevertheless, the fairness of the instruments regarding a sex bias is questionable.

**Minority and disadvantaged students**

Unlike the USA, Turkey can be considered as an amalgam consisting of different ethnic backgrounds blended long ago. Today, everyone who has a Turkish identity card is legally accepted as Turkish. Further background is not questioned in any legal registration. Because no further data is required with regard ethnic background the issue of who is or is part of a minority group does not exist.

On the other hand citizens with a lower socio-economic status (SES) can be considered as disadvantaged. Turkey is an A-rated country for late 2000s. It had the highest income equality with Chile and Mexico among Organisation for Economic Co-operation and Development (OECD) countries (OECD, 2011). Thus, large economical differences exist between SES groups. Such differences can threaten access to identification programs and educational opportunities. Authors also reported observing group differences in WISC-R scores in different SES groups (Savaşır & Şahin, 1995).

**Uniform understanding of education**

The administrative understanding shaping educational settings in Turkey is based on uniformity of opportunity and challenge by setting equal objectives, courses, and curriculum around the country, i.e., an understanding that “equal is fair”.

Turkey is a highly populated and relatively big country geographically. As such there are different regions each experiencing distinct climates and economic traditions, which, in turn, result in a variety student experiences. Irrespective, Turkish students nationwide are required to honor the
same objectives, experience the same evaluation based on the nationally established criteria for success. A central authority, in this case MEB, sets these uniform standards for everyone. Clearly some local environments are not helping all students to accomplish some goals. From this perspective, making every student compete in this way may not be fair.

Akarsu (2001) reported that this centralized management of education could be one of the reasons for misidentification of children. In such a uniform environment, gifted students who learn in different ways and constantly ask questions (Han, 2007) can be perceived as children who have learning difficulties or understanding problems. Many parents tell of children referred to RAMs by their teachers on suspicion of having a learning difficulty or problem in understanding the material. Diagnostic tests revealed that they were in fact gifted instead of having a learning problem. These cases appear to show how the uniform understanding of education limits recognition of extraordinariness of children.

Objectivity in assessment

As mentioned before, individual programs utilize students GPA information as an indicator of prior achievement whenever applicable. Although there are established criteria for evaluation of student grades (e.g., minimum points for passing grade), teachers are allowed to use their own initiative in adjusting student grades with oral exams, etc. Schools or regions can evaluate students according to a total class, school or district in a norm-referenced fashion especially when established criteria don’t fit to students’ learning environments. This raises a major concern in that while students’ grades are the same, they may not represent the same level of attainment of objectives. Grade, and therefore GPA, incongruence makes objectivity in identification an issue especially when students compete for selection and placement in gifted programs.

Difference in number of applicants and admissions

A discrepancy between supply and demand for educational opportunity is another contextual issue. Opportunities for gifted students are limited—certainly insufficient to satisfy the need. Due to these limitations the chances of admission to such a program are low. This creates the conditions for an environment in which identification and placement to gifted programs highly selective and competitive. These circumstances positively or negatively influence a full understanding of giftedness while raising the question: Is giftedness uni- or multi-dimensional?

Gifted child as the exceptional child understanding

Polyzoi and Haydey (2012) claimed that extreme level giftedness might not be limited by social and cultural context. However, if faced with choosing a small number of applicants only the brightest are chosen. Others, perhaps with lower levels of giftedness, are likely to be ignored. This scenario reinforces the perception that the gifted only consist of the very brightest, i.e., those with really exceptional and extreme levels of talent. It appears to be the case in Turkey where the understanding giftedness is contextual.

This issue also pertains to availability of opportunities. If the seats for extremely gifted students are insufficient in number (especially highly populated countries such as Turkey with having more than 80 million citizens), then even the individuals with extreme talents can have hard time finding a suitable place for their development.

Teacher training

Teachers play a prominent role in identification by referring and observing students. Teacher training in special education is therefore necessary to interpret students’ potential accurately. In the context of gifted education, there is only one education department offering teaching for gifted children as an undergraduate major and it only accepts 45 students per year ("Student Selection and Placement Center, Öğrenci Seçme Yerleştirme Merkezi [ÖSYM], 2012). Graduates from this department are employed as teachers for gifted students mostly in BİLSEMs and as classroom teachers in primary schools. In-service teachers’ capabilities should be also suitable to deal with children with special talents to some extent. In 2001, Akarsu (2001) noted that both pre-service and in-service teacher training lacks the necessary preparation to respond diverse educational demands of
gifted individuals. For example, differentiating instruction through teaching methods, timing, content, and instruments is not a focus of training.

In this context, Ficici and Siegle (2008) examined Turkish mathematics teachers’ perceptions of mathematically gifted students. They presented data indicating teachers ranked individuals with computational (arithmetic) skills more highly than those with creative problem solving skills and the ability to relate mathematics to the real world. To consider computational (arithmetic) skills the most valued indicator of mathematical giftedness is problematic as it negatively impacts accurate evaluation of giftedness. Improvements in teacher training may advance teachers’ awareness of giftedness, improve identification of giftedness and increase the quality of teacher referrals to RAMs.

Entrance examinations

Turkey subscribes to nationwide entrance examinations for both high schools and universities. Students take these exams in 6th, 7th, 8th grades and 12th grade. Students in 6th to 8th grades compete for entrance to better high schools which are thought to prepare them better for university entrance. Students must compete for admission as there are high numbers of applicants and limited availability. Admission to high schools and universities depends on students’ GPA and in an effort to ensure objectivity in such a large-scale assessment, students take exams consisting only of multiple-choice tests in science, mathematics, literature, and social sciences. Activities especially important to the typical highly able and creative student, e.g., creative thinking, solving ill-defined problems, probing, and asking questions, are not facilitated enough through identification and education. In fact, they are considered irrelevant and time consuming for exam preparation.

Discussion

The analysis of issues discussed in the literature can increase awareness. In particular consideration of issues associated with gifted education and found in different countries, helps understand common dilemmas, sufferings, and even possible opportunities. Such issues as summarized by Feldhusen and Jarwan (2002) are, for the most part, germane to conditions existing in Turkey. While rooted in the past, the identification of giftedness in Turkey is affected by current practical situations. The fact that Turkey is highly populated, has a centralized education system, provides limited opportunities for gifted students and teacher training for gifted students, while at the same time subscribes to high stakes exams raises many contextual issues related to identification of giftedness.

Different countries experience similar issues and thus also similar challenges. I believe that by defining specific contextual factors insights into ways and means by which problem issues may be overcome. Issues observed in Turkey’s group-oriented culture provide examples of how contextual situations shape the understanding of giftedness, identification procedure, and underrepresented groups in gifted population.

Conclusion

First of all, the themes examined in this paper are not isolated. They are intimately connected to culture, the practical situations, and the nature of the concept of being gifted itself. Trying to overcome a particular issue as if it is isolated from the context will not be an effective solution and yet suggesting solutions to work on all issues all at the same time will not be efficient. Some possible opportunities were provided here.

More gifted education opportunities are needed in Turkey. Existing education opportunities are limited. Providing alternatives (e.g., formal education and informal education) and variability of service (e.g., enrichment and differentiation) will increase, not only provision for those with identified needs, but also the variability of students in these programs.

Increasing parents’ and teachers’ awareness will increase the quality of identification. Breaking through prejudice with respect to gifted people can help diminish underrepresentation issues. And by increasing awareness in teachers, more effective referrals, assessments, instruction, and evaluation of students’ performance may be anticipated. With effective teachers analyzing talents more accurately, identification will be enhanced and recognized as being important throughout one’s lifetime. In the
early years it may help a student continuously receive support at various levels of education e.g., at primary, secondary, and tertiary levels. Students who graduate from institutions for gifted students can be given some advantages in continuing their education in another institution providing gifted education services. This would also ease students' burden of preparing for nationwide exams that may not be compatible with their gifted characteristics. This solution requires collaboration between institutions at different education levels.

**Limitations and further research**

This study is limited in that it depends largely on a literature review, observations, statistics provided by institutions, and empirical studies. Through examination of more empirical studies for the purpose of international comparisons our knowledge and methods of analyzing issues of giftedness in a particular context will be enhanced. Missing data from Turkey presented a further limitation. More data would contribute to a better picture and profile of gifted people. It is also important to note that only the practices of individual institutions were examined in this article. The theories upon which these institutions were founded were excluded from analysis.

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Gender Differences on the Concept of Wisdom: An International Comparison

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Abstract
The study aims to depict the most common ideas regarding wisdom from young people (ages 15-18) in Latvia, Lithuania, Mexico, Korea and the United States. A questionnaire was administered to nearly 800 adolescents from these countries and comparisons, by country and gender were made regarding participants perceptions of a wise man and a wise woman. Although differences were found between countries, more consistent differences by gender are reported. This research establishes three general traits to describe wise people: charismatic, goal-oriented, and unconventional. Also, participants consistently excluded a person from the concept of wise if they were poor, pessimistic, naïve, or inconsistent. A lack of values attached to the description of wisdom were found, and it is argued that school should foster the development of conceptions of wisdom as a desirable stage in human development that includes values such as justice, equity and respect for others. Difficulties in international comparative research are discussed.

Keywords: Gender differences; traits; conception of wisdom; comparative research.

Introduction
Wisdom and Culture

The concept of wisdom varies across cultures; however, few studies have attempted to establish differences and commonalities regarding this construct between different countries. Persson (2012) warns of the problems of cultural bias inherent in conducting research on giftedness across cultures and writes that social science researchers must be “aware of cultural variation and its impact on research validity,” (p. 36). Cross-cultural definitions of wisdom therefore depend on various issues such as cultural values, expectations, and ideals.

Baltes & Smith (2008), define wisdom as a system of expert knowledge, experience and judgment ability in main areas that relate to differences in cultural contexts and relativity of life. Sternberg (2004) claims that wisdom is the use of one’s intelligence and experience as mediated by values toward the achievement of a common good through a balance among our own interests and considering our environment in the long term. In general, wisdom is knowledge of what is true or right and it is related to judgment as to action, insight and problem solving skills. Sternberg (2003) argues that wisdom depends upon our ability to effectively balance between creative and analytical intelligence, interests of self and others, and short and long-term benefits when attaining one’s goals. Sternberg emphasizes the importance of cultural context as different things are seen as important in
different cultures. In some cultures, wise people are considered special and wisdom is commonly associated with giftedness and success in life.

There has been a growing interest in the psychological study of wisdom (Baltes & Smith, 1990; Clayton & Birren, 1980; Holliday & Chandler, 1986), and this has spawned several streams of scholarship. Among them are the formulation of life-span developmental theory (Lerner, 1984), the identification of positive aspects of aging (Alexander & Langer, 1990; Sinnott & Cavanaugh, 1991); and the search for new forms of intellectual functioning with presumed high ecological validity for the period of adulthood (Dixon, 1992; Dixon & Baltes, 1986; Simonton, 1988; Sternberg & Wagner, 1986).

Much of this work on wisdom, however, is theoretical and speculative rather than empirical, and few studies on cultural variations of wisdom and on differences and commonalities in the perception of wise people around the world.

**Wisdom around the world**

Worldwide, there are cultural differences in the conception of wisdom, though there are also some similarities. For example, different kinds of social skills and cognitive abilities are seen as important in most cultures, but there are variations on which features are the most important to a wise person.

In Finland, wise people are perceived as collaborative, persuasive, sophisticated and prudent (Raty & Snellman, 1992). In Latvia, wise people are perceived with high social skills and intrapersonal abilities, comprehensive knowledge and with adaptation and forecasting abilities (Ivanova & Račevska, 2010). In the United States and Australia, a wise person is associated with experience, knowledge and age; whereas in India and Japan wise people are depicted as discreet, aged and experienced (Takahashi & Bordia, 2000). These results suggest that cognitive dimensions are important in Western cultures; whereas emotional and cognitive are emphasized in Eastern, cultures (see also Kaufman & Lan, 2012).

A study of Taiwanese conceptions of wisdom revealed that three main components of wisdom as a process were cognitive integration, positive effects (activities resulting in profit for self and others) and embodiment of ideas into real life (Yang, 2008). Interestingly, there are different conceptions of wisdom in different professions (Sternberg, 1985). In Korea, intelligent people are associated with high social skills, ability to deal with new situations, problem-solving ability, self-control and practicality (Lim, Plucker & Im, 2002). Despite these findings, still there is much to explore about how wisdom is perceived in different cultures.

**Present study**

The purpose of this study is to describe and compare the concept of a wise person between adolescents in five different countries with significant cultural differences. This study was partly inspired by Glück, Strasser, and Bluck (2009) who reported small gender differences in abstract conceptions of wisdom, but larger differences when wisdom was contextualized. The present study also builds on the research of Ardelt (2009) who studied interpretations of wise men and women across two age cohorts: undergraduates and adults over the age of 52 in the United States. This cross-cultural research project was designed to test if these beliefs about wisdom would hold true with adolescents across five very different cultures.

**Assumptions about wisdom**

Aldwin (2009) reviews historical definitions of wisdom and suggests a definition of wisdom that includes “compassion, self-regulation, moral action, and social justice, as well as the fact that wisdom is a developmental process, (p. 1). In the present study, three assumptions are made regarding wisdom. The first relates to the tenet that, in an international comparison, the construct of wisdom is
moderated by perceptions values and experiences in a given cultural context that sustain a number of subjective concepts associated to wisdom, such as intuitive understanding, success in life, and happiness.

The second relates to the unavoidable association between the concept of intelligence, which is culture-specific, and its relation to wisdom. Across cultures, the conditions of intelligence seem to be a necessary but not a sufficient condition for wisdom: people can be intelligent without being wise. As Sternberg (2003) argued, merely smart people –who have not achieved wisdom-, are especially susceptible to egocentrism, omniscience, omnipotence and beliefs of invulnerability.

Third, the cultural variation in the perception of the term achievement seems to be important for determining one’s wisdom. Indeed, in the majority of cultures wisdom is not something to be inherited (such as giftedness and talents). Wisdom is a higher stage of human development, to be achieved after being exposed to our ability to reflect upon a number of life experiences and to turn pain, suffering and discomfort into valuable lesson about the sense of life. As Staudinger & Pasupathi (2003) theorize, wisdom is seen as the ideal destination of personal development.

Adolescents were selected as the target demographic for this study because these issues are regarded as important to educators. A conception of wisdom that enhances global economic prosperity and social harmony could be instilled in schools and families, and as some of the defenders of this new vision sustain, there is a profound realignment in fundamental human values within the emerging wisdom culture (Smith & Baltes, 1993).

Methodology

This is a cross-cultural study involving participants from five countries: Latvia, Lithuania, Mexico, Korea and the United States. Investigators in each country abided to demands, procedures, and regulations for research to human subjects and explained to participants the purpose of the study.

Participants

Adolescents selected to participate in the study responded to a paper and pencil questionnaire in their native language. All were in a school setting, and they accepted voluntarily to respond to the instrument. Participants included 843 adolescents between 15 and 19 years olds from five countries (see Table 1). Participants represented a balance in gender and age differences, due to sampling accessibility between the countries. Due to cultural differences in the structures of schools, Korean students were freshman at the college level, whereas Mexican, Latvian and Lithuanian students were in high school. American participants were enrolled in either high school or college.

Table 1: Participant characteristics.

<table>
<thead>
<tr>
<th>Country</th>
<th>Males</th>
<th>Females</th>
<th>Mean age</th>
<th>SD</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>México</td>
<td>104</td>
<td>75</td>
<td>17.18</td>
<td>1.3</td>
<td>179</td>
<td>21.23</td>
</tr>
<tr>
<td>USA</td>
<td>75</td>
<td>28</td>
<td>18.27</td>
<td>1.1</td>
<td>103</td>
<td>12.21</td>
</tr>
<tr>
<td>Lithuania</td>
<td>102</td>
<td>111</td>
<td>15.23</td>
<td>1.6</td>
<td>213</td>
<td>25.26</td>
</tr>
<tr>
<td>Korea</td>
<td>35</td>
<td>109</td>
<td>19.07</td>
<td>1.2</td>
<td>144</td>
<td>17.08</td>
</tr>
<tr>
<td>Latvia</td>
<td>100</td>
<td>104</td>
<td>15.03</td>
<td>1.1</td>
<td>204</td>
<td>24.19</td>
</tr>
<tr>
<td>Total</td>
<td>416</td>
<td>427</td>
<td>16.62</td>
<td></td>
<td>843</td>
<td>100</td>
</tr>
</tbody>
</table>

Measurement instrument

To explore the dimensions of wisdom, a scale assessing 25 pairs of adjectives arranged in opposites was develop for the study. Based on the literature, five dimensions were proposed around five major dimensions of wisdom: Social competence (cooperative-competitive), self-regulation (flexible-strict), social recognition (Respected-ignored), positive emotional disposition (joyful-serious) and personality traits (rebellious-obedient).
The instrument was first developed in English and then translated to Korean, Latvian, Lithuanian, and Spanish. Investigators in each country used the back translation method (Brislin, 1970) to ensure the appropriate meaning and sense of the expression across languages and cultures, in order to guarantee fair comparisons. Adaptations were made to preserve the sense and intention of the item rather than a strict translation. Two sets of items were then presented in a random order, one asking the participant to assess a wise woman and the other to assess a wise man. The alpha reliability coefficient was calculated for each version: English (.973), Spanish (.891) Korean (.759), Latvian (.821) and Lithuanian (.835).

Procedures
Participants were selected for participation in schools determined to be representative of the larger population by the researchers. In every country, data collections were conducted following the rules, demands and procedures of social research. In the United States, participants responded online to the instrument via the web. In all other countries, instruments were administered on paper to groups of students attending classes. In every case, participation was voluntary and students were informed of the purpose of the study and its confidential character. No identifying information was collected from participants to assure anonymity.

Data analysis
Regardless of the format and language, all instruments were transformed into a five point Likert scale per independent trait. Data were analyzed using SPSS. Comparisons were made by gender and country.

Results
Overview
A first exploratory analysis of the data using SPSS was carried out to identify those traits that are associated with wisdom in general, regardless of the country and gender of participants. The five most frequently chosen traits were: strong, respected, direct, creative, and flexible. The five least commonly chose were weak, poor, selfish, unnoticed, and pessimistic. However, differences were found by, country and gender as depicted below.

Differences by gender
T-tests were conducted to explore for gender differences. In general, gender differences were found in 52% of items. There were no gender differences in dimensions such as: individual-group oriented, influential-unnoticed, famous-unobserved, joyful-serious, inconsistent-persistent, and abstract-concrete. However, women more consistently identified wise people as: Optimistic, cooperative, extrovert and spontaneous, whereas men labeled wise people as strict, questioning and calculating. When compared by country, males showed different perceptions in every trait except for strict, competitive, and influential.

Wise men and women
Participants were asked to assess the characteristics of a wise man and a wise woman. To explore for commonalities amongst participants, factor analysis of principal components with varimax rotation were performed for a male wise person and a female wise person. In both analyses only the main factors were considered. Regarding a male wise person, 34.7% of the variance was explained by four main factors: personality, responsibility, goal oriented, and unconventional.

Interestingly, the main factor connoting a wise male included adjectives such as kind, warm, joyful, extrovert, optimistic, cooperative, and extrovert. All related to personality and they could be also clustered within the concept of aura, angel or charm. These results emphasise wise persons’ social skills, kindness, helpfulness that can be also seen in results from other studies. The second factor, a negative one, clustered factors associated to unwise people: pessimistic, naïve, inconsistent, and poor. The third factor pertains to goal achievement and it is associated with strict, competitive,
systematic, and planning. The fourth and last main factor connoting a wise man relates to his unconventional nature and relates to rebelliousness, lack of conformity, and notority.

Regarding a female wise person, 38.3% of the variance was explained by four main factors: social influence, responsibility, goal achievement, and unconventional. The first factor was labeled social influenced because it included to sets of different adjectives when compare those used to describe a male wise person. Clustered items could be categorized in two major lanes: intelligence and personality; the first clearly distinguishes wise women as strong, concrete, respected, and influential; the second mimics the first factor of a male wise person depicted as confident, warm, and kind. For a wise woman it was more explicit the identification of cognitive traits than for a wise male. As with the male figure, the second, third and fourth factors were the same.

**Differences by country**

ANOVAS were carried out to identify differences in some of the factors. In almost every trait there were statistically significant differences when compared by country. Exceptions to this were, in general, rebellious and extrovert. The Table 2 illustrates some of the biggest differences found.

Warm, creative, and cooperative seem to be important for Mexican, Latvians and Lithuanians, and they seem to be less important for Koreans and Americans. Individually oriented seem to be less important for Americans than for the rest of participants and social respect was the most salient for Lithuanians.

<table>
<thead>
<tr>
<th>Trait</th>
<th>MEX (X)</th>
<th>USA (X)</th>
<th>LT (X)</th>
<th>KOR (X)</th>
<th>LV (X)</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative</td>
<td>2.60 (1.29)</td>
<td>1.31 (1.14)</td>
<td>2.23 (1.35)</td>
<td>1.04 (1.80)</td>
<td>2.25 (1.40)</td>
<td>30.0</td>
<td>.001</td>
</tr>
<tr>
<td>Witty</td>
<td>2.47 (1.45)</td>
<td>2.00 (1.15)</td>
<td>2.81 (1.98)</td>
<td>2.11 (1.35)</td>
<td>3.05 (1.11)</td>
<td>16.3</td>
<td>.001</td>
</tr>
<tr>
<td>Cooperative</td>
<td>2.47 (1.42)</td>
<td>1.26 (1.48)</td>
<td>2.34 (1.31)</td>
<td>1.07 (1.97)</td>
<td>2.20 (1.40)</td>
<td>24.3</td>
<td>.001</td>
</tr>
<tr>
<td>Respected</td>
<td>2.31 (1.39)</td>
<td>1.40 (1.84)</td>
<td>3.18 (1.09)</td>
<td>1.48 (1.69)</td>
<td>2.90 (1.20)</td>
<td>61.6</td>
<td>.001</td>
</tr>
<tr>
<td>Generous</td>
<td>2.12 (1.47)</td>
<td>2.00 (1.15)</td>
<td>2.47 (1.26)</td>
<td>1.23 (1.24)</td>
<td>1.69 (1.40)</td>
<td>18.7</td>
<td>.001</td>
</tr>
<tr>
<td>Warm</td>
<td>2.10 (1.57)</td>
<td>1.60 (1.49)</td>
<td>2.40 (1.41)</td>
<td>.38 (1.63)</td>
<td>2.21 (1.35)</td>
<td>13.1</td>
<td>.001</td>
</tr>
<tr>
<td>Individual oriented</td>
<td>1.92 (1.41)</td>
<td>.50 (1.03)</td>
<td>1.37 (1.25)</td>
<td>1.20 (1.64)</td>
<td>1.87 (1.43)</td>
<td>7.9</td>
<td>.001</td>
</tr>
</tbody>
</table>

X (SD).

**Conclusions**

Various differences regarding the conception of wise men and women were found between countries as expected by the influence of culture. Likewise, differences were found by gender, these more consistent and obvious than those found by country. Findings thus support the idea of globalization and the force of gender being a specific influences eventually being stronger than nationality and cultural origin. Results show that cognitive, social, and emotional qualities are important to a wise person, similarly as wisdom has been defined after initial studies of this kind (Clayton & Birren, 1980).

From a global perspective, perhaps it is more useful to seek for commonalties and universal characteristics associated with the construct of wisdom. In this perspective, it is important to
underline the fact that wise women need to be recognized both cognitively and by personality, whereas wise men only need from the conative. Is this difference due to the remaining differences between men and women? Is this trend going to change over time?

Internationally, results from this study identify, first of all, some traits that will discard or exclude a person from the concept of wise: poor, pessimistic, naïve or inconsistent. On the other hand, wise men and women could be described as with three major traits: charismatic, goal oriented, and unconventional.

Discussion and recommendations

It is assumed across these cultures that wisdom is a desirable and positive characteristic of a person. As expected, many more differences were found by country that by gender. Projection is a major psychological event to be explored when investigating why people ascribe some traits to wise people. Global influences describe what is wise, but more importantly what is not. Although commonalities in these study give light into a global concept of a wise person, cultural and gender differences regarding the development of this conception require further research and consideration.

The gender differences suggest a need for educators to consider how the perception of wisdom is addressed in the curriculum. One of the important educational implications for this work is the need for educational programs for adolescents designed to challenge assumptions about how wise men and women are perceived around the world.

Potential for international research

One of the limitations of this study is the challenges and difficulties in doing cross-comparative research between cultures and countries. Translation of concepts deserves particular attention, since it was found in pilot stages of the instruments that strict translation did not always preserve the intention of the comparison among languages.

It is important to note that some of the differences by country were so many, that it was difficult to select which ones were worth comparing and analyzing. Thus, cluster analysis is important in exploring data and identifying venues of future research. To foster mutual understanding between cultures and people, future research on the construct on wisdom and the ways this can be taught to the next generation are needed.

References


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Confucian Values in Vietnamese Gifted Adolescents and their Non-Gifted Peers

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Abstract
The present study aims to examine the similarities and differences between Vietnamese intellectually gifted adolescents and their age-peers not identified as gifted in the adoption of traditional Confucian values and related levels of moral reasoning. In this study, 354 high school students (180 intellectually gifted adolescents and 174 students not identified as gifted), with equal numbers of males and females in each group, participated in a survey containing (1) the Confucian Value Scale that measures harmony, conservativeness, social responsibility, and self-control, and (2) the Defining Issues Test that measures moral reasoning. Analyses of variance show that Vietnamese intellectually gifted adolescents expressed higher levels of social responsibility, self-control, and moral reasoning than their peers who were not identified as gifted. Although both groups endorsed harmony with ethical conduct, the intellectually gifted group appeared to be less conservative than the latter. Implications of the study have been provided to school teachers, parents, counsellors, principals and educational policy makers, and especially to the gifted students.

Keywords: Gifted Adolescents; Confucian Value Scale; moral reasoning; Defining Issues Test; Vietnam.

Education has been highly valued and respected in Vietnam since the foundation of the nation approximately four thousand years ago. It has been cultivated in the minds of millions of Vietnamese people that education can change the life of a person, irrespective of their socio-economic status and or physical appearance (Harman & Nguyen, 2010). In other words, whether you come from a wealthy or underprivileged family, and whether you are of medium or limited height, education can change your life. In the year 1964, following a decree by Mr. Pham Van Dong, the then Prime Minister, in order to encourage students who had a passion for Mathematics, the Hanoi University cooperated with the Department of Education to organise an enrichment program for mathematically gifted learners. In September 1965, the first “special Mathematics class” was established (Nguyen, 2001). In the 1980s and 1990s, the expansion of those classes specialising in Literature, Foreign Languages, Physics, Chemistry, Biology, Informatics, History, and Geography, together with the establishment of several schools for gifted students, created a system of provisions for these talented learners. As shown in Table 1, Vietnam ranked third, with three gold medals and three silver medals in the 2007 International Mathematics Olympiad (IMO). Vietnamese students competing in the IMO were all from schools for gifted learners (IMO official website, 2007).

Table 1: Results by country in the 2007 International Mathematics Olympiad (IMO)

<table>
<thead>
<tr>
<th>No</th>
<th>Code</th>
<th>Name</th>
<th>Points</th>
<th>Gold Medal</th>
<th>Silver Medal</th>
<th>Bronze Medal</th>
<th>Honourable Mention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RUS</td>
<td>Russia</td>
<td>184</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>CHN</td>
<td>China</td>
<td>181</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>VIE</td>
<td>Vietnam</td>
<td>168</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>KOR</td>
<td>Korea, South</td>
<td>168</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>USA</td>
<td>United States</td>
<td>155</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>UKR</td>
<td>Ukraine</td>
<td>154</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>JPN</td>
<td>Japan</td>
<td>154</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>PRK</td>
<td>PDR of Korea (North Korea)</td>
<td>151</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>BUL</td>
<td>Bulgaria</td>
<td>149</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>TPE</td>
<td>Taiwan</td>
<td>149</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Vietnam focuses on providing the best learning facilities for students with an emphasis on creativity and a comprehensive education. In Vietnam, there are currently 64 administrative areas under the direct control of the government; in each of these administrative areas, there is at least one high school for gifted students. To be admitted to these specialised schools, gifted students are required to fulfil qualifying criteria based on their specialized subject area test scores and secondary schools grades.

Confucian ideology in Vietnam

Confucianism is an amalgamation of thoughts initiated by a Chinese scholar, Confucius, (551 - 479 BC) and his followers. It emphasizes themes such as harmonious relationships, benevolence, diligence, self-improvement, and life-long learning. Vietnamese have inherited the Chinese historical and philosophical ideas from their forefathers.

There are four prevalent values in Confucian philosophy: (a) the hierarchical relationship among people (Ding, 2003), which emphasizes the stability of society (Bi & D'agostino, 2004; Hofstede & Bond, 1988; Kennedy, 2002); (b) the family as a key unit, which emphasizes that everybody should act respectfully to others (Hofstede & Hofstede, 2005); (c) benevolence, which emphasizes unconditional love and care for people regardless of their origin, race, background, and social status (Hofstede & Hofstede, 2005); and (d) life-long learning, which emphasizes boundless enquiries and self-regulation (Cleary, 1992; Oldstone-Moore, 2002).

The Impact of Confucian ideology on Vietnamese culture and education

China influenced Vietnam for more than a thousand years. In the second century B.C., the Chinese reached the Red River Delta, which included Vietnam (currently North Vietnam). In subsequent decades, a number of revolts by Vietnamese locals erupted against the Chinese. In 938 AD, Ngo Quyen led a Vietnamese rebellion and defeated the Chinese army at Bach Dang River, concluding a one-thousand-year occupation by the Chinese (Ray, Dragicevich, & Louis, 2007). During that one millennium, Confucianism was introduced to Vietnam. The philosophy was embraced by Vietnamese as a guide to their personal and social life (Ashwill & Thai, 2005). Furthermore, as most Vietnamese inhabitants were descended from Chinese who had settled in Vietnam and become Vietnamese, they inherited Chinese historical and philosophical ideas from their forefathers (Murti, 1968; Papp, 1981; Taylor, 1983).

The cultural patterns (with rites and rituals) observed in Vietnam are somewhat a reflection of the system in China. Its proximity to China makes Vietnam heavily influenced by its largest neighbouring country in the following centuries after the Chinese left Vietnam. The trading and investment opportunities between the two nations have been constantly expanding. The most obvious similarity between China and Vietnam is their transition from socialist to market-oriented economies. The cultural and political features that the two countries share have in one way or another shaped the relationship of these two peoples. Out of the many cultural heritages transferred from China to Vietnam, Confucianism is the most prominent.

Moral reasoning

Morals are “social rules and norms intended to guide the conduct of people in a society” (Gyekye, 1996, p. 55). One distinctive feature of gifted adolescents to be examined in this study is their high level of moral reasoning.

It is important to differentiate between moral reasoning (sometimes referred to as moral judgment) and moral behaviour. According to Rest (1979), moral judgement is “the process by which a person arrives at a judgement of what is the moral thing to do in a moral dilemma” (p.18). It is a mental process to decide whether an idea is right or wrong in terms of moral values. It is a decision
made with specific reasons in mind, a philosophical tenet consisting of intentions and reasons that sustain the actions. Advanced moral judgment does not necessarily lead to advanced moral behaviour.

The cognitive approach to moral development has its origins in the work of Piaget (Penn & Collier, 1985). His stage theory was extended by Kohlberg (1976), who was interested in how moral decision-making and moral reasoning take place. Based on Kohlberg’s theory, an individual’s level of cognitive development will determine the constraints on his or her progression through the stages of moral development (Kohlberg, 1976, 1980; Rest, 1986b, 1988). Moral reasoning is a complex process where subjects are asked to analyse social problems and judge proper actions (Rest, 1986a).

**Rationale of the study**

In the field of gifted education, many studies relating to the development of the socio-emotional development of gifted learners have been conducted. It is worth noting that there are significant differences in the socio-emotional development of gifted children as compared to their non-gifted peers (Neihart & Tan, 2009; Neihart, 2006; Cross, 2005; Dabrowski, 1964; Delisle & Galbraith, 2002; Hébert & Kent, 2000; Hébert & Speirs-Neumeister, 2002; Hollingworth, 1942; Matthews, 1999; Neihart, Reis, Robinson, & Moon, 2002; Piechowski, 1997; Silverman, 1993; Tuttle & Becker, 1983; VanTassel-Baska, 2003; Whitmore, 1980).

As gifted adolescents also experience all the changes that occur in normal adolescents, they have a “unique set of developmental circumstances that can reach beyond the normal dimensions” (Buescher, 1985, p.11). Gifted children have socio-emotional needs like normal children, but coupled with their advanced cognitive development, their emotional needs are often intensified (Milgram, 1993; VanTassel-Baska, 2003). If these needs are not met, it might lead to increased risk for social isolation and depression (Moon, 2004; Schuler, 1999; Tomlinson, 2004). Gifted students may be extraordinarily sensitive to the feelings of other people, and, because of this capacity to empathize, they may become concerned with ethical concerns much earlier than their non-gifted peers. Vietnamese gifted students, with their unique social and emotional development, are under the strong influence of Confucianism, a philosophy deeply endorsed by generations of Vietnamese since the early days of history. Our study aims to examine, through a large-scale survey, the similarities and differences between Vietnamese intellectually gifted adolescents and their non-gifted peers in the adoption of traditional Confucian values and related moral reasoning.

**Method**

**Participants**

In this study, 354 high school students (including 180 intellectually gifted adolescents and 174 non-gifted students) participated in a survey containing (1) the Confucian Value Scale with 40 items that measures four constructs in this domain, and (2) the Defining Issues Test (DIT), a psychometric test with high reliability and validity, designed to measure levels of moral reasoning. Gifted students were selected from Le Quy Don gifted high school, a school for gifted students in Danang city in central part of Vietnam. Students not identified as gifted were selected from Thai Phien and Thanh Khe comprehensive high schools in Danang, Vietnam.

**Instruments**

The Confucian Value Scale was devised initially on the basis of previous studies (Chinese Culture Connection, 1987; Chiu, Wong, & Kosinski, 1998; Hofstede, 1991; Lu, Cooper, Kao, & Zhou, 2003; Matthews, 2000; Wong, 2004). The revised version has been verified by means of a series of factors analyses (Nguyen, Jin, & Gross, 2010). The new version of the Confucian Value
Scale yields four factors, namely, harmony based on ethical conduct, conservativeness, social responsibility, and self-control.

Table 2: Pattern matrix of factor analysis.

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patriotism</td>
<td>.635</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reciprocation of greetings, favours, and gifts</td>
<td>.609</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance to corruption</td>
<td>.599</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filial piety</td>
<td>.539</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of righteousness</td>
<td>.468</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry (working hard)</td>
<td>.442</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordering relationship by status and observing this order</td>
<td>.433</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmony with others</td>
<td>.433</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solidarity with others</td>
<td>.421</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humbleness</td>
<td>.416</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sincerity</td>
<td>.391</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benevolent authority</td>
<td>.389</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courtesy</td>
<td>.354</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Thrift</td>
<td>.318</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loyalty to superiors</td>
<td>.543</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being conservative</td>
<td>.506</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation of rites and rituals</td>
<td>.465</td>
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<tr>
<td>Repayment of both the good and the evil that another person has caused to you</td>
<td>.402</td>
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<td></td>
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<tr>
<td>Adaptability</td>
<td>.718</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Trustworthiness</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Prudence (Carefulness)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Persistence (perseverance)</td>
<td>.516</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Personal steadiness and stability</td>
<td>.414</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge (Education)</td>
<td>.392</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protecting your &quot;face&quot;</td>
<td>.386</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wealth</td>
<td>.360</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderation, following the middle way</td>
<td>.343</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>A close, intimate friend</td>
<td>.321</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having a sense of shame</td>
<td>.320</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-competitiveness</td>
<td>-.637</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having few desires</td>
<td>-.490</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contentedness with one's position in life</td>
<td>-.463</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tolerance of others</td>
<td>-.353</td>
<td></td>
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</tr>
</tbody>
</table>

Rotation converged in 12 iterations.

The Defining Issues Test (DIT) was first developed by James Rest in 1972. It was based on Kohlberg’s research, which examined moral reasoning and cognitive development. Since its first use, hundreds of studies have tested thousands of subjects. The DIT possesses adequate reliability with coefficients usually in the .70 and .80 (Rest, 1986c). It consists of six stories involving unresolved moral dilemmas. The subjects are required to peruse the dilemmas and, subsequently, read 12 statements about the each scenario. They are then requested to rate the importance of each statement in deciding whether to follow or not a certain course of action suggested in the story. Once this has been completed, students are required to select what they believe are the four most important statements relevant to the story and place those sentences in order of importance. Once participants have indicated the importance of each statement, they rank them as “the most important”, “second
most important”, “third most important”, and “fourth most important.” The statements are written in a way so as to represent the different moral dilemmas.

Procedure

The Defining Issues Test (DIT) and Chinese Values Survey (CVS) were translated into Vietnamese and back-translated into English to ascertain that the Vietnamese translation was accurately produced. Several changes were subsequently made to the Vietnamese version to ensure that the participants would understand the dilemmas. Before the large scale project was carried out, a pilot study was conducted with the participation of 20 students. The aim of the pilot study was to ensure that students fully understood the stories and the situations in the DIT and the CVS. After consultation with the students in the pilot study who filled in the questionnaires and with several researchers in linguistics, the DIT and CVS were amended with minor changes, and the final versions of the DIT and CVS were then ready to be distributed.

The ultimate goal of the questionnaire was to learn about the participants’ opinions on social issues and cultural aspects. Students were given 40-50 minutes to complete the questionnaires after which they submitted them to the captain of the class. The researchers collected the questionnaires from the captains.

Results

A series of 2 (group: gifted versus not identified as gifted) × 2 (gender: males versus females) analyses of variance (ANOVA) were conducted on Confucian values and moral reasoning. Among the key differences between the two groups of students, the most striking feature is that gifted students disagreed with conservatism, whereas the non-gifted students recognised conservatism as unimportant or neutral in their responses. Details are shown below.

Table 3: Descriptive statistics for each Confucian value.

<table>
<thead>
<tr>
<th>Confucian Values</th>
<th>Gifted</th>
<th>Non-Gifted</th>
<th>Std Deviation</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Descriptive Interpretation</td>
<td>Mean</td>
<td>Descriptive Interpretation</td>
</tr>
<tr>
<td>Filial Piety</td>
<td>4.56</td>
<td>Strongly agree</td>
<td>4.53</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Industry (working hard)</td>
<td>4.20</td>
<td>Strongly agree</td>
<td>4.04</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Tolerance of others</td>
<td>3.89</td>
<td>Agree</td>
<td>3.80</td>
<td>Agree</td>
</tr>
<tr>
<td>Harmony with others</td>
<td>4.11</td>
<td>Strongly agree</td>
<td>4.04</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Humbleness</td>
<td>3.87</td>
<td>Agree</td>
<td>3.84</td>
<td>Agree</td>
</tr>
<tr>
<td>Loyalty to superiors</td>
<td>3.43</td>
<td>Agree</td>
<td>3.50</td>
<td>Agree</td>
</tr>
<tr>
<td>Observation of Rites</td>
<td>3.52</td>
<td>Agree</td>
<td>3.67</td>
<td>Agree</td>
</tr>
<tr>
<td>Reciprocation of greetings, favours, and gifts</td>
<td>4.27</td>
<td>Strongly agree</td>
<td>4.29</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Kindness</td>
<td>4.19</td>
<td>Strongly agree</td>
<td>4.10</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Knowledge (Education)</td>
<td>4.22</td>
<td>Strongly agree</td>
<td>4.02</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Solidarity with others</td>
<td>3.98</td>
<td>Agree</td>
<td>4.12</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Moderation, following the middle way</td>
<td>3.87</td>
<td>Agree</td>
<td>3.57</td>
<td>Agree</td>
</tr>
<tr>
<td>Self-culturation</td>
<td>4.25</td>
<td>Strongly agree</td>
<td>3.94</td>
<td>Agree</td>
</tr>
<tr>
<td>Ordering relationship by status and observing this order</td>
<td>3.86</td>
<td>Agree</td>
<td>4.06</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Sense of righteousness</td>
<td>4.11</td>
<td>Strongly agree</td>
<td>4.16</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Benevolent authority</td>
<td>3.99</td>
<td>Agree</td>
<td>3.92</td>
<td>Agree</td>
</tr>
<tr>
<td>Non-competitiveness</td>
<td>3.00</td>
<td>Agree</td>
<td>3.41</td>
<td>Agree</td>
</tr>
<tr>
<td>Personal steadiness and stability</td>
<td>3.97</td>
<td>Agree</td>
<td>.705</td>
<td>3.82</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------</td>
<td>-------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Resistance to Corruption</td>
<td>4.37</td>
<td>Strongly agree</td>
<td>.708</td>
<td>4.21</td>
</tr>
<tr>
<td>Patriotism</td>
<td>4.45</td>
<td>Strongly agree</td>
<td>.679</td>
<td>4.43</td>
</tr>
<tr>
<td>Sincerity</td>
<td>4.09</td>
<td>Strongly agree</td>
<td>.707</td>
<td>4.10</td>
</tr>
<tr>
<td>Keeping oneself disinterested and pure</td>
<td>3.87</td>
<td>Agree</td>
<td>.733</td>
<td>3.97</td>
</tr>
<tr>
<td>Thrift</td>
<td>3.88</td>
<td>Agree</td>
<td>.690</td>
<td>3.89</td>
</tr>
<tr>
<td>Persistence (Perseverance)</td>
<td>3.92</td>
<td>Agree</td>
<td>.659</td>
<td>3.72</td>
</tr>
<tr>
<td>Patience</td>
<td>3.97</td>
<td>Agree</td>
<td>.815</td>
<td>3.82</td>
</tr>
<tr>
<td>Repayment of both the good and the evil that another person has caused to you</td>
<td>3.13</td>
<td>Agree</td>
<td>.969</td>
<td>2.99</td>
</tr>
<tr>
<td>A sense of cultural superiority</td>
<td>3.74</td>
<td>Agree</td>
<td>.814</td>
<td>3.76</td>
</tr>
<tr>
<td>Adaptability</td>
<td>3.93</td>
<td>Agree</td>
<td>.725</td>
<td>3.65</td>
</tr>
<tr>
<td>Prudence (Carefulness)</td>
<td>3.97</td>
<td>Agree</td>
<td>.593</td>
<td>3.90</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td>3.93</td>
<td>Agree</td>
<td>.767</td>
<td>3.65</td>
</tr>
<tr>
<td>Having a sense of shame</td>
<td>3.63</td>
<td>Agree</td>
<td>.819</td>
<td>3.58</td>
</tr>
<tr>
<td>Courtesy</td>
<td>4.02</td>
<td>Strongly agree</td>
<td>.713</td>
<td>3.97</td>
</tr>
<tr>
<td>Contendedness with one's position in life</td>
<td>2.62</td>
<td>Neutral</td>
<td>.998</td>
<td>3.10</td>
</tr>
<tr>
<td>Being conservative</td>
<td>1.84</td>
<td>Disagree</td>
<td>1.058</td>
<td>2.11</td>
</tr>
<tr>
<td>Protecting your face</td>
<td>3.64</td>
<td>Agree</td>
<td>.803</td>
<td>3.55</td>
</tr>
<tr>
<td>A close, intimate friend</td>
<td>4.03</td>
<td>Strongly agree</td>
<td>.797</td>
<td>3.83</td>
</tr>
<tr>
<td>Chastity in women</td>
<td>3.82</td>
<td>Agree</td>
<td>.958</td>
<td>3.83</td>
</tr>
<tr>
<td>Having few desires</td>
<td>2.66</td>
<td>Neutral</td>
<td>.994</td>
<td>3.20</td>
</tr>
<tr>
<td>Respect for Tradition</td>
<td>3.91</td>
<td>Agree</td>
<td>.784</td>
<td>4.08</td>
</tr>
<tr>
<td>Wealth</td>
<td>3.94</td>
<td>Agree</td>
<td>.710</td>
<td>3.84</td>
</tr>
</tbody>
</table>

**Confucianism Construct I: Harmony based on Ethical Conduct**

This construct includes the following items: patriotism; reciprocation of greetings, favours and gifts; resistance to corruption; filial piety; sense of righteousness; industry (working hard); ordering relationship by status and observing this order; harmony with others; solidarity with others; humbleness; and sincerity. No significant differences were found by group, gender, or group × gender interaction. Therefore, no table is reported.

**Confucianism Construct II: Conservativeness**

This construct includes the following items: loyalty to superiors, being conservative, observation of rites and rituals, and repayment of both the good and the evil that another person has caused you. As demonstrated in Table 4, the group effect was found to be significant, $F(1,350) = 7.95, MSE = 5.16, p = .005 (p < .01)$, indicating that gifted students ($M = -.09; SD = .85$) have lower level of endorsement for the factor “conservativeness” than non-gifted students ($M = .10; SD = .76$). No significant differences were found by gender or group × gender interaction.

**Table 4: ANOVA on Conservativeness**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
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<td>5.164</td>
<td>7.945</td>
<td>.005</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.379</td>
<td>.583</td>
<td>.446</td>
</tr>
<tr>
<td>Group × Gender</td>
<td>1</td>
<td>2.046</td>
<td>3.148</td>
<td>.077</td>
</tr>
<tr>
<td>Error</td>
<td>350</td>
<td>.650</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Confucianism Construct III: Social Responsibility

This construct includes the following items: adaptability; trustworthiness; prudence (carefulness); persistence (perseverance); personal steadiness and stability; knowledge (education); protecting your "face;" wealth; moderation; following the middle way; a close, intimate friend; and having a sense of shame. As expressed in Table 5, the group effect was found to be significant, \( F(1,350) = 12.72, MSe = 9.91, p = .000 \) \((p < .001)\), indicating that gifted students \((M = .20; SD = .90)\) have higher level of endorsement for the factor “social responsibility” than do non-gifted students \((M = -.20; SD = .86)\). No significant differences were found by gender or group \(×\) gender interaction.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>9.907</td>
<td>12.718</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.260</td>
<td>.334</td>
<td>.564</td>
</tr>
<tr>
<td>Group (×) Gender</td>
<td>1</td>
<td>1.459</td>
<td>1.873</td>
<td>.172</td>
</tr>
<tr>
<td>Error</td>
<td>350</td>
<td>.779</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Confucianism construct IV: Self-control

This construct includes the following items: non-competitiveness, having few desires, contentment with one's position in life, and tolerance of others. As depicted in Table 6, the group effect was found to be significant, \( F(1,350) = 17.77, MSe = 11.74, p = .000 \) \((p < .001)\), indicating that gifted students \((M = .17; SD = .86)\) have higher level of endorsement for the factor “Self-control” than non-gifted students \((M = -.18; SD = .76)\). No significant differences were found by gender or group \(×\) gender interaction.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>11.741</td>
<td>17.774</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>2.468</td>
<td>3.737</td>
<td>.054</td>
</tr>
<tr>
<td>Group (×) Gender</td>
<td>1</td>
<td>.104</td>
<td>.157</td>
<td>.692</td>
</tr>
<tr>
<td>Error</td>
<td>350</td>
<td>.661</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Moral reasoning

Moral reasoning is also a variable to be examined in this study, together with Confucian values. As shown in Table 7, the group effect on moral reasoning was found to be significant, \( F(1,350) = 7.38, MSe = 610.50, p = .007 \) \((p < .01)\), indicating that gifted students \((M = 27.16; SD = 10.04)\) have higher scores of moral reasoning than non-gifted students \((M = 24.12; SD = 8.11)\). The gender effect was also found to be significant, \( F(1, 350) = 5.51, MSe = 456.14, p = .019 \) \((p < .05)\), indicating that female students \((M = 26.68; SD = 9.42)\) have higher scores of moral reasoning than male students \((M = 23.88; SD = 8.70)\). The group \(×\) gender interaction effect was not significant.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>610.497</td>
<td>7.382</td>
<td>.007</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>456.144</td>
<td>5.516</td>
<td>.019</td>
</tr>
<tr>
<td>Group (×) Gender</td>
<td>1</td>
<td>2.104</td>
<td>.025</td>
<td>.873</td>
</tr>
<tr>
<td>Error</td>
<td>350</td>
<td>82.702</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Moral reasoning is an act of arguing in one’s mind whether an idea is ethically right or wrong. High moral reasoning levels do not necessarily lead to high moral actions. If a person possesses high moral reasoning, it means he or she needs to account for various factors to show whether a specific action is appropriate and relevant to the current situation. High moral reasoning indicates a complex and interwoven argument in a person’s minds to undertake a particular action, arguing back and forth and giving weights to two sides of an argument. In this research project, results indicate that...
Vietnamese gifted students had higher scores of moral reasoning than their non-gifted peers. This has been supported by previous studies, which indicate that gifted students have higher levels of moral reasoning than their non-gifted peers. Gifted students reportedly endorse moral issues with complex and intricate thinking patterns (Gross, 1994; Hollingworth, 1942). Gifted students differ from their non-gifted peers not only in their academic agendas but also in their socio-emotional development. The hypothesis that gifted students have higher levels of moral reasoning than the non-gifted students was supported by the findings of our study, as measured by the DIT.

The relationship between moral reasoning scores (DIT) and gender was also examined in our study. We found that female students had higher scores of moral reasoning than male students. This finding is in contrast to the claims held by Kohlberg (1976) and Rest (1988) who found no significant differences in gender for the DIT in Western samples. The East Asian culture emphasizes the females’ caring role (Jin, 1992, 2010). This cultural influence may contribute to the gender difference in moral reasoning among Vietnamese students. The results of our study imply that more curriculum development support are needed to achieve the best learning outcomes for students, especially gifted female students.

With regard to Confucian values, Vietnamese gifted students and their non-gifted peers differ in the ideology of conservativeness. It was found that gifted students have a lower level of endorsement for the factor “conservativeness” than non-gifted students; i.e., gifted students are less likely to oppose liberal reforms, less resistant to changes, and less conforming to conventions than non-gifted students. Vietnamese gifted students are eager to keep up-to-date knowledge and are willing to create changes within their living environments. The more these students are exposed to world knowledge, the more open-minded they become. As knowledge seekers, these intellectually gifted students are always in search of new ideas and innovative information. This differentiates intellectually gifted students from their non-gifted counterparts. The intellectually gifted students are not as inclined to assume conservative views and are more willing to commit changes.

In terms of “social responsibility”, it appears that Vietnamese gifted students have higher levels of endorsement for this value than non-gifted students. This is an important finding of the study. Social responsibility refers to the commitment to behave in a socially ethical manner, to contribute to the socio-economic developments and quality of life for the whole community. The ideology behind this factor is that gifted students are more inclined to feel that they bear more accountability for the future of society and their communities than do non-gifted students. Gifted students see themselves as active members of society. This is due, in part, to the cultural environment in which gifted students are raised.

The school culture also plays a significant role in establishing gifted students’ duty towards society. However, it is mostly because of the gifted students’ mature minds as compared to those of non-gifted students. The difference between the two investigated groups is significant, which means gifted students experience higher level of social responsibility towards society than their non-gifted peers. They feel that, as members of the community, they are responsible for the well-being of society. This also shows a high level of socio-emotional development in gifted students in comparison to non-gifted students.

As to the aspect of “self-control”, Vietnamese gifted students tend to have a higher level of endorsement for this facet than non-gifted students. Gifted students recognize that, in order to succeed, they need to identify various ways to control their feelings and understand what the best course of actions for them is. Gifted students tend to feel more confident in the management of their emotions compared to their non-gifted counterparts. As Vietnamese gifted students possess a high degree of self-control, they understand themselves better and master their emotions more effectively. This is connected to their keenness in competing in the world arena. It is highly recommended that gifted students engage in activities that connect them with the world, creating opportunities to compete with students in other nations.
Implications for school teachers

Based on our study’s findings, Confucian values play a significant role in the socio-emotional development of Vietnamese gifted adolescents. Therefore, it is essential that specific acceleration programmes be included in the curriculum design of classes for these gifted learners. Recommended by the American National Association of Gifted Children, the Parallel Curriculum Model is an integrated framework to cater to the needs of gifted learners. It includes a Core Curriculum, a Curriculum of Connections, a Curriculum of Practice, and a Curriculum of Identity. While the Core Curriculum addresses the key concepts, principles, and skills of a discipline, the Curriculum of Connections includes guidelines and procedures to connect overarching concepts. At the same time, the Curriculum of Practice helps students understand, use, generalize, and transfer knowledge, and the Curriculum of Identity works on the notion of self-actualisation and is based on reflections of personal experiences. Our findings on the socio-emotional development of Vietnamese gifted adolescents should be used to extend the model and include a Curriculum that focuses on Confucian philosophy. The core competencies of this Curriculum might include self-awareness, social awareness, self-management, and interpersonal skills. These soft skills are important contributing factors to the success of gifted students. This could be another addition to the qualitatively differentiated curriculum for gifted learners in Vietnam. Notably, such a curriculum could also be added to the education of students from East Asian countries, or students from East Asian backgrounds, who have migrated to the U.S.A., Canada, France, or Australia. This study, thus, increases teachers’ knowledge of the unique socio-emotional development of these groups of learners and draws important implications for curriculum development.

Implications for parents

Families play a significant role in the realization of a child’s potential. Home environments create an atmosphere where children are free to develop a unique identity. Families foster creativity and intellectually stimulate children’s development. The positive role of the family affects gifted students’ attitudes towards education and later their attitudes towards life. Confucian values are transferred from one generation to the next, and the familial environment is where these values are nurtured. Obviously the social world of a child begins within family members. On these grounds, the parental role is to assist their gifted children, especially through their adolescent years, to build social networks that can give them emotional support (Subotnik & Olszewski-Kubilius, 1997). Parents greatly influence children’s motivation to achieve and various patterns of family styles may lead to different trajectories of their children’s socio-emotional development. Parents need to establish good relationships with their children and to allow for open discussion of ideas and independent thinking. Parents should also take into account students’ Neo-Confucianism, in which they are very competitive in their endeavour to obtain knowledge of the world. Parents should create every opportunity for their children to adapt to a modern lifestyle and to persist in their quest for knowledge. Vietnamese gifted students also value trust. Thus, the role of family members, especially parents, is to build children’s faith and belief in others. It is essential that these students are provided with opportunities by their parents to be successful both academically and socially.

Recommendations for the enhancement of parent-teacher cooperation

Teachers and parents have close contact with gifted students. There should be parent-teacher cooperation to provide the best environment for gifted students. Our study indicated that Vietnamese gifted students express strong endorsement for social responsibility and self-control. Extra-curricular activities, which advocate these two features, will contribute to boosting students’ confidence and increasing their social engagement in society. Gifted students need assistance from adults, especially their parents and teachers, to guide them in establishing priorities, to reflect on past experiences, and to resolve conflicts. These adults should also give gifted adolescents emotional support and assist them in building social networks. They should create opportunities for these gifted students to be involved in charity events, donation activities, and volunteer placements. Through these activities, interpersonal and social skills, especially leadership skills like planning and organizing, can be promoted. In recognition of the high degree of capacity in social responsibility and self-control of
gifted students, a variety of counselling approaches should be made available to Vietnamese gifted students. With appropriate counselling, students will feel less pressured and their talents can be transformed into academic excellence, thereby making valuable contributions to society.

**Conclusion**

Vietnam, a South East Asian country, has been immensely influenced by Confucian ideology. This heritage has been transferred down generations, and has greatly affected the development of the love of learning in Vietnamese intellectually gifted adolescents. The purpose of the study is to compare the two groups (Vietnamese gifted students and their non-gifted peers) in terms of the adoption of Confucian values and moral reasoning. A total of 354 high school students participated in a survey containing 40 items that were selected from previous studies published in scholarly English journals on the adoption of Confucian values in various cultural settings. The Defining Issues Test, a psychometric test with high reliability and validity widely used in Western cultures, was utilized in the study to measure moral reasoning in gifted students and their non-gifted peers.

Exploratory factor analysis using oblique rotation (SPSS 18.0) eliminated six items and yielded four correlated factors with high factor loadings: (1) harmony based on ethical conduct, (2) conservativeness, (3) social responsibility, and (4) self-control. These four factors constitute a scale to measure the endorsement of Confucian values in Vietnam as well as other countries whose cultures are influenced by Confucianism. Additionally, a multi-variate analysis of variance revealed that Vietnamese intellectually gifted adolescents expressed higher levels of social responsibility, self-control, and moral reasoning than their non-gifted peers. Although both groups endorsed harmony with ethical conduct, the gifted students appeared to be less conservative. The features experienced by Vietnamese gifted adolescents are considered Neo-Confucianism, an adaptive version of Confucianism in modern time. Implications of the study have been provided to school teachers, parents, counsellors, principals and educational policy makers, and especially to the gifted students. The study hopes to lead to future directions in the research of psychosocial developments of gifted students in Vietnam in particular and Confucianism-influenced countries in general.

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The German Project Called „Triangelpartnerschaften“ (triangle partnerships): Can Music Bridge the Intergenerational Gap?

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Abstract
The authors of this article believe intergenerational projects provide appropriate solutions to this complex phenomenon. With this in our mind, we present the story behind a unique German program involving gifted young people which is designed to bring different age groups together in order to perform and share experiences through music. The program is called “triangle partnerships” because three institutions (a school, a university and a home for the elderly) working together to realize this vision – using music to bridge the intergenerational gap. We hope this idea will catch on and be duplicated beyond the borders of Germany. Imagine seeing and hearing young and old singing together on a weekly basis and a band with a senior citizen playing on the drums!

Keywords: Intergenerational projects; German music; community services; triangle partnership.

“The great aim of education is not knowledge, but action!” (Herbert Spencer)

Introduction
A problem addressed by many industrial nations today and one we experience in Germany, i.e., population changes and socialized medical insurance policies, exacerbate generational separation. For example, on one hand, many young people seem to prefer a very non-economic and energy-inefficient life-style (including living alone in single apartments and preferring to eat unhealthy fast food). The elderly, on the other hand, may find themselves removed far away from their familiar environment and placed in community homes where they are seldom visited because of lack of time and, or other priorities. Many new challenges are a consequence wrought of such ways of living. We have to accept these challenges and find sustainable solutions that take into consideration emerging needs of a younger generation, while, at the same time, respecting the needs and wishes of our more elderly population.

To contemplate and implement any such intergenerational program raises questions and thus also demands considerable thought. We will therefore examine the project in closer detail, field a number of questions and offer some other considerations which, in aggregate, address the following question: How may education help to bridge the gap between generations?

Accordingly, our examination of the project will include a look at its historic and scientific background, why it is important and what it means specifically to involve gifted students in triangle partnerships. In particular, we will shed light on the Lower Saxony experience, the scientific and technical support received for the project, results and practical experiences of the intergenerational music education and the results of the scientific survey of the project. We will also look at who emerge as winners, prospects for transferring this model, the challenges and opportunities of intergenerational music education and what students can do.
Historic background

Giuseppe Verdi, the great opera composer, when asked about his greatest work, he spontaneously answered: “Haus zum Ausruhen für Musiker”. Together with his wife Giuseppina Streponi he founded ‘Casa Verdi’ or the ‘House of rest for Musicians’ in Milan, 1899. It is here they both found their rest at the end of their days. Today, 115 years after the establishment, ‘Casa Verdi’ has become a place of intergenerational musical learning with twenty young students of music living and working together with sixty retired professional musicians. Both generations are honored and proud to live and work there. They appreciate having music as the common bridge between generations. Mutual care and respect are integrated in their daily living.

This is a beautiful example, however the question arises: Is it also possible to replicate such a way of life in a wider, more general population? Maybe. For example, in the USA, Judy Bowers, professor of music education at Florida State University in Tallahassee, has, for more than 20 years, tested models of intergenerational music education. The emphasis is on singing and making music together.

Studies have been conducted using interview narratives recorded from the young and senior program participants at their first and final meeting together. Data from evaluations show both generations profit from singing together, not only on an individual basis (emotionally and intellectually), but also on a social and societal basis (Bowers, 1998). When Bowers presented her results at the music education congress (MENC) in 1998, a pivotal question arose for one of the authors who attended this congress: Christian Werner wondered if this model would be transferable to other countries, specifically if it would be transferable to Germany.

Scientific background

During a long-term cross-section study, Klaus-Ernst Behne, professor and president of the University for Music and Theatre Hannover, established different German generations possess completely different musical preferences. For the most part, he discovered the likelihood of any intersection for a common song repertoire is minimal (Behne, 2009). However, he also found exceptions to the rule. For example, four years earlier, in 2005, following an invitation from the first author - a former music student, Behne visited the old and beautiful Lower Saxony town of Braunschweig. There he was astonished to find young and old singing European folk songs as well as current German-language pop hits together.

Back in 1998, on a research visit to Boston, Massachusetts, Werner observed senior citizens performing music together with young people. He carried a particular vision of an older person playing drums back with him to Germany. Five years later he finally grasped the opportunity to organize a similar project in cooperation with a neighboring old peoples’ home called Marienstift and the CJD-Braunschweig high school. The vision of a senior citizen drumming and practicing music in the company of young people provided the inspiration. His hope was to create a bridge between young and old in order to give them the feeling of being connected and belonging together.

The triangle partnerships project in lower saxony

Based on scientific data we can say the triangle partnerships project in Braunschweig was successful. From 2003 until 2010, people of all ages came together to make music. While doing so however, they also exchanged ideas and talked with each other. Music was observed bridging the gap between generations. This work was conducted on a scientific footing with results being published during spring 2010 in a book with the title ‘Dialog auf Augenhöhe’ (dialogue eye-to-eye) (Werner, 2010).

Knowing the gap can be bridged through music, the significance of such a project is clear. Many young children live far away from their grandparents. Often, not only do they rarely meet with their grandparents, contact with any older folk is also limited. As these young people mature to
adulthood, the situation is not much improved; especially considering the increasing number of single one-person households (this is valid in many industrial countries)\textsuperscript{xii}.

The triangle partnership project in more detail

Project manager Werner, together with Professor Klaus-Ernst Behne and Dr. Sandra Linke, developed a scientifically-based questionnaire designed particularly with gifted and talented children in mind (see section below: “Involving gifted and talented students”). The questionnaire provided items to which participants, young and old, were asked to respond both before the project began and after its conclusion - normally one year in between.

Practical aspects of the intergenerational music were undertaken by Werner in cooperation with the geriatric nurse Ursula Stadler. As well as working with the elderly at Marienstift, Nurse Stadler also taught student nurses as their practical instructor. These two people acted as the cornerstone for the young and the old. They were responsible for, and managed all organizational issues between the school and the nursing home.

Also crucial to the success of the project was the cooperation and voluntary assistance from the pink ladies (who are called ‘Grünen Damen und Herren’ inside Germany). They accompanied at group singing meetings, offered much helpful assistance to the young people in their endeavors to deal respectfully with old people in general, and specifically, those with such health problems as dementia (Stadler, 2008 & Harms, 2003). All this work was done on a voluntary, unpaid basis.

Between 2004 and 2006 the project was successful in local, regional, national and transnational competitions\textsuperscript{x}. Data associated with the scientific questioning\textsuperscript{xii} was so encouraging it was decided to continue and expand the project. Two further partners wanting to implement this project where found in Lower Saxony, one in the town of Burgdorf and another in Braunschweig. In 2007 a new phase of ‘Triangle Partnerships’ started at the three locations with a revised version of the questionnaire (for more details: Werner, 2010)\textsuperscript{xii}.

What we did?

Cooperation between young and old has important effects on the partners involved. The vision of a drum-playing senior citizen has become a reality since 2007 in the projects at the CJD School and Marienstift in Braunschweig. Four groups (three of them intergenerational, only the real technically-expert musicians were solely students\textsuperscript{xxii}) were practicing and singing together. All the singers, the band, the guitar players and the technically competent met weekly as a group. Lively and intense collaborative relationships facilitated the sharing of ideas and thoughts through dialogue along with the exchange of experience and knowledge, e.g. how a passage is to be played or how an intended sound or phrase should be rendered. All this ended in a very ‘harmonic’ atmosphere bolstered in the summer with barbeques, music, joint musical comedies, and services with songs from Taizé or a campfire-gathering highlighted by drinking home-brewed tea from a kettle.

In Braunschweig the initiative came from the nursing home for the elderly: The Marienstift and the CJD Braunschweig began a cultural partnership in 2010 with the name ‘Kultur – Arche’ (culture – ark).\textsuperscript{xxv} The focus was, and still is, social music, music for the region - community music. The aim was to provide a cultural event and activities for young and old people in Marienstift once a week. Once a month a cultural highlight took place and once during the year all the people involved in that project had a big celebration where other interested people were also invited to come and find out more about the joy such community can give.

In Burgdorf the project was a little different. Music teacher Almut Stoppe brought 7\textsuperscript{th} grade high school students\textsuperscript{xxvi} together with older people from the neighboring church and they had regular singing/music sessions over a period of two years. Ultimately, a performance of the musical ‘Heute Nacht oder nie’ (tonight or never) was held in the High School in Burgdorf in autumn 2008. This was the official terminal event of this project. Two concerts, each of them attracting more than 450
spectators, raised public awareness of the project outside the High School. Young and old participants came together again in 2009 in order to attend a musical in Hamburg.

Almut Stoppe continued the project with students from a 6th grade class and older people from the same neighboring church were again involved. Performances were held in the school and also in the church. Burgdorf project participants were asked the same questions as those in Braunschweig. The data was also published in the final report. It underlined the possibility of implementing projects successfully in Germany especially in the area of the intergenerational music education.

At the third location, pupils of a Braunschweig primary school visited the senior meeting place called ‘Lange Aktiv Bleiben’ (LAB) meaning: stay active for a long time. Once a week, a policeman escorted the children across the city center ring, a dangerous four lane road. What came of all this effort? Specifically with this group, it was a great shared experience distinguished by common celebrations, trips and a CD with songs. But overall, it indicated to us that when the three partners, i.e., the school, the university and the home for the elderly, collaborated together like three legs on a stool, it really was a strong partnership, one with great promise and benefit for all involved.

What we learned?

First, we learned the developed and tested scientific methods of examination could facilitate intergenerational work in other places in other villages. Beyond the fundamental purpose of project, the goal for this session was to develop a manual for intergenerational music education. Enthusiastic support was found for this endeavor after Werner presented the project to Professor Dr. Theo Hartogh at a congress in Paderborn (Germany) in 2006. Hartogh provided important input with respect to his own experiences in the area of music gerontopedagogy. Hartogh also agreed to provide an important scientific contribution to the final report on the project. He entitled it: ‘Dialog auf Augenhöhe’ or ‘eye-to-eye’ dialogue.

Key points learned via the scientific survey
The final report describes the effects on the participants. The four key findings are:
1. Music keeps you healthy;
2. Music supports your identity and keeps you grounded;
3. Music supports community; and
4. Music facilitates dialogue on an equal level between young and older people.

The stimuli for a dialogue between young and older people on an equal level were set and these might go far beyond Braunschweig, Burgdorf and Hannover. In fact, the effect should be tested in much more cities. It should also be noted that in 2009 and 2010 ‘Triangle partnerships’ won several UNESCO prizes.

Involving gifted and talented students
Discussion with respect to gifted and talented students and their particular involvement in the triangle partnerships project is important. Why? Observations and research over the years have shown highly able students not only possess special gifts and skills in a wide and diverse realms of human endeavor but also exceptional needs. These needs are not easily or always served by their own efforts. Given their abilities, they need and deserve support and it is good that we, as researchers and teachers, sometimes discover interesting and appropriate challenges for them.

Gifted students, especially, look for and thrive on challenges. They are interested in projects that afford opportunities not only to use their abilities but also that may offer benefits to themselves and others. In addition, they often profit from relationships with adults and the broader tolerance of old people compared with teachers. The old people's decisions are different when it comes to setting limits or when it is needed to bend the rules. Gifted students welcome and appreciate alternative or
innovative ways of looking at a situation (McTravish, 1971). It appears easier for gifted students to accept advice from an old person once the confidence is gained. They can listen to advice without having fear older person will check if this advice has been put into practice. Ultimately it is their decision to follow the old people's advice or not. This could be seen as an example of relationship-based interaction which is one of the five types which Jerry Loewen (1996, citing Alfano, 2008) has advocated for intergenerational interactions. In all cases, they can keep their freedom in order to weigh the reasons for what is the best solution in their special situation. Our perception is that this is why gifted students feel respected in this project.

Despite almost 100 years of research (e.g., Hollingworth or Silverman) and other activities in gifted education, much ignorance and unjust prejudice still exists. Myths are prevalent and one of them is that gifted individuals are not nearly advanced socially as they are intellectually. In comparison they are often considered inept, even ‘retarded’. However, it is not our purpose to discuss here whether this is true or not. Furthermore, in the context of this article, the answer has no real relevance. What we found to be important is that despite whatever imbalance may exist, experiencing the embrace of a community is affirming. It imparts an irreplaceable sense of having value and meaning in society.

**Triangle Partnerships: Roles and responsibilities of students**

Triangle partnerships allowed us to address whatever prejudices and other difficulties did exist. We offered young people (either particularly identified as gifted or talented or not!) opportunities not only to join this project and experience feeling responsible for a senior citizen, but also to affirm the importance of their unique personality and how it contributed positively to the weekly meetings.

Each project member was required to follow some basic principles in this project. Experience taught us that some structure, with its attendant set of rules, is useful for all participants, young or old. It was good for the gifted students, but especially important for otherwise capable students who may have some attention deficits or who are underachieving for other reasons. General rules included such requirements as:

1. Each participant attends regularly or gives notice if attendance is not possible;
2. Careful listening and no interruptions;
3. An open-mindedness to facilitate learning from each other; and
4. The need to watch out for each other and offer help when needed.

Other basic rules were observed by all, including the project manager, for example:

A. Respect each student; no matter how different he or she appears to be!
B. Let students help other people!
C. Respect through tolerance and understanding of each other!

**What can the students do?**

Each student can choose between four different areas of involvement:

- Help with organization, e.g. to distribute and collect the song books;
- Engage in all kinds of technical support, e.g., microphones, amplifiers, speakers etc.;
- Engage in service learning, e.g. to go to one of the old people, pick her or him up from his or her room and bring this person back.
- This is especially important for learning many different social skills and becoming emotionally committed and responsible. Of course, they are free to choose one person with whom they feel comfortable and for whom they have sympathy. This person may be a contact person or, in the best case, as a real friend for a long time, even after the project is finished.
- Contribute with his/her musical abilities in each session.
- Overall, empathetic engagement is crucial to the project. In this context communication is very important and so students are advised to talk to family members, relatives or close friends about the achievements of the person. Without empathy it can be difficult to keep students motivated.

All students have to learn how to deal with old people in a friendly and respectful way. This means that before they are allowed to join the project, they get four hours of training (e.g., two hours
practical training where they sit in a wheelchair and find out how that feels like; either to sit in the wheelchair or to push it). After they finish this training successfully, they get a so called “wheelchair drivers license” which is a certificate proving their competencies.

**Perspectives for transferring this model:**
**Challenges and opportunities of intergenerational music education**

A senior citizen during the project stressed: “To become old is like climbing mountains. Your energy becomes less, but in return you can see further.” This sentiment is also valid for the challenges presented by intergenerational projects. The further one reaches, the clearer one sees the difficulties and possibilities in this work.

The challenges result from the structural limitations: Typically society is organized in peer-groups. There appears to be some partition resident in human heads capable of separating the young from the old. The negative impact of these otherwise invisible structures may be observed at certain times and in different circumstances. Sometimes actual barriers are raised. For example, a barbed wire fence barred the way between the CJD Braunschweig and the home for the elderly. It not only separated young and old effectively, but often prevented contact between organizational personnel. Activities of the project initiated the removal of this barrier in 2004. Openings were forged creating a short cut which facilitated an easier means of contact for young and old.

In 2006 the school went further and built an actual path on the campus suitable for people who need to use a wheelchair or walking frame. Seniors can now visit the young students at school or use this short cut for going to the supermarket. There has been a positive change in the mindset of people and this can be clearly seen in different situations. People in charge of both institutions have supported this project from the beginning. Work done in this regard has been presented as evidence of successful effort and used in support of crucial commissions for different enterprises. However, it took a while for the barbed-wire fence to be removed, making it clear that it is potentially a long process in order to reach a real partnership of young and elderly people together.

It has to be admitted that a metaphorical fence is still present in the heads of some. And for these people intergenerational projects are inconceivable – they simply will not work. Intergenerational initiatives also fail because of legal questions, by-law restrictions or questions or profiles which are valid only for a certain age group. It can be difficult and laborious finding partners with an intergenerational perspective willing to work long-term.

Special challenges result from a lack of commitment amongst many young participants. A young student stated: “The sense of responsibility and the will to stay focused on one’s own decisions are missing in many young people.” Many do not come to the project, although they decided before to do so. This is very difficult in many school projects but especially when it comes to young and elderly people singing together.

Students feel pressure. Demands on time and performance have increased recently in Germany because of the mandated length of schooling has been decreased from 13 to 12 years. Consequently both students and their parents try to compensate for the increasing pressure by stopping voluntary activities. Activities traditionally taking place after regular school time, e.g., in the afternoon, now stand little chance of survival. Experience gained from the project in Braunschweig and Burgdorf shows that it is crucial to inform and connect parents if they are to support such a project.

A third challenge is the financing of intergenerational projects. In order for the integration process to succeed, a lot of resources required. For example, a piano or a drum is not always standard equipment for a home for the elderly. School buildings are not always handicapped accessible. Older disabled people in wheelchairs may not have easy access and thus may find it difficult to participate regularly in school events.
And the winner is… The winners are…

Yes there are challenges; big challenges. However, things can happen if there is a will to make them happen. We were fortunate to find unlatched doors! Many people worked together to provide sufficient support. It is not impossible.

Consider, for example, Ursula von der Leyen was the Federal Minister of Family Affairs from 2005 to 2009, who managed to support such initiatives. She recognized development of new structures was necessary in order to bring such projects to life. A very well-known example in Germany has been the revitalization of multi-generation houses. These activities are particular germane to projects like Triangle Partnerships because access to shared space allows people of different age groups to practice and perform activities like playing music and singing together. Such developments not only support isolated projects, but also long-term commitment. In order to make this idea public, we use publications, e.g., Werner, 2010, newspaper articles (e.g. local newspaper in Braunschweig reported about it) and TV xxii and radio stations xxiii which broadcasted information about this project.

So who wins if such intergenerational projects are developed and implemented?

Clearly young people are winners. In their teenage years they are looking for identity (see literature from Erik H. Erickson xxiv). They are also typically in search of their skills and talents, but even the most advanced do not know what they are exactly. During such a project they have the opportunity to try something new, test their abilities and their limits. In addition, they take responsibility for other people and they learn how to serve others. They feel grounded and find their own identity through common cultural activity and practice pastoral, organizational, technical and musical fields of activities. They can engage in local politics and receive positive feedback for their voluntary work and commitment. Any documents, certificates, appraisals and newspaper articles received along the way provide extremely valuable information to be included in a personal file ready for an application for college or some other vocational selection procedure. Evidence of outside school activities involving some real community service can be seen as a big advantage when seeking scholarships.

It is equally clear that the senior citizens win. They find back their way to happiness xxv out of these activities and this leads to regeneration and an increased sense of well-being (Latz, 1998; Kawohl, 1989). They have the opportunity to feel younger xxvi, to share the easiness of the younger generations in some regards and to rediscover old abilities (Miedaner, 2001). They are encouraged to pass on experiences, knowledge and respect to younger people. With reference to music specifically, happiness may be experience while making music, perhaps re-living the pleasure found in memories of their own culture and, or their childhood. The actual physical act of singing and making music maintains health xxvii and visibly improves the quality of life. Long cherished dreams may even be realized: e.g. an individual who, as a child, dreamed about learning to play a guitar but never could because of war and post-war conditions. To begin learning to play an instrument, for example in the guitar group for young and elderly people together provides a new beginning and great satisfaction.

Who else wins?? Society of course! Why? Simply because society has always, and likely will always, consist of a mix young and old. It seems self-evident that all will profit if together there is a desire to reconcile differences, live peacefully, have fun and seek ways to mutually benefit from common dialogue and interaction. Maybe we can sum up this by the following sentence which is a conclusion from Werner’s experience: “Learning about oneself and about the conditions of life of an older or younger person are possible by-products of programs that bring generations together.”

Some final thoughts

This intergenerational eye-to-eye dialogue through music retains an important part of our culture. Traditions, sense of value and an understanding for art and culture passes from generation to generation. It can be demonstrated that intergenerational projects xxviii have the capacity to build the foundation for greater understanding each other and for reconciliation between generations at a time
when the demographics of societies such as Germany are changing so rapidly. We consider music education, in its broadest sense, serves as an important link and some stability in turbulent times. In this context we pass on the wisdom of a visitor from the African nation of Congo who deplored the unrest in his country. Tracing this back to the missing consciousness for his own culture he said: “Finally we must begin to take responsibility. We were taught that our culture has no value. But if we are unable to protect our own culture and they steal it, then we are dead”.

Each day the dominance of English-language songs is obvious on so many different radio stations. It appears to us that such a loss of culture is taking place inside (Stark, 2009) and outside Germany, especially when it comes to singing or making music. However, we have found when people from different age groups communicate, culture seems easier to retain. In all three locations where the ‘triangle partnerships’ project took place, it was amazing to observe how young people learned the German-language folk songs from the bright-eyed seniors. And vice versa, the seniors learned songs from the young people.

The main goal of this kind of education is not knowledge, but experiences. The weekly activities can be in the field of music or arts. Cultural highlights could be exhibitions, concerts, readings, celebrations or (church) services. For example, Marienstift has already built a stage in the shape of an ark into the park of the nursing home where the performances can take place. The organizers hope to find ‘open doors’ and wish, of course, to experience unexpected support and find more interested people. The first event was already successful and took place in June 2010. Young and old people sang and ate fried sausage together and all enjoyed this pleasant event!

Conclusion

Ultimately some questions remain. Is this project really so rare and exceptional within Germany that it has no significant influence on further scientific research questions? Why don’t we put more effort and money into changing this situation? How do we find young students willing to be integrated in long-term responsible structures?

We were encouraged by the fact that back in 2010 the Christian youth organization (CJD) proposed arranging 40 new young/old projects each year. Up to now there are more projects for seniors established but in reality it remains difficult young and old to interact. So a lot of work must be done in order to make more progress and gain more experience in intergenerational projects.

Even so, after completing the scientific investigation in Braunschweig and Burgdorf and together with all these experiences in that intergenerational project, the organizer was bubbling over with ideas for new and more improved concepts. The central ideas remain: Young and elderly people need to stay in contact and the main goal of such projects should be to keep such partnerships lively and happy.

References

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**Christian Werner** is High School teacher at the “Neue Schule Wolfsburg gGmbH” (new school in Wolfsburg, Germany), teaching music lessons, history, politics, social studies and German language. This is an International school of Volkswagen in Wolfsburg (Germany), about 90 km away from Hannover. Until 2012 he has been weekly involved in this intergenerational project called: ‘Triangelpartnerschaften’ (triangle partnerships) and still, today, he is in charge of it.

**Sandra Linke** is a Doctor of Philosophy since 2010. She studied in Braunschweig (Germany) Education, Psychology and Sociology and is known as a co-founder of the International Center for Innovation in Education (ICIE) in Germany. She helped organizing several ICIE conferences and has conducted a number of workshops concerning gifted education and how to support children appropriately. In December 2013, she was appointed to the Institute for Educational Science at the University of Education in Freiburg. Her responsibilities include developing the advanced Master’s degree program designed for experienced teachers wishing to specialize in professional school development.

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End Notes

ii. German term for: House of rest for Musicians
iv. Conversation took place on the 14th July 2010 with Gudrun Schneider, teacher and tutor of practice at a Protestant church in Oldenburg. Gudrun Schneider visited the ‘Casa Verdi’ together with 15 elderly
care nursing students in Milan during spring 2010. Literature source: Sabine Dörfel, „Alles dreht sich in der Casa Verdi um die Musik“ (All concerns music in the Casa Verdi. Article from the evangelic newspaper from July, 11th, 2010, Nr. 27 Niedersachsen, p. 15).


vii. The Christian Youth Village (CJD) in Germany is a similar association to the young men's Christian association [abbr.: YMCA] and it offers annually 150,000 young people and adult guidance and future prospects. They are promoted, supported and trained from more than 8000 employees at over 150 locations. The basis is the Christian idea of man with the vision: "No one should get lost". In Braunschweig, a pedagogical focus is on promoting and fostering highly gifted young people.

viii. The increasing number of single households inside Germany can be found and is retrieved [20th of January 2014], from http://www.zzeit.de/gesellschaft/familie/2012-07/single-haushalte-statistik

ix. German information to the competitions and prizes can be found and is retrieved [20th of January 2014], from: http://www.cjd-braunschweig.de/braunschweig/pages/index/p/12198

x. The questionnaire from Kraag, B. & Nord Rüdiger, D. (1987) was used as a basic instrument which was modified for the reference group. German title: “Der Fragebogen zu Lebenszielen und Lebenszufriedenheit: Beschreibung – Theorie – Anwendung”. Frankfurt.

xi. Main results could be found in German language and is retrieved [20th of January 2014], from http://bs.cyty.com/kirche-von-unten/archiv/kv130/klingendenbruecken.pdf

xii. Later on, it was one old woman involved in the technique group who also helped in another project for young and old (intergenerational). It was a history project for the Jewish museum in Braunschweig, one of the oldest Jewish museums in the world. Unfortunately this woman died meanwhile the history project but inside the memory of the students who learned a lot from this woman, she is still present.


xiv. These students were not identified as gifted or talented.

xv. These students were not identified as gifted or talented as well.

xvi. Here it is important to mention that only on the CJD the students were identified as gifted (IQ higher than 130). Both authors encourage replicating the intergenerational project not only with gifted students, but especially the gifted students mentioned different kinds of individual benefits.


xix. The five types are: “curriculum-based; relationship-based; reciprocal relations; community based and authentic work” (Alfano, 2008, p. 254).

xx. Just think about accident assurance which is needed: Students are not allowed to leave school regularly. They could be insured either on the school compound or on the compound for the elderly. The way between both compounds is not insured and for that reason in this example we used a school which is in neighborhood with a home for elderly. Another example is the foundations: Either they are allowed to donate money for young or old people. It is very difficult to convince foundations in order to support intergenerational projects if this is not in their regulations or bylaws.


xxii. The World Council for Gifted and Talented Children
Coping with the Qualities of Giftedness

Peter Overzier
Noks Nauta

Abstract
There are a lot of group training sessions to train people in more effective behaviour. The authors are experienced in the development and execution of such courses for small groups of gifted adults. Because literature about this theme is scarce, the authors like to share their experiences. First, we explain the theoretical model we use in the training course. Then, we explain its design and how it works. Finally, we describe our experiences with the first three groups to go through the process.

Keywords: Qualities of giftedness; models; capacity building; training.

An existential model of giftedness
We have chosen the descriptive model of Kooijman & van Thiel [2008], which is now in widespread use in the Netherlands.
Gifted adults can be described in the following terms:
- Highly intelligent (thinking);
- Autonomous (being);
- Multi-faceted feeling;
- Passionate and curious (wanting);
- Highly sensitive (perceiving);
- Creation directed (acting); and
- Sparkling, original, quick, intense and complex (interplay).

This model can be called existential and was created by means of a Delphi study, which is a method of finding consensus in a group. It was developed by a team of professionals who work with gifted people and are themselves gifted. People who recognize themselves in these terms profit from information about gifted adults and can use the terminology and characterization as examples in coaching. There is no other tool currently available to measure this broad conceptualization of giftedness in a valid way.

Why training course for gifted adults?
Gifted adults have started receiving more attention in the last ten years. It is generally thought that they can quite easily help themselves. However, this often turns out not to be the case, particularly when one was not recognized as gifted during childhood and one does not appreciate being different (Nauta & Corten, 2002; Nauta & Ronner, 2008 & 2013). Contrary to popular belief and even in the hyper-competitive culture of the United States, giftedness is not always an advantage. It can easily lead to problems like performance anxiety, boredom or conflicts at work (Jacobsen, 2000; Streznewski, 1999).

Gifted adults can roughly be divided into three different groups. The first group does not function well and does not realise their full potential. The second group functions without many problems and the third group can manage but needs some assistance once in a while. The third group may need practical support and skills, but can find these in books, articles and courses that take giftedness into account. It is the first group that often needs specialized support and sometimes mental healthcare. Alas, this is not possible in the mainstream, as there are currently no standard mental healthcare interventions that take giftedness into consideration.
The kind of problems the first group experience can be seen where gifted adults write about their experiences – on internet forums, in the newsletters of Mensa (a worldwide society for people with a high general intelligence) and on some LinkedIn groups. Their problems concern making connection with others – at work, with friends and in intimate relationships. Burnout and conflicts at work are particular problems [Van der Waal et al, 2013]. A lot of these people, because of their experiences, start looking for the causes of their problems and find out that giftedness can be a contributing factor. Some gifted adults only discover their own giftedness when their equally gifted children have problems at school, get tested and the parents recognize themselves in the profile.

For a number of the problems of gifted adults, suitable courses already exist – such as those for performance anxiety, assertiveness and stress reduction. The starting point for the design of the group training course was realising that many gifted people don't feel at home in groups of people with average intelligence. The pace of instruction is too slow, so they tend to lose interest and the practical tasks are also unsuitable. When a gifted person is perceived as “showing off”, relationships with fellow students can become difficult. Some become jealous and hostile, while those who find the work a struggle can get so daunted by the comparison that they want to give up. All of these factors were taken into consideration in designing this course.

**The design of the course**

The purpose of the course is to teach the participants how they could handle their qualities more effectively in daily life. Writing a practical manual for themselves is the main theme of the course and of the homework set after each session.

Experience has told us that these are the situations that most need to be discussed:

- General stress and work-related stress;
- Performance anxiety;
- Hypersensitivity;
- Relationships (private and work-related); and
- Making choices.

Furthermore, it was decided that several theories and models should be taken into account:

a) The Delphi model of giftedness;

b) Balancing burden (load) and load capacity;

c) Coping skills;

d) Rational emotive therapy and cognitive behavioural principles; and

e) Values and ethical considerations.

The trainers conduct a short telephone interview with all participants in advance of the training, to ascertain their needs and objectives relative to what the group course can offer. This interview also allows those for whom the course is unsuitable to be referred to a more fitting intervention.

Working with a group consisting solely of gifted adults has the advantage of mutual recognition and potential support. A lot of gifted adults, especially when they are new to their gifted status, hesitate to speak about it for fear of seeming boastful. The course was designed for small groups with a maximum of eight participants, because gifted adults work rather intensely and experience many sensory perceptions. This makes large groups too intense and taxing.

The course consists of four parts, held on four afternoons or two whole days. Recruitment was done within the network of gifted adults and on the website of one of the trainers, which attracted the attention of several potential participants.

The course was structured in advance, for the most part, and then adapted according to the feedback of the participants. They were also given the opportunity of a follow-up telephone call with one of the trainers during the three months after the end of the course.
The First Three Groups

The first three groups had 5, 6 and 8 participants. Their ages ranged from early 20s to late 50s and they all had a regular salaried job. The course was paid for by the disability insurance of one participant and by the employers of two other participants.

At first, most of the group were reluctant to participate, probably because their previous experiences in groups weren't always positive. Once they relaxed, they obviously found it pleasant to meet and share experiences with other gifted adults. Many participants recognized themselves in the stories of others and this made for a tight-knit group with honest and open communication.

It soon became clear that the participants preferred to review the relevant theories at a fast pace, finding a slow pace irritating. The practical exercises – in pairs or plenary – were designed to complement the theory, inspired by situations the participants themselves contributed. It became pretty clear that comprehension of a theory is no guarantee of an instant application of the knowledge.

Rational emotive therapy and cognitive behavioural principles were an eye-opener for most of the participants, although practical applicability was not easily accepted and some resistance was verbalized.

Practical exercises were also not an easy feat for some of the participants. They wanted to achieve the course’s objectives, but found themselves feeling defensive. Their unconscious resistance to the new knowledge and methods took the form of either criticizing the theory or calling the behaviour the trainers suggested contrived and impractical.

The trainers responded by giving the participants the choice between learning by experimenting or by further discussion of the theory and searching for relevant examples. The trainers refrained from criticizing or evangelizing, allowing the participants to adapt at their own pace and in their own way. Given respect and a choice, much of the resistance dissolved and progress was made to the satisfaction of everyone involved.

Besides discussing theoretical concepts, participants enjoyed talking freely about being gifted, the consequences thereof for contact with others and the problems it can cause. Sharing problems and solutions was an important part of the course.

Text block

Some reactions by participants:

- The relaxed atmosphere is positive;
- The course has useful information and exercises;
- The course has a varied design, lots of material to work with; and
- Learning focused on methods of working it out for oneself, rather than being given standard one-size-fits-all solutions.

Discussion

The liveliness of the discussions, the persistent attendance and the positive reactions show that this course fills a need for this target group. Not only schoolchildren struggle with giftedness – seemingly successful adults also need coping strategies to deal with their giftedness.

One of the participants said: "I used to want to tell everyone in a meeting how to act. Now I wait until they look at me before I tell them how to handle the problem”.

Our aim was to make the course manageable and affordable, taking travelling into account because participants came from all parts of the Netherlands. We chose to hold the course on four
Saturday afternoons, so participants didn't need to take days off work. Due to private obligations, this still proved to be a problem for some participants.

As an experiment, the trainers organised the third training course during two whole days in the week after Christmas, when many people have time off work anyway. The drawback was coping with the intensity of two full days of activity at a time of year with lots of social and practical obligations. Gifted adults can be very sensitive to stimuli and they tend to communicate intensely, so they were rather weary after a full day of the course.

In comparison with regular group courses for the general public, these participants clearly needed to fully comprehend the theoretical model before they could work it through and accept it, to agree with it before they could use it in practice. They tend to be uncomfortable with knowledge that is handed down – they prefer a subject that is open to discussion and well-substantiated before it can be accepted and used. This makes a course for gifted adults more difficult, but also more fascinating and challenging!

**Suggestions for trainers**

We would like to share some suggestions for trainers wishing to work with groups of gifted adults:

- Work with small groups – a maximum of 8 participants and preferably with two trainers.
- Assess participants in advance by telephone to ensure that the course is appropriate for the individual. Recommend that people with mental health problems seek advice from their doctor, coach or therapist about participating in the course.
- Try to steer abstract and theoretical ramblings that serve as a defensive distraction back towards talking about the personal experiences of the participants.

The intensity of working with a group of gifted individuals is a double edged sword – it can be both invigorating and tiresome. Take regular breaks and discuss your observations of the group in private with your co-trainer.

Any theory that can be reasonably assumed to be new and unfamiliar should be discussed fully. It can be helpful to send relevant literature beforehand.

If participants report that they know this theory already, don’t accept it at face value. Ask what they understand about it and encourage further exploration. Be aware that some participants need to have a detached discussion about the theory before they will be willing to put it into practice.

You will be severely tested as a trainer! Take time for discussions with individuals, but keep an eye out for the needs and goals of the whole group.

**References**


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Communication Skills among Gifted Students in Jordan

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Abstract
The purpose of this study is to investigate the communication skills among gifted students in Jordan and to investigate the effect of gender and the level of students in acquiring these communication skills. A questionnaire was distributed among the sample of the study which comprised of (240) tenth, eleventh, and twelfth grade students from Al Youbil School. The method included a questionnaire of thirty items about the communication skills among gifted students in Jordan; it was given to 240 gifted students. After that the researcher collected the questionnaires and analyzed the data statistically. Descriptive statistical analyses were used (Means and Standard Deviation) for the items of the questionnaire and T-t tests were used to measure the effect of gender and level of students on their communication skills. The findings of the study indicated that there were statistically significant differences among gifted students in their communication skills, due to gender, and level.

Keywords: Gifted students; communication skills; Jordan.

Introduction
To identify the gifted and talented can create a problem to education professionals and teachers because they are not homogeneous group, when we think of a gifted child we will have a picture of a highly able child, hard working student who always complete work in a perfect way. (Winstanley, 2004)

Gifted students must not only develop the skills to communicate abstract ideas effectively within and beyond the classroom but also acquire advanced knowledge. Gifted students acquire advanced communication skills through the creation of products and opportunities that utilize new techniques, materials, and designs that are then presented and critiqued by real audiences. Presentations, debate, speeches, and multi-media presentations provide students with opportunities to effectively share and communicate ideas. (Bouse Elementary School, 2013)

Research involves gathering and interpreting information in order to yield meaning. This occurs through data gathering, synthesizing material, scientific investigations, or any other form of inquiry that makes use of information. Research skills are beneficial to gifted learners because they integrate critical thinking, reading, composing, and the formation of autonomous judgment. Research skills, like writing, are developmental involving a non-linear discovery process. They cannot be mastered at a single grade level but must be built upon and practiced throughout the course of a student's education. (Wheeler, 2013)

A thinking skill is any cognitive process broken down into a set of explicit steps that are then used to guide thinking (Johnson, 2000b). Gifted learners develop thinking skills by studying the role of assumptions, generalizations, and facts when reaching a valid conclusion. Learning higher level thinking skills will translate across, apply to, and enhance any field of inquiry a student may encounter.

Gifted children have the same social and emotional needs other children have, but their needs are often intensified by the characteristics that make them gifted. A commonly held belief by teachers is that gifted and talented children have social and emotional problems and therefore need to work on these skills. If educators fail to understand their needs gifted children can be at risk for academic
underachievement social isolation and depression, potentially resulting in a loss to the whole of
society because of unrealized potential and contributions (Moltzen, 2004).

Schools should aim to meet the specific social and emotional needs of gifted and talented
students. There is some awareness and recognition of the social and emotional needs of gifted and
talented children (Riley et al, 2004).

Talented and Gifted students need to learn how to deal with personal characteristics, such as
sensitivity and perfectionism, identify and accept their strengths and weaknesses, and to communicate
and cooperate with others. (Johnson, 2001)

Although each gifted and talented child has their own unique pattern of characteristics Clark
(2002) has listed several affective characteristics that are common to many, including: knowledge of
own and others’ emotions; sensitivity to others feelings and expectations, keenness of humor;
heightened self awareness and feelings of being different; unusual emotional depth and intensity;
heightened expectations of self and others; and perfectionism.

Significance of the study

Communication allows the gifted child to ask for what he wants or needs, form relationships
and understand how he fits into his family, his school and his community. Effective communication is
crucial to the gifted child's development. Children begin developing communication skills as infants
and continue to improve communication with age. In order to develop and maintain social skills with
peers and authority figures, communication should be practiced and encouraged at home and in
school from a young age.

Statement of the problem

In the primary stages of the gifted students' life, communication skills vary such as listening
skill, interpretation skill, cognitive skill, remembering skill, evaluation skill and responding skill from
student to student. Improving communication can lead to better inclusion of all students as well as
better communication skills throughout a student's learning career and life. Communication goals are
important to meet for teachers, who have several tools at their disposal to do so.

Purpose of the study

The purpose of this study is to investigate the communication skills among gifted students in
Jordan and to investigate the effect of gender and the level of students in acquiring these
communication skills.

Questions of the study:

1. What are the communication skills among gifted students in Jordan?
2. Are there any communication skill differences between gifted boys and gifted girls?
3. Are there any communication skill differences between tenth, eleventh and twelfth grade
   students?

Literature review

Some researchers report common educators' reactions to a diagnosis of talent or giftedness.
Actually, educators may feel threatened by the creativity and uniqueness of their students and find it
easier to cope if they completely ignore the ways in which they are exceptional or if they play down.
To find that their student is talented, educators may be very over-excited, and at this point they try to
impose unrealistic expectations on their students.

Although education has improved academically for gifted students since the late 1980s, Keen
(2005) identified that pre service teacher education had not successfully integrated principles of gifted
education into the teacher education curriculum. Nevertheless, inclusive policies have changed the requirement of pre service teacher education programs to address the needs and responsibilities for preparing them to cater for diversity in mainstream classrooms (Jobling & Moni, 2004). Taylor and Milton (2006) examine the extent of university coursework for gifted education and whether pre service teachers are provided with relevant competencies and skills for educating these students. These include familiarization with the characteristics of giftedness, methods for identifying gifted students, devising and implementing challenging curricula and heightened awareness of problems experienced by gifted students when their educational and social needs are neglected.

Plunkett (2000) suggests that teachers require a positive attitude about gifted education as a starting point for identifying gifted students. Lewis and Milton (2005) agree with Plunkett that teachers’ and pre service teachers’ beliefs and attitudes have a significant impact on their classroom practices.

In a study of the characteristics of effective teachers of gifted students, aspects such as passion for their subject matter, positive relationships and a capacity to relate new learning to students’ interests were significant factors (Watters, 2010). Studies have shown that teachers who participate in gifted education programs have more positive attitudes than those who do not avail themselves of such opportunities (Lassig, 2009). Although Pre service primary teachers are educated to provide general education, they may not have the full range of academic diversity skills to cater for the gifted student (Callahan, Cooper, & Glascock, 2003; Taylor & Milton, 2006) and are often biased with regard to practices advocated in gifted education (Bain, Bliss, Choate, & Brown, 2007).

Pre service teachers generally considered the average student more desirable to teach than a gifted student, with a preference for students not to be studious (Carrington & Bailey, 2000). This body of research suggests that a major concern that pre service teachers have is a lack of understanding of the nature of giftedness, their stereotypical views of the rarity of gifted students and hence a lack of awareness of the prevalence of children who need enhanced or enriched educational experiences beyond what is normally provided in classrooms. Hence, there are two key issues confronting the teaching of gifted education principles to pre service teachers: attitudes and teaching knowledge.

A study was conducted by Tatkovic, N.; Ruzic, M. & Dujmovic, M. (2005) entitled "Communication for the Purpose of Encouraging Gifted Students". Their work starts with the theoretical definition of the conception of "talent"; then follows the explanation of the possibilities to identify and encourage talented pupils and students. Giftedness is regarded in terms of communication and interactive communication among the subjects of educational process. The attention is paid to the teacher's expert analysis in estimating talented students as an important factor of communication between students and teachers and the role that the students as proactive subjects have in the development and estimation of personal capabilities. The possibilities of encouraging talented students during their study are suggested in the form of talks on the choice of the study course in relation to the talent development.

The results of the research into interactive communication with students as proactive subjects in the talent development are enclosed as well as several suggestions on how to promote one's personality as a very important segment in the educational institution. Long term programs and their good strategy are to be made in educational work with talented student and training of university teachers for working with this population of students, promoting good communication skills at all levels of communication.

**Methodology**

**Population of the study**

The population of the study consisted of all private schools in Amman the First Directorate of Education.
Sample of the study
The sample of the study comprised of (240) tenth, eleventh, and twelfth grade students from Al Youbil School, a questionnaire was distributed among them.

Instrument of the study
A questionnaire was distributed among the gifted students and this questionnaire was designed by the researcher himself, it consisted of 30 items. Many variables were included such as gender of the students, and the level of the students.

Reliability of the instrument
To ensure the questionnaire reliability, the researcher applied it to a pilot sample of (10) students excluded of the study sample with a two-week period between the first and second time it was distributed. The reliability of the test was calculated using correlation coefficient.

Procedure
This study was conducted over two month's period. This study was quantitative and qualitative in nature. At the beginning of the study, a questionnaire about the communication skills among gifted students in Jordan was given to 240 students. After that the researcher collected the questionnaires and collected data, and then this data was analyzed statistically.

Statistical analysis
The results were analyzed for each item in the questionnaire using SPSS, means and standard deviations. The researcher also used figures to clarify the results more.

Results
The purpose of this study is to investigate the communication skills among gifted students in Jordan and to investigate the effect of gender and the level of students in acquiring these communication skills.

To answer the first question about the communication skills among gifted students, what are the communication skills among gifted students in Jordan? A questionnaire was distributed among them and means and standard deviation were calculated. Results were shown in table 1:

Table 1: Means and standard deviation about communication skills among gifted students.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening skill</td>
<td>4.14</td>
<td>.420</td>
</tr>
<tr>
<td>Interpretation</td>
<td>4.10</td>
<td>.560</td>
</tr>
<tr>
<td>Cognitive skill</td>
<td>4.31</td>
<td>.464</td>
</tr>
<tr>
<td>Remembering skill</td>
<td>4.32</td>
<td>.321</td>
</tr>
<tr>
<td>Evaluation skill</td>
<td>4.19</td>
<td>.420</td>
</tr>
<tr>
<td>Responding skill</td>
<td>4.17</td>
<td>.476</td>
</tr>
<tr>
<td>All items</td>
<td>4.20</td>
<td>.339</td>
</tr>
</tbody>
</table>

Table 1 shows there are statistically significant differences in communication skills among gifted students. It shows the results of the questionnaire which was distributed among (240) students about the communication skills they master. Means and standard deviations were calculated and results show that "Remembering Skill" got the highest mean which was (4.32); "Cognitive Skill" comes next with a mean of (4.31).

Standard deviation for the "Remembering Skill" was (0.321) which is higher than (α = 0.05) so it means that it is statistically significant. Standard deviation for the "Cognitive Skill" was higher; it was (0.464) which is also statistically significant.
It is clear in Figure 1 that the mean of "Remembering Skill" was the highest mean; "Cognitive Skill" comes next. The mean of the "Evaluation Skill" and "Responding Skill" are nearly the same, so gifted students got good communication skills.

To answer the second question about the effect of gender on gifted students' mastering of communication skills: Are there any communication skill differences between gifted boys and gifted girls? Means and standard deviations were computed and table 2 shows the results:

Table 2: Means, standard deviations and t-test according to gender variable.

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All items</td>
<td>Male</td>
<td>110</td>
<td>4.15</td>
<td>.405</td>
<td>-2.411</td>
<td>238</td>
<td>.017</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>130</td>
<td>4.25</td>
<td>.264</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows there are statistically significant differences due to gender variable. It shows the results of the questionnaire which was distributed among (240) gifted students about communication skills they master. Means and standard deviations were calculated and results show that male gifted students got a lower mean than female gifted students which was (4.15, and 4.25) respectively; this indicates that gender have an effect on mastering communication skills among gifted students.

Standard deviation for male gifted students was (0.405) which is higher than ($\alpha = 0.05$) so it means that it is statistically significant. Standard deviation for female gifted students was lower; it was (0.264) which is also statistically significant. So, table 2 shows there are statistically significant differences due to gender variable in favor of female gifted students.
Figure 2 shows that female gifted students master communication skills better than male gifted students.

To answer the third question about the effect of gifted students' level and mastering communication skills: Are there any communication skill differences between tenth, eleventh and twelfth grade students? Means and standard deviations were computed and Table 3 shows the results:

Table 3: Means, standard deviations and t-test according to gifted students' level variable.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th grade</td>
<td>83</td>
<td>4.08</td>
<td>.225</td>
</tr>
<tr>
<td>11th grade</td>
<td>77</td>
<td>4.23</td>
<td>.466</td>
</tr>
<tr>
<td>12th grade</td>
<td>80</td>
<td>4.31</td>
<td>.246</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
<td>4.20</td>
<td>.339</td>
</tr>
</tbody>
</table>

Table 3 shows there are statistically significant differences due to level variable. It shows the results of the questionnaire which was distributed among (240) gifted students about communication skills they master. Means and standard deviations were calculated and results show that eleventh grade students got the highest mean which was (4.23) this indicates that the academic level have an effect on mastering the communication skills among gifted students.

Standard deviation for eleventh grade students was (0.466) which is higher than \((\alpha = 0.05)\) so it means that it is not statistically significant.

The researcher also conducted a two-way analysis of variance to analyze the scores of the two groups. Table 4 shows the results:

Table 4: Summary of the Two-way Analysis of Variance of the scores of all Groups.

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2.092</td>
<td>1.046</td>
<td>9.747</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>25.438</td>
<td>37</td>
<td>.107</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27.530</td>
<td>39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table (4), the results showed that there was a statistically significant difference in the mastering of communication skills among gifted students due to their gender in favor of female gifted students. The results also showed that there was a statistically significant difference \((\alpha = 0.05)\) due to the interaction between gender and group.

Post-Hoc Tests (Scheffe) was applied for comparisons between sub groups; Table (6) shows that:

<table>
<thead>
<tr>
<th>(I) CLASS</th>
<th>(J) CLASS</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th grade</td>
<td>11th grade</td>
<td>-.15(*)</td>
<td>.052</td>
<td>.005</td>
</tr>
<tr>
<td>10th grade</td>
<td>12th grade</td>
<td>-.22(*)</td>
<td>.051</td>
<td>.000</td>
</tr>
<tr>
<td>11th grade</td>
<td>10th grade</td>
<td>.15(*)</td>
<td>.052</td>
<td>.005</td>
</tr>
<tr>
<td>11th grade</td>
<td>12th grade</td>
<td>-.08</td>
<td>.052</td>
<td>.146</td>
</tr>
<tr>
<td>12th grade</td>
<td>10th grade</td>
<td>-.22(*)</td>
<td>.051</td>
<td>.000</td>
</tr>
<tr>
<td>12th grade</td>
<td>11th grade</td>
<td>.08</td>
<td>.052</td>
<td>.146</td>
</tr>
</tbody>
</table>

There are statistically significant differences among gifted students on the kind of communication skills they master. There is a difference between eleventh grade and twelfth grade in
favor of twelfth grade, tenth grade and twelfth grade in favor of tenth grade, tenth and eleventh and again in favor of tenth grade. This shows that gifted students develop their communication skills.

\[ \text{Table 3: Post-Hoc Tests (Scheffe) result for comparisons between sub-groups.} \]

<table>
<thead>
<tr>
<th></th>
<th>10th grade</th>
<th>11th grade</th>
<th>12th grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.05</td>
<td>4.15</td>
<td>4.30</td>
</tr>
<tr>
<td></td>
<td>3.95</td>
<td>4.05</td>
<td>4.20</td>
</tr>
</tbody>
</table>

It is clear from the Figure 3 that twelfth grade gifted students got the highest mean which means that they master the communication skills better than tenth and eleventh grade students.

**Discussion**

Some gifted pupils have a particular interest in some communication skills. They will typically enjoy some activities relating different types of communication skills, these students differ in the level of acquiring such skills and some times there are differences among males and females in this aspect.

Educators can support their children by trying to ensure that they master some kinds of communication skills. Making games and playing games are good examples of ways in which children can do this. It is also important to balance activities which acquire new knowledge and new skills with activities which provide an opportunity to strengthen already existing skills by focusing on ways of acquiring new skills.

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Students Attitudes towards the Web Based Instruction

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Arab Open University, Jordan

Abstract
This study aimed at investigating the attitudes of students at Faculty of Educational Studies at the Arab Open University (AOU) towards the integration of the web–based instruction using the learning management system (Moodle) adopted by the university. This study also investigated the effect of some selected variables on their attitudes. Results revealed that students at the AOU had positive attitudes towards using the web–based instruction and believed that it improved their chances to succeed in their studies, the study also found a statistical significance differences in the attitudes among students, in favor of male members, third year academic level, graduate program students, with more than 3 years experience in using the computer, and (25-35) year’s old students. Some difficulties were revealed among students using the (Moodle), they needed more time to develop basic competences. The study was concluded with a number of recommendations, most important of which was to call for the need to carry further research related to integration of the web based instruction in the educational field.

Keywords: Attitudes; open system; the web–based instruction; Moodle.

Introduction
In Jordan, like many other developing countries, integration of technology into instruction has become an important issue in current educational research; there is a lot of pressure for educators to acquire competence in using information technology in education (Imad Al-Deen, 2004). Different learning systems such as Blackboard and WebCT were gradually adopted in different educational institutions to build and design online courses (AlAbadi, 2001). The Arab Open University (AOU) which was established in 2002 aimed to attract large number of students who can not attend traditional universities because of work, age, financial reasons and other circumstances. The AOU adopted the open learning system, offering access to individuals without the traditional constraints related to location, timetabling, entry qualifications (Hamdi, 2003). In this matter it is a unique university that offers a perfect mixture of all forms of Blended Learning where students meet with their instructors face to face weekly in tutorial sessions and continue to communicate through the online tools provided by the web based instruction system (Ministry of Higher Education, 2006). The AOU employed Moodle as an open-source course management system, it was adopted at AOU mainly to design a well formed learning management system which facilitates the interaction among all parties involved, both students and instructors can access the system from anywhere with an Internet connection (Al-Debassi,200). Moodle provides many learning tools and activities such posting course materials, delivering and revising assignments and home works , forums, chats, on line tests or quizzes, surveys, and recording grades (Owson,1997).

The interactions between instructors and students to students remained as the biggest barrier for the success of this educational media (Hill, 1997). Indeed, the first step to succeed in the adoption of this system will be to investigate the perception of students towards its implementation and their attitudes towards it as in (Johnson, 2000) and (Hamdi, 2001).

Methodology
In order to investigate the attitudes of students at the Faculty of Educational Studies at the Arab Open University (AOU) towards the integration of the web–based instruction using the learning management system (Moodle) adopted by the university; a survey method for data collection was
used and a questionnaire was developed after reviewing previous studies and literature and deduced the significance of their reliability and validity to answer the following two questions:

1. What are the attitudes of the students at education studies faculty towards the integration of the web–based instruction using the learning management system (Moodle)?
2. What is the influence of some chosen variables such as: gender, academic program, academic level, experience in using computer, age of student towards the integration of the web–based instruction using the learning management system (Moodle)?

The questionnaire consisted of two parts, including: Part one, personal information related to student age, gender, academic program, academic level, and experience in using computer. The second part covers the items related to the attitudes of students towards the integration of the web–based instruction using the learning management system (Moodle).

This questionnaire has 28 items, and categorized in five secondary dimensions, as follows:

- The general students’ attitudes towards the integration of the web–based instruction using the learning management system (Moodle), covered throughout (8 items).
- Students’ interactions with the on line course materials covered throughout (8 items).
- Students interactions with students, covered throughout (4 items).
- Students interactions with the tutors, covered throughout (4 items).
- The role of the learners and the tutors, covered throughout (6 items).

Participants’ responses to each statement were recorded on a five-point Liker type frequency response scale. In scoring, each response was allocated 1,2,3,4, or 5 points for each of the responses categories; ranged between strongly agree to strongly disagree, and the weights given (5,4,3,2,1) to the sequence response in case of items in the positive direction and the weights inverted in case of items with negative direction.

The study population consisted of Faculty of Educational Studies students at the Arab Open University enrolled in fall semester for the academic year (2009-2010), their number was (891) student. The study sample consisted of (205) students and that is the number of students who returned the questionnaire after filling it with the required data, where (350) questionnaires were distributed by a random cluster manner. Table (1) below illustrates the distribution of the participants according to the selected variables: Age, gender, academic program, academic level, and experience in using computer.

**Table (1):** The distribution of participants according to the selected variables: Age, gender, academic program, academic level, and experience in using computer.

<table>
<thead>
<tr>
<th>The variable</th>
<th>The number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33</td>
<td>16.1%</td>
</tr>
<tr>
<td>Female</td>
<td>172</td>
<td>83.9%</td>
</tr>
<tr>
<td><strong>The academic program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>graduate</td>
<td>11</td>
<td>5.4%</td>
</tr>
<tr>
<td>Under graduate</td>
<td>194</td>
<td>94.6%</td>
</tr>
<tr>
<td><strong>Academic level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First year</td>
<td>38</td>
<td>18.5%</td>
</tr>
<tr>
<td>second</td>
<td>42</td>
<td>20.4%</td>
</tr>
<tr>
<td>Third</td>
<td>65</td>
<td>31.7%</td>
</tr>
<tr>
<td>Forth</td>
<td>49</td>
<td>23.9%</td>
</tr>
<tr>
<td><strong>Experience In using computer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than one year</td>
<td>35</td>
<td>17.1%</td>
</tr>
<tr>
<td>1-3 years</td>
<td>113</td>
<td>54.6%</td>
</tr>
<tr>
<td>More than 3 years</td>
<td>57</td>
<td>28.3%</td>
</tr>
<tr>
<td><strong>Age of student</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 25 years</td>
<td>63</td>
<td>30.7%</td>
</tr>
<tr>
<td>25-35 years</td>
<td>114</td>
<td>55.6%</td>
</tr>
<tr>
<td>More than 35 years</td>
<td>28</td>
<td>13.7%</td>
</tr>
</tbody>
</table>
The researcher also carried personal interviews with several students from different academic levels in order to find out the extent of their perception and their attitudes towards the integration of the web–based instruction using the learning management system (Moodle). The interview protocol has included a number of (semi-structured) questions related to the objective of the study according to the following question:

- How do you evaluate your experience in the implementation of the web–based instruction using the (Moodle) in your courses?
- What are the obstacles which face you in using the Moodle?

Results

The arithmetic means were calculated, as well as normative deviations and the percentage for each item of the questionnaire. The results showed that the collective degree of of students’ attitudes in this study was (3.81) out of five marks with percentage importance (72%). This indicates that the members of the study sample had shown positive attitudes towards the integration of the web–based instruction using the learning management system (Moodle). The extent of students’ attitudes towards each dimension is shown in Table 2.

Table 2: The arithmetic means, normative derivations, the percentage importance of each dimension.

<table>
<thead>
<tr>
<th>The dimension</th>
<th>Number of items</th>
<th>Mean</th>
<th>Normative Deviation</th>
<th>Percentage Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>General student attitudes.</td>
<td>8</td>
<td>3.76</td>
<td>0.44</td>
<td>77%</td>
</tr>
<tr>
<td>Interactions with the course content.</td>
<td>8</td>
<td>4.02</td>
<td>0.71</td>
<td>78%</td>
</tr>
<tr>
<td>Interactions with tutors.</td>
<td>4</td>
<td>3.94</td>
<td>0.75</td>
<td>73%</td>
</tr>
<tr>
<td>Interactions with students.</td>
<td>4</td>
<td>3.28</td>
<td>0.47</td>
<td>69%</td>
</tr>
<tr>
<td>The role of tutors and students.</td>
<td>6</td>
<td>3.37</td>
<td>0.66</td>
<td>70%</td>
</tr>
<tr>
<td>The collective degree.</td>
<td>30</td>
<td>3.81</td>
<td>0.48</td>
<td>72%</td>
</tr>
</tbody>
</table>

It is clear that the arithmetic mean for the attitudes measurement recorded between (3.28) to (4.02). The dimension related to the interactions with the course content recorded the highest mean in the positive direction, then interactions with tutors, then general student attitudes and then the role of tutors and students and lastly interactions with students. These results showed that students at (AOU) had positive attitudes towards using the web–based instruction, they believed that the learning management system (Moodle) is a beneficial educational tool, they felt confident in their ability to use it, they also felt they gained new skills, and became more responsible for their learning, while availability of courses material on line added richness to the sources to support learning, they could access the on line materials any time to revise the notes and submit the assignments when they are ready or do any adjustments before submitting them in final shapes, they thought that the learning management system (Moodle) preserved their privacy of their marks on tests, quizzes, they also believed that tutor–student and student–students communications were facilitated by using the learning management system (Moodle) and that it had improved their chances to succeed in their studies.

After analyzing the data regarding the second question about the influence of some chosen variables such as age, gender, educational program, academic level, and experience in using computer on the attitudes of students towards the integration of the web–based instruction using the learning management system (Moodle), the study revealed statistical significance differences in the attitudes among students, due to gender in favor of male members, due to program level in favor of graduate students, due to education level in favor of third year level, due to experience in using the computer in favor of experienced students with more than 3 years experience, and due to age of a student in favor of (25-35) year olds.

These findings agreed with the issues that the researcher found out in the personal interviews with the group of students, in particular with the first question related to the evaluation of students experience in the implementation of the web–based instruction using the (Moodle) in their courses.
Participants in this study agreed that this type of education system adopted by the university helped students to adapt smoothly to their study plans in keeping with their capabilities and regardless of work commitments, geographical distance, or inadequate prior learning experiences which may feature as obstacles denying them access to full-time traditional education. Most of them were convinced that the implementation of the web–based instruction using the (Moodle) in their courses was linked with technology and the academic services related to it. So, their answers varied according to their relationship with technology. Some of them agreed that the online system opened new entries for new thinking methods, where learning became possible for every individual according to his/ her ability and learning style. They affirmed that the web–based instruction using the (Moodle) and its rich resources formed flexible environment to improve learning, and developed student skills, where students became more responsible about their learning. Most of them realized the importance to open new communication channels with tutors to get continuous feedback on their progress, as well as communications with their classmates.

The interviewers revealed some obstacles facing them using the learning management system (Moodle) focused on three sides: Human obstacles, technical obstacles, and technological obstacles. The most important are the following: The fear and fright from using technology, lack of computers and other equipment in the classrooms which should be linked with the internet, a large number of students faced difficulties to access the internet from their homes. Some students demanded to keep the computer laboratories opened all the time and to give keys for those labs. Some claimed that the work by technology put them under pressure, they needed more time and effort inside the class and outside to work with the technology team, and with other students. Finally, most of them believed that the responsibility of the tutors is to help them develop basic competence to learn and use the new web-based Moodle properly.

Conclusion

Results of this study revealed that students at the AOU had positive attitudes towards using the web–based instruction. They believed that the learning management system (Moodle) is a beneficial educational tool. They also believed that student-tutor and student-students communications were facilitated and that it had improved their chances to succeed in their studies. Some difficulties were also revealed among students using the learning management system (Moodle). They needed more time for practicing in order to develop sufficient confidence and they believed that the responsibility of the tutors were to help them to develop basic competences for the system to succeed. Finally, it is recommended that this study should be repeated with a large sample size and with in depth interviews with the participants possibly conducted.

References

About the Author

Nahla M. Khatib, Ph.D., is an academic advisor at the Faculty of Educational Studies/ Arab Open University in Amman, Jordan. She is teaching at the university since 2006. She is specialized in science education. She is teaching a number of courses, including: Science and methods of teaching science, curriculum and instruction. Her research area is mainly concerned with the integration of technology into instruction.

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Book Review

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Book Review

The Creativity Revolution: Reinvent Your Creativity Self to Shape the Future and Prosper

Ashfaq Ishaq (2013)

Book Review by Sara Kapadia

This book is uniquely positioned between theory, practice, history and a keen understanding of the need for creativity in the current era. The author, Ashfaq Ishaq, is well-versed, experienced, and is an avid advocate for children. As the founder of the International Children’s Art Festival (ICAF), Ishaq places children and their artwork front and center. With an adept voice, Ishaq speaks to the readers through multiple lens, focusing on topics with a scholarly input and insight. The children’s artwork seems carefully curated and they mirror in image what each chapter evokes in words.

What is striking in this book is that the author proposes five types of creators from a study of more than a hundred thousand paintings by the children from the ICAF’s Arts Olympiads, the final sample for comprehensive analyses resulted in approximately one thousand children’s paintings. Commonalities with paintings led to the groupings and finally to the five types of creators: Native (celebrating the culture of the homeland), Nomad (exploratory in the physical or metaphorical senses), Savant (masterpieces invoking technique and presentation), Empathic (creating art that puts others’ needs at the center), and Spiritual (artwork that seems to express journeys to or awareness of another plane). Ishaq readily acknowledges that some children’s artworks may cross over into more than one category, nevertheless the categories provide an interesting framework for the creativity discussion in which Ishaq leads the reader to ask questions of themselves and the context in which the reader may exist. For example Ishaq draws parallels between child development, economics, and the development of creativity during a lifetime.

Reading this book it would be hard for any reader not to notice the poetic prose entwined with a distinctly scholarly narrative. One can imagine that the author has already traversed both ends of the sometimes imagined spectrum of accepted conventions in academics and the novel ideas in this new era of creativity.

With the categories of creators neatly divided into corresponding chapters, Ishaq becomes part academic and part weaver, judiciously threading research and anecdotes into a vivid backdrop of yet more thought-provoking questions.

The final chapter is an invitation from the now familiar voice to the reader to look inward in order to create outwardly, with renewed knowledge from the previous chapters, which Ishaq clearly and succinctly summarizes, not as a guide or a teacher but in a friendly tone, where one is left
wondering if they had read the book or had a sitting with a trusted sage to reminisce on what was shared and learned together after entering the realm of children’s art.

As with all fascinating passages both written and literal in this case, I was left with several questions? What aspects were analyzed to lead to the categories? I was intrigued by the categories, specifically to the process developed in order to place an art work in one category versus another, did it involve more of one theme? Another area that sparked my curiosity was about the specifics of how much data were collected about each child’s paintings, and were the children given the opportunity to tell and retell what the inspiration for their artwork was? Do the descriptions change? These questions are a demonstration of how exceptional ICAF’s global Art Olympiad program is.

Finally my two questions are whether the author believes children are inherently more creative? And will there be another book?

I recommend this book to anyone interested in creativity, how children create, those fascinated by culture, art-making, and education… ultimately if you enjoy a myriad of topics important to this era, this book is for you.

Reference

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An abstract for a review or a theoretical article should describe in no more than 150 words the topic (in one sentence), the purpose, thesis or organising structure and the scope of the article. It should outline the sources used (e.g., personal observation and/ or published literature) and the conclusions.

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