



# **International Journal for Talent Development and Creativity**

(Volume 5, Number 1, August, 2017); and (Volume 5, Number 2, December, 2017)

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# International Journal for Talent Development and Creativity

(Volume 5, Number 1, August, 2017); and (Volume 5, Number 2, December, 2017)

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From the Founders:

# Facilitating Knowledge Mobilization through Networking

Ken W. McCluskey; Taisir Subhi Yamin

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One term that seems to be gaining traction of late is “knowledge mobilization,” which refers to the importance of transporting currently available knowledge from the domain of research and applying it in practical ways to help address real-world issues and problems. From our perspective, the underlying intent is to connect theory, research, and practice in authentic ways to improve policy, enhance service delivery, and make a positive difference in people’s lives.

Part of the mission of the International Centre for Innovation in Education (ICIE) and *Lost Prizes International* (LPI) is to do precisely that through our publications and via networking opportunities at our conferences, training sessions, and courses. **To this end, ICIE co-sponsored the following events in 2017:**

- The 15<sup>th</sup> Annual International ICIE Conference in Lisbon, July 3-5, in partnership with the University of Lisbon. (For more details, see Ken Reimer’s article elsewhere in this volume of IJTDC);
- The 5<sup>th</sup> Annual *Lost Prizes/ICIE Seminars*, held on the campus of the University of Winnipeg (UW), Manitoba, Canada from July 12-15 (more about this momentarily);
- A Training and Regional Conference in Amman-Jordan, offered in collaboration with the Jubilee Institute/King Hussein Foundation from August 5-10;
- The International Capacity Building Conference (on Excellence, Innovation, Creativity, and Giftedness), in partnership with both Al Qasemi Centre for Innovation in Education (ACIE) and Tüm Üstün Zekâlılar Derneği (TÜZDER), held in Antalya, Turkey from December 24-27; and,
- Training and Consultation Sessions in Croatia, Jordan, Kuwait, Lebanon, Oman, and the United Arab Emirates.

**ICIE also released several new publications this past year:**

- *Finding New Voice and Vision in Literacy Learning* (edited by Karen Magro);
- *In Two Minds: The Interaction of Moods, Emotions, and Purposeful Thought in Formal Education* (by Douglas P. Newton);
- *Questioning: A Window on Productive Thinking* (by Lynn Newton);
- *Distress or Satisfaction? Talent Management in Higher Education Worldwide* (by Roland S. Persson); and,
- *Innovation Education* (edited by: Taisir S. Yamin; Ken W. McCluskey; Todd Lubart; Don Ambrose; Kari C. McCluskey; & Sandra Linke).

**As well, the following video interviews were produced:**

- *Female Gifted Students and Workers*; and *Paradigm Shifts in Gifted Education* (with Sally M. Reis); and,
- *Latest Developments in Excellence, Creativity, Innovation, and Gifted Education* (with Joseph S. Renzulli).

Certainly, members from the University of Winnipeg's Faculty of Education have embraced the idea of connecting theory and practice in their work, and various ICIE initiatives have been inspirational in making it happen. Some examples of knowledge mobilization stand out for us: (1) Don Ambrose (2015), at several ICIE conference sessions and in his target paper for a special issue of *IJTDC*, noted how essential it is for those of us in gifted education to strengthen the conceptual foundation within our field through interdisciplinary collaboration. His argument was that by reaching out, crossing boundaries, and "borrowing insights" from other disciplines, we enrich our own. And partly as a result of Ambrose's work, some important partnerships have taken root. Indeed, in Education at the University of Winnipeg, an overt effort is now being made to avoid the pitfalls of insular isolation by inviting individuals from radically different subject areas to become part of our tenure and promotion process (McCluskey & Yamin, 2015). (2) One of the earliest ICIE conferences featured discussions about alternative education approaches for marginalized populations and, as a consequence, a major gifted component was injected into UW's ACCESS program (Baker, 2008). Some years later, after reading Robert Sternberg's (2013, 2016, 2017) compelling arguments (offered in *IJTDC*, *Roeper Review*, and elsewhere) concerning the need for a new Active Concerned Citizenship and Ethical Leadership (ACCEL) Model, increasingly flexible admission procedures were put into place at ACCESS. This shift gave more disadvantaged individuals the opportunity to enter university and eventually become teachers in their own right while, at the same time, solidifying still further the program's reputation as a "home of second (and third, and fourth ...) chances." (3) UW's *Lost Prizes* initiative is really a hybrid, "where enrichment programming usually reserved for identified high-ability students with visible talents is employed with at-risk kids whose latent gifts are often not even noticed, yet alone celebrated or nurtured" (McCluskey, Treffinger, Baker, & Wiebe, 2016, p. 51). In essence, strategies from the gifted realm are blended with strength-based approaches from the at-risk domain to reach these twice-exceptional children and youth. Many of the refinements to *Lost Prizes*, and to the ever-expanding mentoring programs at UW (Wiebe, 2013; Wiebe, McCluskey, Baker, Van Bockern, Brendtro, & Brokenleg, 2015), have come about as a result of ICIE networking.

Something special occurs when meaningful connections take hold and networks evolve. To highlight this point, we asked one of the people involved to speak for himself. In his own words, then, here is how it happened for Ken Reimer, one of the new faculty members at the University of Winnipeg:

It is amazing how ICIE can bring together people from a multitude of disciplines across the globe. During the Lisbon ICIE Conference in 2017, I was approached by Luis Vasconcelos, a Brazilian researcher who was attending the event for the first time. He asked if he could interview me about where I thought the education system was headed in the 21st century. We spoke for some time about the future, and I soon learned that he was completing his Ph.D. in Engineering from Cambridge University. It was a thought-provoking and inspirational conversation focused on creativity and innovation, core themes of the conference. We concluded our conversation by exchanging contact information, and parted ways.

A few days later, I delivered a conference keynote presentation, and Luis was in attendance. After my address, he reached out to me via email; over the next few months, we corresponded regularly. When I mentioned that I would be visiting Oxford University in December, Luis was kind enough to arrange for me to meet some of his colleagues at Cambridge. I was ultimately connected



with Cambridge University's Ian Hosking (Engineering) and Bill Nicholl (Education, Design). I was asked to present a brief lecture to Faculty of Education students at Cambridge, and also to spend an evening learning about a fascinating initiative that Mr. Hosking and Mr. Nicholl had developed entitled *Designing Our Tomorrow (DOT)*, wherein teenage students were given the opportunity to help gather information and develop interventions for needy children with medical conditions.

After our preliminary discussion about DOT, we all agreed that collaboration would be a good idea and that the conversation should continue after I returned to Winnipeg. Later that week, I presented at the Oxford conference, where I had lunch with Dr. Eric Pool, a project manager who works at the Mayo Clinic in Rochester, Minnesota (the largest integrated medical centre in the world). He too was immediately intrigued by DOT, and volunteered to assist in any way that he could. This offer was graciously accepted by all parties.

Importantly, the collaboration that is now unfolding connects seamlessly with a variety of work done through existing partnerships among ICIE, LPI, and the Renzulli Center for Creativity, Gifted Education, and Talent Development. A number of theoretical frameworks are guiding the way, including the Amphitheater Model, which provides the philosophical underpinning for *Lost Prizes* projects designed to identify and develop the talents of at-risk young people (McCluskey, Treffinger, Baker, & Wiebe, 2016); and the Prism Metaphor for Reversing Underachievement, featuring Renzulli's Type III enrichment activities (such as mentoring, real-world problem solving, and self-selected topics) which provide high-ability, underperforming students with the opportunity to act as practicing professionals, hone their abilities, and demonstrate their unique gifts (Baum, Renzulli, & Hébert, 1995; Renzulli, McCluskey, & McCluskey, 2014).

Thanks to the 2017 ICIE Conference, and to Luis Vasconcelos for reaching out, people from Cambridge University, the Mayo Clinic, the University of Winnipeg, and the University of Connecticut are now partnering on cutting-edge undertakings that have the potential to reshape inquiry-based, socially responsible projects in English, American, and Canadian schools ... and perhaps around the globe. For me, the ICIE Conference truly helped bring the world together.

In any case, in cooperation with LPI and ICIE, the University of Winnipeg has also been active on the publishing front. After some intensive work throughout the year, UW Faculty of Education Publishing is now set to release the books *The Three Pillars of Transforming Care: Trauma and Resilience in the Other 23 Hours* (by Howard Bath & John Seita) and *Schools that Matter* (by Steve Van Bockern). In addition, the University of Winnipeg Education Centre is just finishing up production of its third monograph, *The Care and Feeding of Inexperienced Educators: Connecting Pre-service and Induction Activities* (by Beth Bergren-Mann, John Hoover, Marc Kuly, & Ken McCluskey).

As noted in a recent Board Report, the 5<sup>th</sup> Annual *Lost Prizes/ICIE* Seminars were held on the UW campus from July 12-15, 2017. This time around, there were well over 200

paid participants at the conference itself, where five keynote and 16 workshop sessions were delivered by faculty members, community partners, and international scholars. Six conference-connected Post-Baccalaureate Diploma in Education (PBDE) courses (tied directly to and offered for in-service teachers immediately before or after the event) drew 254 registrants from the PBDE Inclusive Education stream. Five other associated courses in our PBDE Counselling and General streams filled an additional 176 seats. In other words, this past summer, Education courses at the University of Winnipeg accommodated 430 registrants. This time around, the Seminars featured an evening keynote address, “It Takes a Village,” by Ishmael Beah – best-selling author of *A Long Way Gone: Memoirs of a Boy Soldier* and *Radiance of Tomorrow: A Novel*. Other popular keynotes were delivered by Mitch Bourbonniere (“Learning from Indigenous Learners”), Tessa Blaikie Whitecloud (“Settler-Indigenous Relationship Building”), Karen Magro (“Encouraging Transcultural Literacies in Cosmopolitan Times”), and Carl Heaman-Warne (“Trauma and Learning: Supporting Students Who Carry Trauma”). The breakout sessions were strong, and the following conference-connected courses were all relevant and appreciated: “Poverty and Potential” (Sheila Giesbrecht), “Teacher Stories, Student Stories: Educating with Purpose” (Marc Kuly), “Emotional Intelligence and Educational Leadership” (Karen Magro), “Borrowing Indigenous Perspectives” (Mitch Bourbonniere), “Strategies to Support Trauma-Affected Learners” (Carl Heaman-Warne), and “Expanding Gifted Education” (Cathrine Froese-Klassen).

It goes without saying that ICIE and LPI have a number of events scheduled for the coming year:

- The 16<sup>th</sup> Annual ICIE Conference in Paris, France (July 3-6, 2018), in partnership with Université Paris Descartes and Al Qasemi Centre for Innovation in Education. The theme is “Latest Developments in Research and Practices.”
- The second International Capacity Building Conference on Excellence; Innovation; Creativity; and Giftedness (Istanbul, Türkiye, January 2-6, 2019); in partnership with Istanbul University, Al Qasemi Centre for Innovation in Education (ACIE), and Tüm Üstün Zekâlılar Derneği (TÜZDER).
- Two initiatives are proposed in Croatia – the Rijeka Annual Youth Summit for Creativity and Peace (July 9-16, 2018) and the Rijeka-ICIE Professional Certificate in Excellence and Gifted Education.
- The 6<sup>th</sup> Annual *Lost Prizes*/ICIE Seminars, will take place, as always, at the University of Winnipeg from July 3-7, 2018. Three popular keynote speakers have been confirmed thus far: Steve Van Bockern (“Schools that Matter”), Mark Freado (“Kid Whispering” and “Three Pillars of Trauma-Wise Care”), and Kevin Lamoureux (“Truth and Reconciliation in the Classroom”).

Obviously, people in our respective organizations are working hard to produce pragmatic programs for educators based on solid theory and research. Whether it be through international or regional conferences; professional journal articles, monographs, or book projects; training sessions or courses; or service delivery projects for talent development, feel welcome to join us in our ongoing quest for knowledge mobilization.

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From the Editor's Desk:

# Transcultural Prisms of Teaching and Learning

**Karen Magro**

The University of Winnipeg, Canada

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Our latest issue of the IJTDC presents international research perspectives into teaching, and learning processes across disciplines, educational levels, and cultural contexts. In essence, the contributions in this volume remind us that we are living in an age of “superdiversity” and that fundamental changes continue to be visibly present in our lives. Learning occurs within globalized contexts and events (Dei, 2002). Dagnino (2012) writes:

Physical and virtual mobility has indeed become the main trope of societies characterized by conditions of “superdiversity” and the dynamic interplay of alternative /multiple modernities. Constantly increasing migratory flows, together with the pressure of economic globalization....are inciting as well as enabling a whole new range of intercultural interaction, transnational patterns, and neo-nomadic lifestyles” (Dagnino, p. 1).

Transcultural literacies express the confluence of cultures; traditional dichotomies of north and south, west and east, national and ethnic, and native and immigrant no longer exist in binary ways. Transcultural ways of knowing represent an expansion of awareness. Orellana (2016) explains that transcultural literacies is “about questioning the ontologies that hold things apart. It involves the resolution of dialectic tensions and the emergence of something new — something that perhaps we cannot even imagine” (p. 91).

Our students need to be able to connect historical and political events to their own lives in some ways. Expanding the horizons of creative and critical thinking might involve encouraging the development of transcultural literacies and learning. In “The Transcultural Journey” Richard Slimbach (2005) writes that individuals today are pursuing lives that connect the local and the global. Learners need a unique sets of skills, abilities, and attitudes to navigate this new terrain. Furthermore, he notes that the journey of learning is lifelong, and it challenges each person to be an artist, problem solver, traveler and sojourner, scholar, and cultural anthropologist. The transculturally “intelligent” person possesses six key cognitive and emotional competencies that include: 1) perspective consciousness; 2) ethnographic skills; 3) a global awareness of transnational conditions and systems, ideologies, and institutions that impact the quality of life; 4) world learning that includes an understanding of contrasting political histories, family lifestyles, social groups, arts, religions, and cultural orientations within non-English speaking, “non-Americanized” environments; 5) foreign language proficiency; and 6) emotional development (e.g., empathy, inquisitiveness, initiative, flexibility, humility, sincerity, gentleness, justice, and joy (Slimbach, 2015, pp. 206-207).

George Sefa-Dei (2002) asserts that greater representation of minority voices and ways of knowing should be encouraged in all education. A transformative education must be anticolonial and antiracist. He writes that “in our teaching practices we must always be

conscious of the socioenvironmental and political contexts of data gathering (knowledge production). In many parts of our world, people's freedom have been taken away as they teach critically and politically" (p. 130). Educators must be prepared, according to Sefa-Dei (2002) to ask a key question: "What political space do we choose to occupy at particular moments and why?" Sefa-Dei (2002) suggests that educators should seek to learn from non-western and indigenous ways of knowing that embrace a more holistic and spiritual perspective that examines how conceptions of self, personhood, place, history, culture, and belongingness to community impact learning. "Seeing students/learners as powerfully demarcated by race, ethnicity, gender, class, language, culture, and religion can implicate knowledge production. Thus, identity is linked to schooling" (p. 128).

There is value in oral storytelling of ancestral myths and legends; they tap into imaginal and artistic expression, mentorship, land-based learning, and authentic practices that are grounded in the community. Aboriginal writings from Manitoba First Nations, Metis, and Inuit people reflect "activity, change, and struggle, movements that reflect the harshness and beauty of life" (Sinclair & Cariou, 2011, p. 2). Cultural revitalization involves, in part, a reclamation of lost languages and ways of knowing. In their anthology of Indigenous writings, Sinclair and Cariou (2011) feature writers who comment on urgent concerns that are embedded within unique cultural contexts. Their writing reflects not only historical themes but contemporary, experimental, and urban ones as well:

The writings are about spirituality, geography, migration, politics, and colonialism; yet, they are also about hope and life and the importance of humour; beauty itself. They represent a broad history that encompasses many incredible struggles, but they also give voice to Aboriginal cultural values of community, sharing, respect for the land, and honour for the ancestors. (p. 5)

If transcultural competence is to develop, learners need more opportunities to understand the stories of diverse people. Along these lines, Short, Day, & Schroeder (2016) write that "even if children never leave the small communities in which they were born, their everyday lives are constantly influenced by global societies and peoples" (p. 3). Experiences within families and communities shape personal, social, and ethical development. Texts reflect the imaginary, emotional states, and attitudes of people on the move across or beyond nations, languages, and cultural borders. Children, youth, and adults can learn to become global citizens when they have opportunities to explore the journeys of others---"these journeys may be brief, extended, positive, or negative. They can be imaginative, chosen, forced. Physical, or emotional." (Young and Mathis, 2016, p. 201). They emphasize that "an understanding of global cultures is a necessity, not a luxury" (p.3). The sense of global responsibility and interconnectedness is essential to intercultural understanding. There is a sense that cultural identities are in a dynamic state of change; they are complex and reflect the dynamic of new experiences (Banks, 2011). In integrating literature across cultures into the classroom, teachers can encourage learners to develop empathy and awareness; in turn, cycles of discrimination, prejudice, and oppression can be broken.

In her award winning poetic book *Citizen: An American Lyric*, Claudia Rankine (2014) urges readers to ask: "Why are so many African-American youth feeling alienated? Why is the creative potential of so many individuals hindered by systemic barriers? What could happen if all schools were invested in students' learning and if students' existing experiences and literacies were valued and validated?" Rankine (2014) presents powerful examples of racial prejudice through compelling examples in her own life; nuanced and overt

racial discourse in everyday experiences, “stop and frisk measures,” references to the *Black Lives Movement*, and the deaths of African-American youth and adults as a result of racial profiling and police brutality are addressed in beautiful poetry, startling images, and prose. Rankine’s (2014) visual poetry and prose echo social justice themes from the works of Frederick Douglas, Frantz Fanon, Zinedine Zidane, and James Baldwin. Drawing from the work of Nora Hurston Zeale, Rankine (2014) writes of the systemic racism the tennis champion Serena Williams experienced over her career. The experiences of Williams are juxtaposed with powerful poetic verses that include “I feel most colored when I am thrown against a sharp white background.” Critically unquestioned assumptions, stereotypes, and myths continue to erode the fundamental human rights of black youth growing up in America. The cultural environment for too many youth inhibits personal and academic growth. The images and poems in Rankine’s *Citizen* (2014) present an urgent plea to break down systemic violence, hatred, and oppression at all levels and begin. “*The worst injury is feeling that you don’t belong so much---to you*” (p. 146). Children can become alienated not only from the school community but from themselves.

Research into talent, creativity, and giftedness must acknowledge the way that systemic barriers prevent more children from realizing their talents and creativity. How can education inform, uplift, and empower? A transformative education acknowledges the socio-cultural forces that may hinder an individual from tapping into their creative potential (Magro, 2015). The essence of a person and their resilient spirit can be crushed. Rankine (2014) writes that “the endless struggle to achieve and reveal and confirm a human identity, human authority, contains, for all its horror, something very beautiful” (p. 128). What can be done to encourage greater inclusion and equity not only in education but in all spheres of life such as safe housing, healthy neighborhoods, life-centered communities. Education and training are central to innovation in all trades and professions. The European Council Commission (ECC) on education continues to emphasize that evidence-based education policy relating to the cultivation of creativity, knowledge, flexibility, and innovation is necessary for both personal and professional development. From their perspective, creativity and innovation are multi-disciplinary phenomena that integrate several fields of knowledge.

The articles in this issue reflect the dynamic intersections of learning, teaching, and creative processes across disciplines, educational levels, and cultures. The research studies include both urban and rural contexts. How is creativity and talent conceptualized and how do educators assess creativity from a more complex socio-cultural, psychological, and historical lens? Learning processes from an individual and collaborative perspective are explored. In their research article, Don Ambrose and Valerie K. Ambrose seek to understand the “culture-giftedness nexus” through an interdisciplinary exploration. Their timely article explores insights from cultural anthropology, English studies, political science, ethical philosophy, and history. The emergence of growing fields such as bioarcheology and cultural psychology can provide new insights into human origins and the long-term sustainability of life. How can these fields and disciplines inform and deepen our way of thinking about dimensions of giftedness within cultural contexts? Ambrose and Ambrose emphasize that it is vital for theorists and practitioners to keep an open mind to understanding the nuances of creativity and talent; ethnocentrism and powerful discourses can oversimplify conceptions of culture, talent, and giftedness. Educators “assessing” giftedness and creativity must be keenly aware of the cultural context of the learner.

A number of the studies in this issue concentrate on the dynamics of a creative classroom climate and the importance of key emotional intelligence traits of teachers who



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can nurture talent and creativity. Judy Goldberg and Rama Klavir examine the intersection of school climate, classroom climate, and teacher quality. Their study highlights the importance of the way students are perceiving and receiving information about learning processes. A positive classroom climate should encourage the development of emotional intelligence skills such as self-awareness, empathy, motivation, problem-solving, cultural appreciation, and effective communication. Specialized teaching and learning strategies can help nurture these qualities in learners (Goleman, 1995; Magro, 2016). Marhoon Janna discusses cultural differences, academic integrity, and attitudes toward academic dishonesty among academically-talented undergraduate students in New Zealand and Bahrain. Ken Reimer, Jaymi Witze, Curtis Howson, and Rick Freeze provide an inspiring case study of an alternative education program that can encourage the development of emotional, artistic, and cultural literacies among Indigenous youth.

Maher Bahloul writes about the way storyboarding can be used to encourage literacy skill development. Applying the ideas of filmmakers who utilize visual storyboards to “stage” each scene in a dramatic script, Bahloul suggests that students can conceptualize the elements of fiction more readily when they apply storyboarding techniques to outline the setting, plot, tone, characters, and point of view in a story. Storyboarding taps into visual and imaginal domains of learning. Gaye B. Roege examines the perceptions of artistically-gifted rural middle school adolescents regarding the support for the development of their talents by the school and community. Roege’s study grew out of nearly three decades of working with academically and artistically-advanced students. Art should be a valuable avenue for students to feel valued, heard, and understood. Roege’s study has important implications for the integration of art across the curriculum. She is critical of secondary school systems that do not encourage or provide resources to inspire the artistic journeys of many adolescent learners. Drawing from the work of M. Csikszentmihalyi, Roege writes that “developing talent requires a synergistic combination of rewards that are both expressive and instrumental.”

Joseph S. Renzulli and Laurel E. Brandon explain the importance of a school and community-wide approach to encouraging the participation of culturally- diverse students in enrichment and talent development behaviors. Their valuable article provides practical strategies that can enrich learning experiences across all educational levels. Renzulli and Brandon advocate for a more culturally and linguistically-inclusive approach to assessing talent development. Ingrid W. Schutte, Marca V.C. Wolfensberger, and Wiel Veugelers discuss the importance of developing global citizenship courses. Their study is particularly timely in a world where industrialism and militarism continue to erode the development of life-centered communities. Earlier, Hall (2002) noted that too many of the world’s people “caught in vicious patterns of cruelty and violence...and that the contemporary movement of people is involuntary movement as economic and political refugees are forced to shift from their homes in search of security as a means to survive” (p. 37). Schutte, Wolfensberger, and Veugelers challenge educators to view the curriculum as dynamic and evolving; how are the current needs, aspirations, and challenges of 21<sup>st</sup> century youth and adults being addressed in meaningful ways through curriculum content and teaching styles that can maximize learning and motivation? How do we integrate social, moral, and civic education into our curricula as a way to move toward a sustainable and peaceful world? Hall writes that “the most powerful instruments to transform the world that we have are our own minds” (p. 43).

We have a number of articles that explore creativity and talent development in the sciences. In an intriguing article, James Campbell, Seokee Cho, and Kirsi Tirri review the research examining the effectiveness of chemistry, mathematics, and physics Olympiad

programs in preparing creative graduates who may work in science, technology, engineering, and mathematics (STEM) professions. How might factors such as family systems and parenting styles, specific school programs and resources available, individual ability, achievement motivation, competition, and opportunities impact short and long term career and professional trajectories? What can be learned from the Olympiad studies? Campbell, Cho, and Tirri suggest that more resources are needed to nurture talent among children from socioeconomically disadvantaged backgrounds.

Anisija Žižić and Andrina Granić suggest that computer science education (CSE) could be a valuable starting point to implement transformative changes in teaching and learning in order to support the development of creative skills in problem solving across different disciplines. Sanja Tatalović and Sanja Martinko explore the connection between students' attitudes toward learning Physics and learning outcomes. Innovative learning strategies are suggested in their study. Arash Esmali Zaghi, Sally M. Reis, Joseph S. Renzulli, and James C. Kaufman explore the creative potential of engineering students with Attention Deficit Hyperactivity Disorder (ADHD). The authors assert that students with ADHD are underrepresented in engineering programs, in part because of the rigidly structured courses that may not recognize the unrecognized talent and unique learning styles of these students. The authors provide innovative suggestions that can encourage divergent thinking, flexibility, problem-solving, and resilience among potential university students identified as having ADHD.

Our current issues also features creative essays. Shawn Robinson describes his own personal journey as an African-American man with ADHD. He describes the way educational systems created barriers that hindered his ability to express his talents and abilities. Robinson's poetry reflects the way personal and cultural experiences intersect with "school systems" that can alienate rather than affirm individual talents. Helen Lepp Friesen's personal essay illuminates the importance of educators being keen observers of life. Being emotionally and spiritually present can be a catalyst to creative thinking. Drawing upon her own experiences, Lepp Friesen explores the ways everyday occurrences and naturalistic observations have the potential to inspire creative writing, grand discussions, and the neglected art of storytelling.

Taisir Subhi Yamin's interview with Joyce Van Tassel-Baska reinforces the idea that an educator can be a catalyst to inspirational thinking and leadership across the academic disciplines. Dr. Van Tassel Baska's remarkable career illuminates the importance of qualities such as motivation, perseverance, academic curiosity, community service, and a dedication to improving the lives of others. Her international work in gifted education crosses continents and cultures. James C. Kaufman illuminates the factors leading to his distinguished career in creativity, chemistry, and engineering. The visionary educational leadership of both Dr. Van Tassel-Baska and Dr. James C. Kaufman have paved the way for thousands of teachers, administrators, professors, and consultants in the areas of giftedness and creativity.

The book reviews in this issue are written by Jasna Arrigoni; Maruška Željeznov Seničar; and Dorothy Sisk. A review of the 2017 ICIC conference in Lisbon, Portugal is provided by Ken Reimer.

The IJTDC welcomes submissions for book reviews, essays, research articles, and theoretical position papers for review.

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- For an extensive bibliography of texts designed to encourage transcultural learning please e-Mail me at [k.magro@uwinnipeg.ca](mailto:k.magro@uwinnipeg.ca)

# Perceptions of Artistically Gifted Rural Middle School Adolescents Regarding Support for Development of their Talent by their School and Community

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## Abstract

This case study explored artistic journeys of six artistically gifted middle school adolescents in rural Montana, USA, in order to ascertain the perceived level of support offered by their schools and communities, for developing their talent. Two primary questions guided the qualitative research, and related to: 1) student perceptions of personal talent and 2) their perceptions of how their schools and communities encourage or inhibit the development of their talent. Three overarching themes—experience, time, and opportunity—emerged during analysis and provided categorical organization for findings related to: a) the students' emotional connection to the experience of art-making; b) the expressive power adolescents perceived being granted through their art; c) the importance of family encouragement and support of their personal talent; d) the internet as a community to which adolescents belong; e) temporal factors related to developing talent; and f) the adolescents' view of the timeline of opportunity. A crucial component of maintaining personal commitment to one's talent area is support. Adolescents believed support from family was adequate, but the support from school and community was lacking. An unforeseen outcome was a perceived lack of time to pursue the talent area.

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**Keywords:** Adolescents; artistically gifted; rural environments; talent development

As definitions become broader and more inclusive as they relate to giftedness, creativity, and talent, misconceptions still prevail, regarding the development of *artistic* talent; and lack of knowledge pertaining to quality, availability, and outcomes of art experiences persists in rural public schools (Talbot, 2009). There are approximately three million identified gifted children in the United States, representing roughly six percent of the total school population nationwide, yet no data exist identifying the number of artistically talented youth; albeit it is likely that some of the academically gifted also possess artistic talent (National Association for Gifted Children [NAGC], 2008). The NAGC (2012) *State of the Nation in Gifted Education* report served as a call to action emphatically stating:

Developing and supporting high levels of talent in every area requires national, systemic attention by all stakeholders. This is a commitment we have not seen in more than two generations...[T]o thrive in the 21st century we need a renewed commitment to excellence and development of talent, and help[ing] students achieve beyond grade level [is] necessary to restore the assets lost and place our nation on more solid footing in an increasingly competitive global ecosystem.

An emphasis on the of 21<sup>st</sup> century's creativity challenge—more aptly, *creativity crisis*—(Kim, 2012) pervades discussions in business and society and ultimately affects expectations for education (Hennessey & Amabile 2010; Pink, 2005) particularly in the visual arts (Robinson, 2010).

The study was premised upon the demonstrated demand for talent that can offer innovative solutions to today's problems; the increasing evidence of creative clusters in rural environs; and the critical developmental needs of adolescents. The study grew out of nearly three decades of my experience working with academically and artistically advanced students and observing the lack of attention being given on a large scale to developing artistic talent in particular. The purpose of the study was to reveal those artistic journeys of adolescents to better understand from their perspective how external support mechanisms did or could impact that talent.

Theoretically, although education should be about talent development, schools were not designed to value and promote creativity; their purpose has been to institutionalize learning and generate a predictable outcome (Rolling, 2013). Today, even as the conversation about innovation grows, emphasis continues to be on standardization rather than recognizing and rewarding excellence and creativity, which marginalizes artistically talented youth. Small rural schools face especially unique hurdles in terms of what they can offer in the way of appropriate experiences for artistically talented students (Clark & Zimmerman, 1999). In Montana, USA where the study was conducted, only 45 of the nearly 10,000 teachers statewide held credentials in any type of gifted education (Shupert, personal communication, March 3, 2015) making talent recognition and development a challenge. However, rural schools and communities can, when partnering to serve students in practical and useful ways, make opportunities accessible that help encourage that development (Colangelo, Baldus, & New, 2003; C. Howley, 2009). “Rural” is not just an “ism.” Rural communities are not just smaller versions of urban areas, but are significant influencers of talent and are becoming magnets for creative clusters. It is important to recognize the cultural benefits of the community to avoid the deprivation of talented individuals that happens when *rural* is viewed as a disadvantage, making outmigration to urban locales the goal for talented students (A. Howley, C. B. Howley, & Pendarvis, 2003; Rakow, 2005).

All talented individuals appear to pass through three basic stages that lead to development of talent: a) love of subject; b) development of discipline and technique; and c) individual position in the field (Bloom & Sosniak, 1981). Where the natural progression of ability due to maturation stops, appropriate intervention can guide further development (Vygotsky, 1978)—especially during early adolescence, a critical time of adjustment in the brain’s structure and function. Those who work with teens intuitively know this but may be unaware of the potential this time period offers. For example, the neural fibers of the corpus callosum connecting the two hemispheres of the brain undergo significant physical growth, expanding the actual grey matter where learning takes place. This alters the function of the brain, opening a window of opportunity at approximately age 12 for new knowledge and skill-building that is short-lived. This proliferation begins to taper off by about age 16, eventually closing that window (Barnea-Goraly et al., 2005). Understanding differences in interests is essential to being able to encourage talent development and relates to the choices students have among several potential areas of talent as well as decisions students make about them during mid-adolescence (Bloom & Sosniak, 1985). External influences (families, peers, community, institutions—and the value society places on a given domain at a given time, whether perceived or real) tend to contribute either positively or negatively to how the adolescent perceives and is able to develop his/her own talent (Clark & Zimmerman, 1988; Dai & Schader, 2002; Evans, Bickel, & Pendarvis, 2000; Rakow, 2005).

Increasing the chance that rural students find appropriate resources to develop their talent, today’s technological capabilities make access to distant sources of advancement and enrichment more likely; however, this option is too often considered in isolation of localizing opportunities.

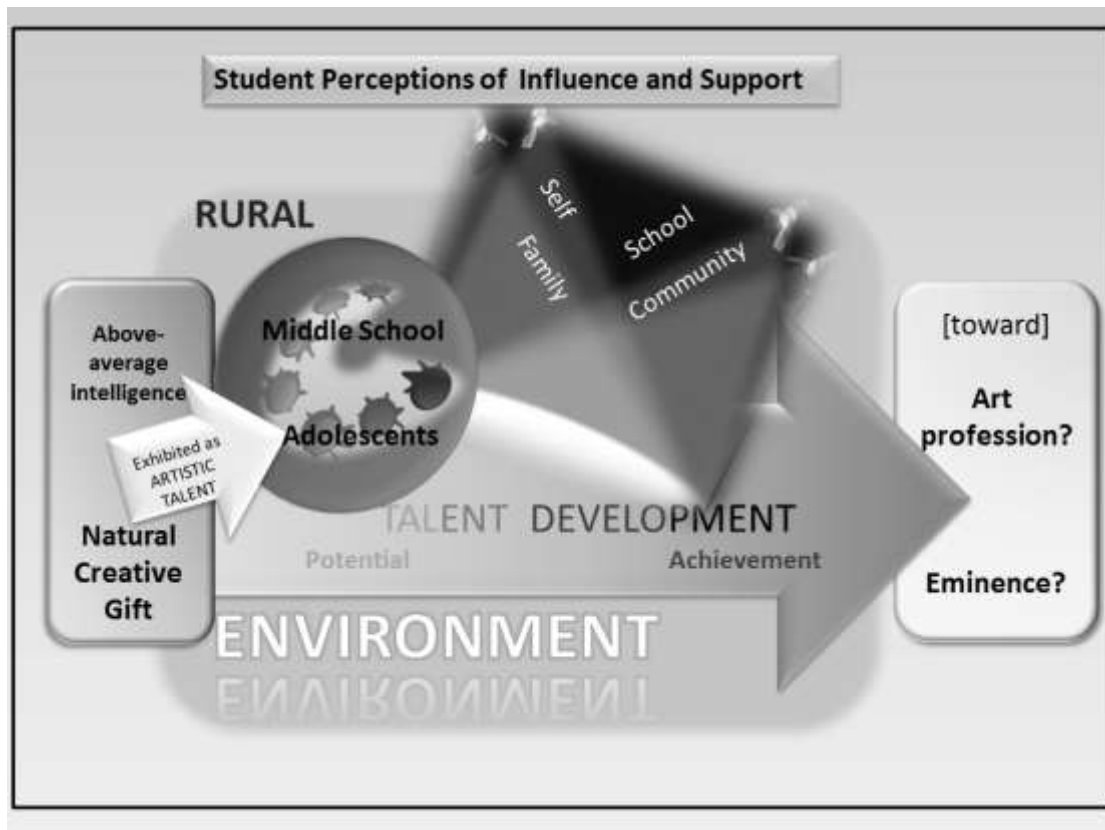
## Conceptual Framework

Context (referred to as “place” in the study), is an essential element of creativity in any form because individuals cannot be isolated from their environments (Plucker & Barab, 2005). According to Csikszentmihalyi (1988):

[Creativity] is the product of three main shaping forces: a set of social institutions, or *field*, that selects from the variations produced by individuals those that are worth preserving; a stable cultural *domain* that will preserve and transmit the selected new ideas or forms to the following generations; and finally the *individual*, who brings about some change in the domain, a change that the field will consider to be creative...so the question ‘where is creativity?’ cannot be answered solely with reference to the person and the person’s work... [it] is a phenomenon that results from interaction between these three systems (p. 325-326).

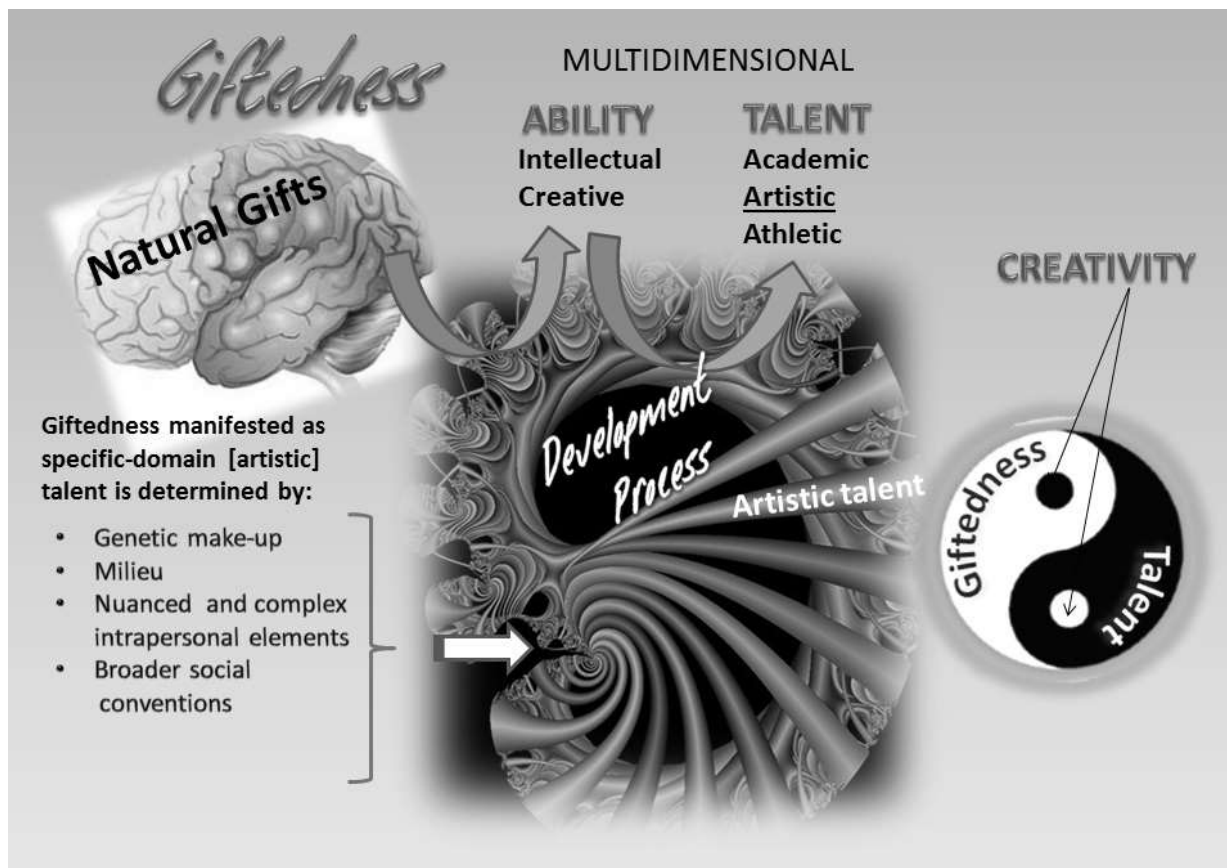
This is important because the rural context in the study is the place wherein the three systems reside. Artistic talent was conceived as a natural creative gift which has been developed to some degree based upon a number of factors and conditions (Gagné, 2008; Getzels & Csikszentmihalyi, 1976;

Katzko & Mönks, 1995). In Figure 1, the environment or milieu (the rural community) is the predominant factor of talent development which hosts all other factors embodied within it; and serves as a catalyst of talent development.



**Figure 1:** Conceptual model of the study of adolescent perceptions related to influences on personal talent development in rural communities. Adapted from DMGT (Gagné, 2008).

Creativity is considered a motivating and energizing factor of unfolding talent in any domain (Khatena, 1992; Pfeiffer & Thompson, 2013). However varying conclusions across different studies related to the same aspect of creativity are often a result of the effect of semantics (Plucker & Makel, 2010). In my study, the constructs of giftedness, creativity, and talent development were operationalized as overlapping and interdependent. Figure 2 illustrates how the multidimensionality of giftedness connects the three components. Natural (innate) untrained gifts are present as either intellectual or creative ability and comprise the first of the two primary strands of giftedness. How these abilities are exhibited in a specific domain forms the second, or *talent* strand of giftedness (Callahan, 2009). Domain-specific talent, represented as manifested giftedness, depends upon a variety of factors including the genetic make-up, and environmental forces which serve to influence development in some way; the nuanced and complex intrapersonal traits; and finally, the broader social conventions that place some level of value on particular types of creativity (Csikszentmihalyi, 1988, 1996; Csikszentmihalyi, Rathnude, and Whalen, 1997; Gagné, 2008; Subotnik, Olszewski-Kubilius, and Worrell, 2011). The intricately patterned graphic in Figure 2 represents the complexities (related to the relationships of the influencing factors capable of moving talent along a trajectory) that are unique to each person (Subotnik et al., 2011) and appear to apply differently in separate domains within which talent can be developed (Bloom, 1985; Eisner, 2002). Tubular shapes extending from the intertwining pattern in the model represent those separate domains; but because artistic talent was the focus of this study, no other domains were labeled. Giftedness and talent were considered mutually reinforcing with creativity embedded within each as represented by the yin yang.



**Figure 2:** Giftedness, Talent, and Creativity, Operationalized.

## Methodology

### Participants

Purposive case selection resulted from an initial pool of students referred by individual professional artists, art teachers, parents, and students. Because there was no standard definition for artistic giftedness specifically, the most widely-accepted definitions for giftedness in general, at the state and national levels were used as basis for selection. In addition, supplemental criteria—above average ability, creativity, and task commitment—taken from the Schoolwide Enrichment Model (Reis & Renzulli, 2010; Renzulli, 1978; Renzulli & Reis, 1985; Renzulli & Reis, 2014) were included in the selection process. Students who are artistically gifted typically demonstrate their talent in a variety of contexts (home, school, community) therefore, my study invoked input from knowledgeable members of the students' community, because "dependence on teachers does not exclude the possibility that underachieving or achieving in venues outside of school will be missed" (Csikszentmihalyi et al., 1997, p. 47).

All participants were enrolled in a rural middle school in one of three different communities. The selected schools and communities were all in the state of Montana in the northwest region of the United States. Two of the schools (referred to in this study as School A and School C) are located in western MT; the third school (School B) is on the eastern side of the state. Nearly 80% of the state's counties maintain "frontier" status (geographic isolation and low population density) according to the US Census Bureau (2010) and the Montana Office of Rural Health, (2012). The state (with a massive 147,164 square miles—making it slightly larger than the size of Japan) averages fewer than six people per square mile. Currently, the average ratio of students to a full-time-equivalent (FTE) teacher across the state is 12:1. Two of the school districts were comparable with respect to socio-economic status and minority populations and closely matched state averages for those categories as indicated in Table 1 and 2 below.



**Table 1:** Montana State Demographics (2014-15).

State Population	Population Density	Ethnicity (2014)					Free/reduced lunches
		White	Black	American Indian	Asian	Hispanic	Public schools
1, 023, 579	6.8/sq. mile (from 2010 census report)	89.7%	0.6%	6.6%	0.8%	3.5%	43.20%

**Table 2:** Breakdown of School District Demographics (2015).

Public School	County Pop. Density (2010 census report)	7 <sup>th</sup> /8 <sup>th</sup> grade enrollment	Minority populations	Free/reduced lunches	Student/teacher ratio
A	16.8/sq. mile	195	11%	42.6%	13:1
B	5.0/sq. mile	58	1%	10%	15:1
C	16.8/sq. mile	233 in 7 <sup>th</sup> & 8 <sup>th</sup> grades. (middle school includes 6 <sup>th</sup> , for total of 423)	11% (6 <sup>th</sup> -8 <sup>th</sup> )	50.6%	16:1

My intent was for a balanced gender representation to be achieved within the sample group; however, this was not accomplished. Therefore, findings could represent a slight bias related to female preference in the sample. Table 3 offers a glimpse of the backgrounds of the six participants.

**Table 3:** Participant Background Information.

Item	Category	School A	School B	School C	Total (Frequency %)
		N=1	N=3 (Frequency %)	N=2	
Gender	Male	0 (0%)	1 (33.3%)	0 (0%)	1 (0.16%)
	Female	1 (100%)	2 (66.6%)	2 (66.6%)	5 (83.3%)
Age	12	0 (0%)	2 (66.6%)	1 (0.16%)	2 (33.3%)
	13	1 (100%)	2 (66.63%)	1 (50%)	4 (66.6%)
Ethnicity	White	1 (100%)	3 (100%)	2 (100%)	6 (100%)
	Other	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Grade	7	0 (0%)	1 (33.3%)	1 (50%)	2 (33.3%)
	8	1 (100%)	2 (66.6%)	1 (50%)	4 (66.6%)
Academics	Adv. courses (non-art)	1 (100%)	2 (66.6%)	2 (66.6%)	5 (83.3%)
	Gifted services (any)	0 (0%)	2 (66.6%)	1 (50%)	3 (50%)
	SPED/Title 1 services	0 (0%)	1 (33.3%)	0 (0%)	1 (0.16%)
Current Art Instruction	School Art program	1 (100%)	2 (66.6%)	2 (100%)	5 (83.3%)
	Privately taught lessons	1 (100%)	0 (0%)	0 (0%)	1 (0.16%)
Referral by	School art teacher	0 (0%)	3 (100%)	2 (100%)	5 (83.3%)
	Private art instructor	1 (100%)	0 (0%)	0 (0%)	1 (0.16%)

## Instruments

A pre-screening questionnaire assessed three componential areas related to perception of personal talent, behaviors indicating prioritization of art activity, and level of actual involvement in art—all relating to overall commitment. Completed questionnaires were analyzed to determine whether the individual's level of talent commitment would align with the purpose of the study. Response items in Part I (Section A) of the questionnaire were assigned a value based on the importance of this attribute to the purpose of study; response items in Part II, (Sections B and C), were Likert-type responses. A threshold score on each of the ten questions in Part I would sum to 32, which equals 70% of the total possible score of 46 across those items. All students scored between 32 and 38 points on these items. As a secondary screening criterion, a raw score of 59 points (again, 70% overall) was established for inclusion in the study. This percentage was chosen as ideal for this study, because few adolescents have demonstrated their talent in ways that reflect their true potential, and to set a higher cutoff would have eliminated those who may show more promise as older adolescents.

The scores of five participants fell within a similar range based on analysis of Part II, (Sections B and C) of the questionnaire, and identified one participant as an outlier related to his interest and ability in digital art. His raw score of only 51—a 60% average score overall—was interpreted as a result of a potential bias in the instrument that had zero questions related to digital art specifically; therefore, he was accepted into the study. Table 4 shows both incremental and aggregated results of the three components of the questionnaire.

**Table 4:** Pre-screening Questionnaire Results Composite Indicating Participant Commitment to Talent.

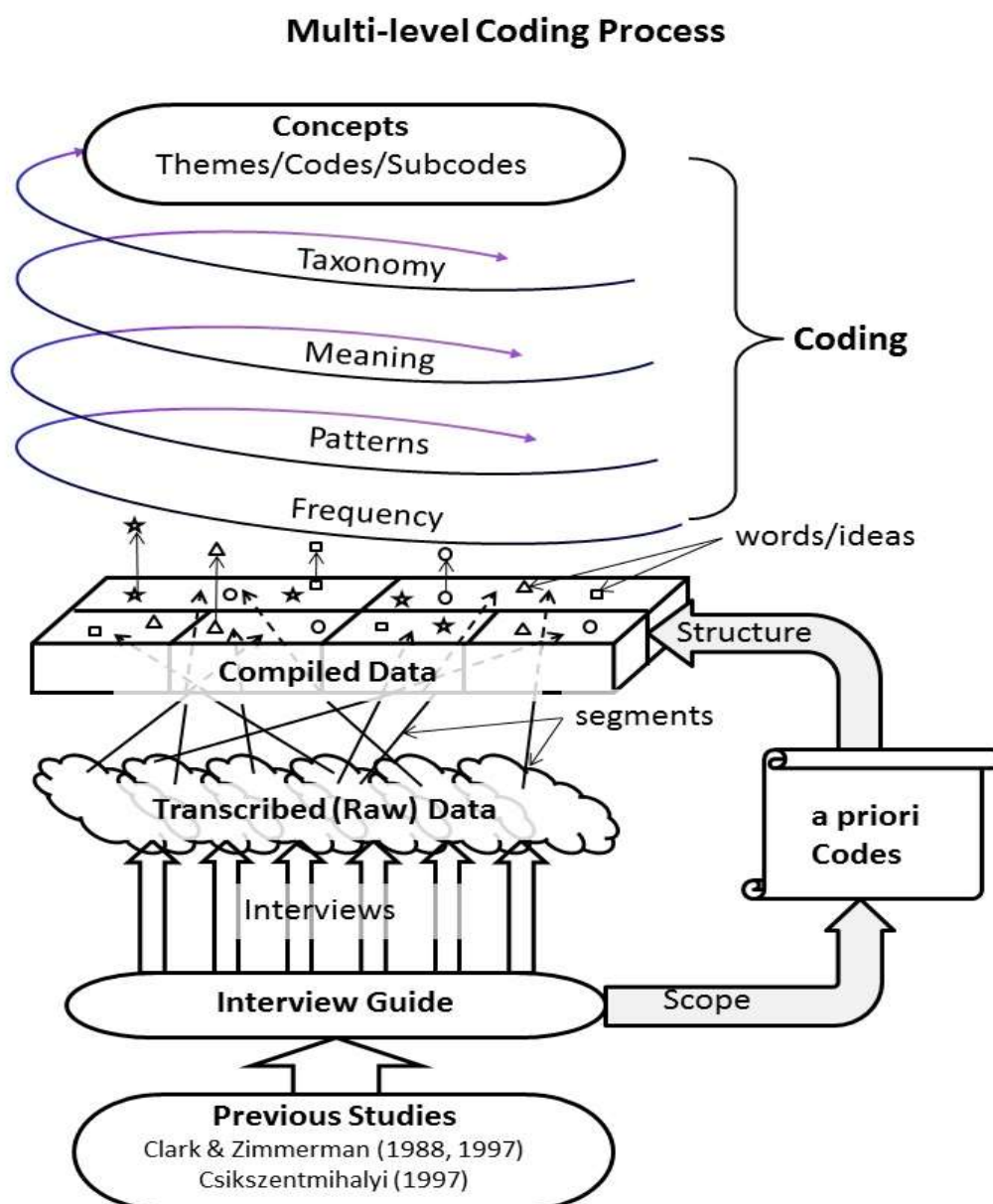
Talent Commitment																									
Section	A. Talent Self-assessment								B. Art Behaviors								C. Activity Involvement								Overall
Question	1	2	3	4	5	6a	6b	Sub-total	7	8	9	10	11	12	Sub-total	13	14	15	16	17	18	19	20	Sub-total	
Points	5	5	3	3	5	5	3	29	4	4	4	4	4	4	24	4	4	4	4	4	4	4	4	32	85
Name																									
Lilac	4	5	3	3	5	3	2	25	4	2	2	3	2	3	16	4	3	4	2	2	3	2	4	24	65
E.J.	5	5	3	1	5	3	2	24	3	2	3	2	2	1	13	4	3	4	3	4	4	3	4	29	66
R.F.	5	4	2	0	5	3	0	19	2	1	3	1	1	3	11	3	2	2	1	3	4	2	4	21	51
Rose	5	5	3	1	3	3	0	20	4	2	3	2	2	2	15	4	3	4	4	4	4	5	4	32	67
Daisy	4	5	3	3	5	2	0	22	3	2	2	2	3	3	15	4	4	4	4	3	4	3	4	30	67
Patricia	4	5	3	3	5	2	0	22	3	2	2	3	2	2	14	3	2	3	4	3	4	2	3	24	60
Cross Sec Mean																									
	4.5	4.8	2.8	1.8	4.7	2.7	0.7	22.0	3.2	1.8	2.5	2.2	2.0	2.3	14.0	3.7	2.8	3.5	3.0	3.2	3.8	2.8	3.8	26.7	62.7
Ratio	0.90	0.97	0.94	0.61	0.93	0.53	0.22	0.76	0.79	0.46	0.63	0.54	0.50	0.58	0.58	0.92	0.71	0.88	0.75	0.79	0.96	0.71	0.96	0.83	0.74

The interview protocol was developed using salient, applicable, and field-tested questions from previous studies on talent development (Clark & Zimmerman 1988; Csikszentmihalyi et al., 1997). The interview guide was designed to address very broadly how participants view their own artistic talent; the forces that influenced it; individuals and catalyzing factors that have affected its development; and how it has been encouraged, inhibited, and cultivated in the rural school and community contexts.

Field and reflective notes, as well as analytic memos, provided the triangulation of data to assure validity and accuracy.

## Procedure

Findings were initially sorted and compartmentalized by their relationship to a priori codes. A first cycle of holistic coding combined with in-vivo (selective) coding produced several broad topic areas that could be categorized under the a priori code names. For example, “being an artist,” “doing art,” “having talent,” “why I love art so much,” or “being able to express myself,” were filed under the a priori code name “views of self,” related to talent. Figure 3 shows the how simultaneous use of axial and open coding further delineated the larger chunks of data into smaller segments as significant words and phrases were identified across transcribed data. In addition, as new relationships emerged during this first cycle of coding, conceptual mapping (See Figure 4) helped visualize the connections which transcended the a priori code categories, necessitating the assigning of new code names to primary and sub-code categories. Concepts evolved from this process and related to the overarching themes of a) experience of talent; b) tension between talent and responsibility (time); and c) motivation, conditions of adult support/encouragement, and commitment to talent, which were then all categorized as opportunity to develop talent (See Figure 5).



**Figure 3:** Analytical Process Map Showing Cyclical Multi-level Coding for this Study.

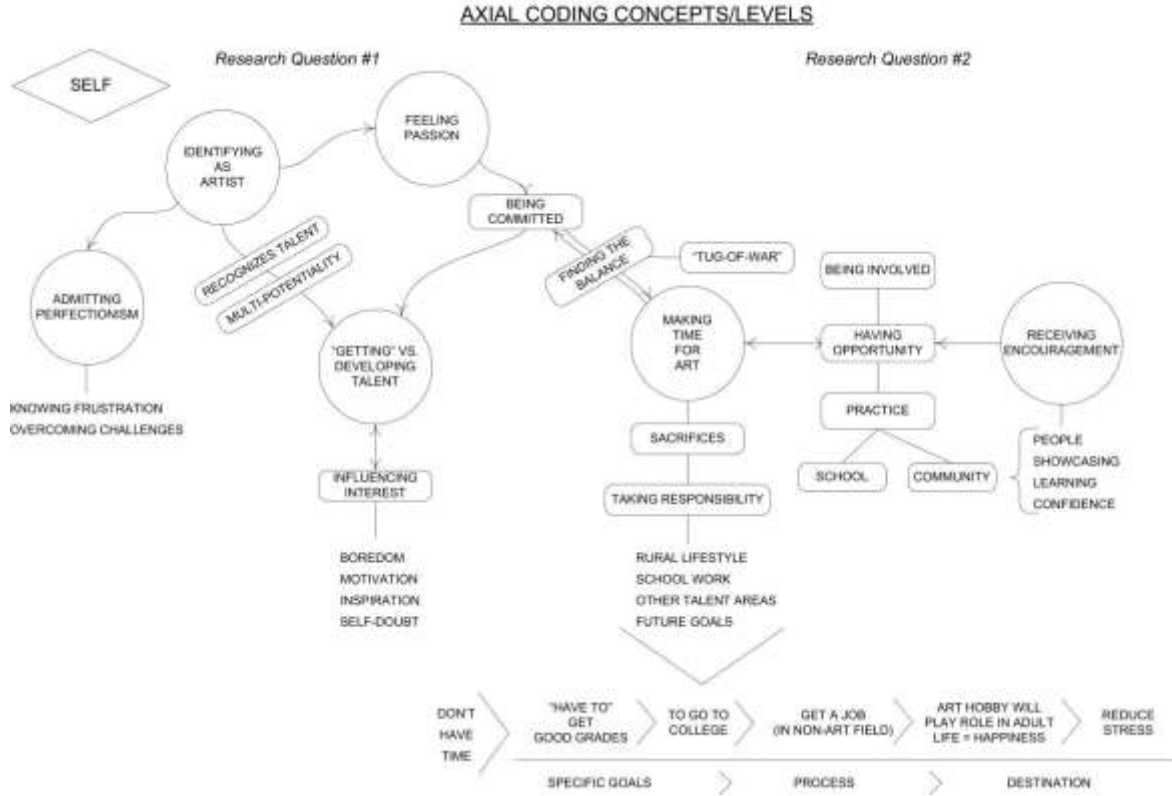


Figure 4: Beginning Concept Formation from First-Cycle Axial Coding.

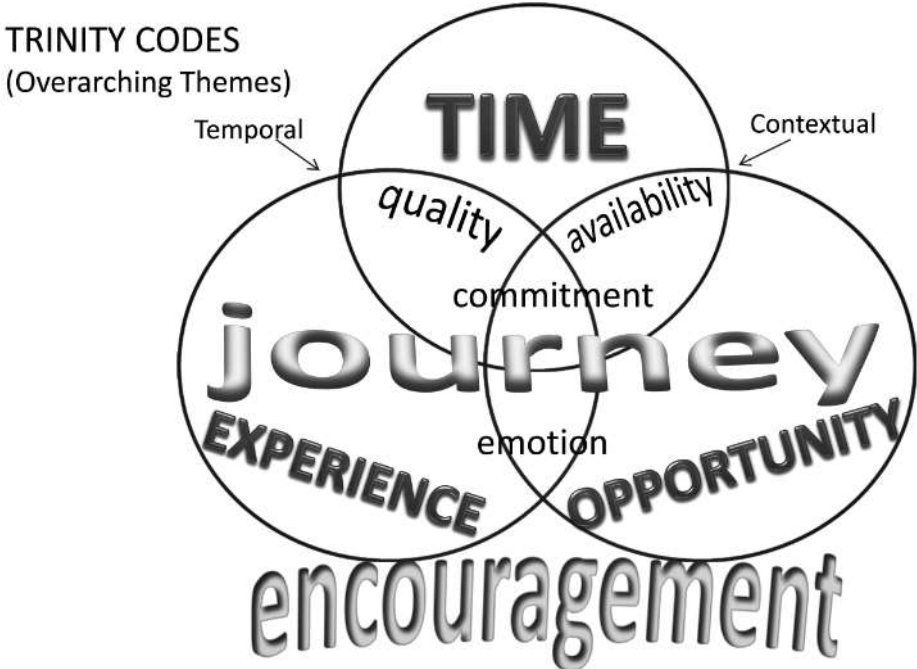


Figure 5: Three Overarching Themes Emerging From Analysis and the Relationship of Other Factors.

**Results**

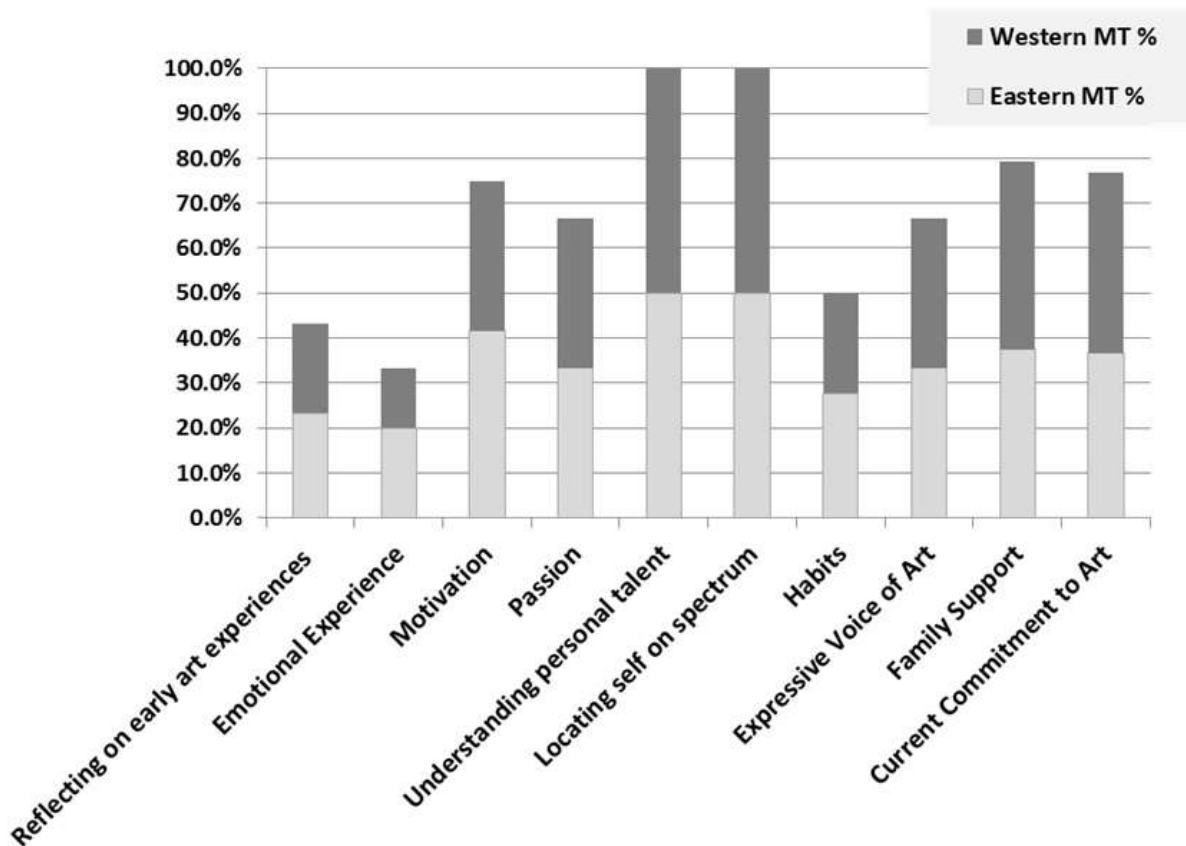
All of the students demonstrated talent in more than one domain. Five of them were receiving advanced instruction in academic courses, and three were receiving some type of pull-out gifted

services. One was enrolled in Title 1 Math. Table 5 breaks down advanced ability across domains for the participants. An X in the subject row indicates some type of advanced ability/accelerated coursework. A star (\*) in the subject row indicates recognized talent with gifted or advanced instructional services being offered in that specific subject. A star beneath the participant's name indicates the student is receiving gifted services but no mention of which specific subjects. Initial analysis showed more similarity overall among the adolescents; however, collective case analysis revealed distinct differences.

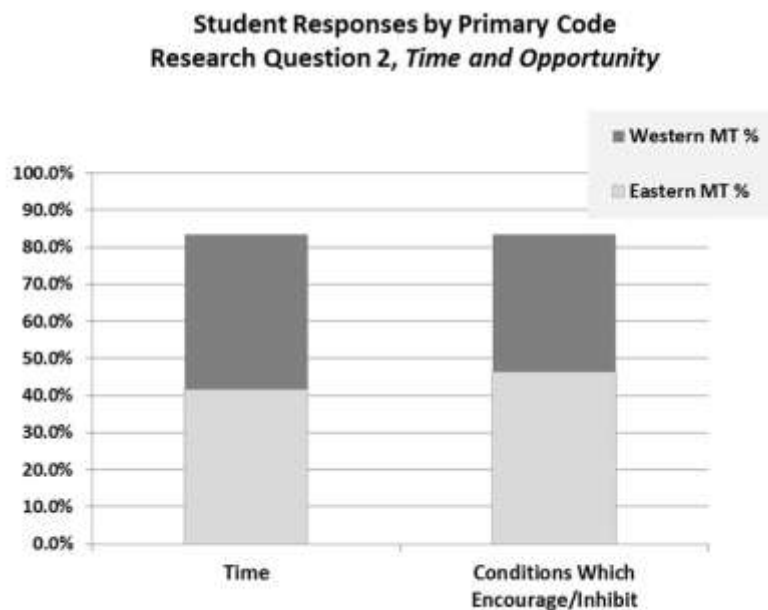
**Table 5:** Indicators of Multi-potentiality in Study Participants.

<b>Specific Talent Area</b> Other than art (indicated where no gifted services apply)	<b>School A</b>	<b>School B</b>			<b>School C</b>	
	Lilac	EJ	RF*	Rose	Daisy	Patricia
Math	X				*	*
Instrument				flute	X	violin
Dance					ballet	X
Science	X				X	*
History	X				X	
Language arts					*	
Writing Poetry					X	X
Sports				track	X	X

**Student Responses by Primary Code**  
**Research Question 1, Experience of Talent**



**Figure 6:** Participant Response Frequencies Corresponding to Code Categories for Question 1.



**Figure 7:** Participant Response Frequencies Corresponding to Code Categories for Question 2.

## Discussion

Insight into the artistic journeys of the adolescent participants derived from the primary themes that were identified during analysis.

### Emotional Connections to Art Experiences

Students were all able to recall being interested in art from pre-school or early elementary school, and they remembered specific people or events as triggers for their interest in art (Clark & Zimmerman, 1988). For all students, those art experiences perceived as optimal appear to have energizing effects on the continued engagement in art activities and serve as a strong predictor of future commitment, thus potential to develop talent. Findings confirmed that participants based their impressions of their talent on the value they placed on the expressive or emotional rewards derived from the activity. Although some of the participants did perceive art to be useful, that criteria did not place high on the scale of what motivated them to persist (Csikszentmihalyi, et. al, 1997).

Differences were noted among the cases regarding the type of emotional connections students recalled for those first art experiences. Students who reflected on art lessons in school viewed those experiences more negatively; while those whose earliest memories of art included family members, viewed first art experiences in a more positive light. A redeeming factor was that as students built a repertoire of experiences related to art practice and recalled those experiences as enjoyable, their emotional connection became more positive overall.

Students all indicated that a need to do well in school and get good grades was a top priority for them as prospective college students. This directly related to the perspective projected by the educational community (and to some degree, parents—who even while supporting their children’s talent—encouraged a career outside of art for stability and security) that STEM courses are more useful and require more discipline and dedication of time and energy. Even when subtle (forwarded through policy and scheduling), the message students get is that art is an enterprise that can be undertaken on one’s own time and is therefore valued less in the educational context. For the adolescents, this often meant pursuing their art in the less hostile environments that existed outside the classroom (Bolster, 1990). However, developing talent requires a synergistic combination of rewards that are both expressive and instrumental (Csikszentmihalyi et. al., 1997). Though they expected to

retain their art interest as adults potentially interweaving art with their professional work, most students in the study did not foresee themselves choosing a career relying solely on art. None, however, directly alluded to being influenced by their parents in their choices.

## **The Power of Expressive Voice**

Adolescents found it especially rewarding to discover their voice through the expressive properties in art. Even those who were less than certain about having their creations exhibited for others to judge felt the immense power of being able to unleash emotion and communicate an understanding of their world through visual means.

All of the study participants felt art provided an avenue to being valued, heard, and understood that would be otherwise inaccessible to them. Whether through doodles or more elaborate pieces, art provided a spectrum for the adolescents to make meaning that could be represented and shared (Eisner, 2002). Giving others a window into their soul—their “truth” about the world that surrounds them—offered a significant boost to their psyche and incentivized continued engagement in art. Researcher-observation data revealed the importance of self-expression to the participants through demonstrations of increased animation, change in voice pitch, and changes in body language while they shared their impressions of what art meant to them. Artistic expression had the capability of offering a freedom that was not experienced in other classes or contexts. How that freedom was interpreted varied among the adolescents.

## **Impact of Family on Talent**

Encouragement from family is of great import to the overall talent development trajectory of the rural adolescents. Findings validate research related to the aspect of stimulation in the early environment being critical to the complex development of talent (Csikszentmihalyi et al., 1997). All students drew inspiration for early involvement in art from an immediate or extended family member; all of them named multiple family members who had some influence on their continued interest in art; and four credited at least one parent for some of that influence. In terms of support that families provided, the study showed that while every student had access to the private space of their rooms to engage in art, none had a studio-like environment within which to work, which aligns with the findings in the Clark and Zimmerman study (1988). All participants believed family provided sufficient encouragement and support for their talent.

Only one of the adolescents had taken art outside of school; however, several were involved in extra-curricular activities and two were taking lessons related to other arts: dance and music. Interesting to note, is that all of the students who were enrolled in extra-curricular instruction outside of school resided in western Montana in Schools A and C where census statistics show the median income to be on average 8% below the county in eastern Montana where School A is located. This may relate to a greater amount of discretionary income being available in households owning family businesses not related to farming—an occupation with fluctuating profit margins highly dependent upon multiple variables which are out of the control of the individual farmer. It could also be related to the communities’ closer proximity to larger towns that do not require long-distance travel costing extra time and fuel. Wealth in terms of assets for farmers did not translate to expendable income.

## **Time**

An unexpected outcome emanating from the study was the common belief across all six cases that lack of time to spend on art inhibited their talent development. All of the students were well aware that without sustained practice, skills do not improve and mastery is not achieved (Gladwell, 2008; Syed, 2010). Two predominant explanations were offered: a rural lifestyle and the amount of study time required to make good grades in school.

The rural lifestyle related to several underlying issues: a) students in rural areas typically do not live within walking distance of school, extra-curricular activities are not always in the same town where the student lives, and sports events require travel to another town, often half the state away—



meaning time away from home depletes available time a student has to engage in art; b) family-owned businesses are common in Montana rural areas, and their operation (especially in the case of the farming occupation) typically includes all members of the family limiting discretionary time at home even on weekends and holidays.

With relation to study time, all of the participants claimed to have as a primary goal, getting good grades and to be competitive for acceptance to college even if they had not narrowed down a career path. For the five adolescents who were enrolled in a school art class, scheduling was blamed for having little or no time to generate personally meaningful art. Doodling was a primary art activity for over half of the participants at school during “boring classes” or at home in between other responsibilities and was viewed as enjoyable and “fun.” After school, aside from any extra-curricular activities including attending siblings’ sporting events together with the family, the amount of homework and hours required to prepare for tests in advanced courses consumed the bulk of their remaining time. Even though all of the students referred to how “busy” their lives were and expressed disappointment that they had little time for art, it was a fact they took in stride as necessary to preparing for college and a career. Rather than journeying on “the road less traveled,” adolescents appeared to be racing on a mapped-out path toward specific destinations: college, a job, and security with art taking a back seat. Interestingly, finding more time to engage in their art was something all of the students longed for, but none of them felt was within their control to change. They did tend to choose art over other optional activities when they *have* a choice however, it was difficult to ascertain the percentage of their discretionary time that was allocated to art. One student offered a “guesstimate” that it was approximately 1½ to 2 hours per week (not including art classes) that accumulated over several smaller sessions that were devoted to art. Bearing this in mind, students were asked during fact-checking, to contemplate possible impacts of educational aims focused more on time spent developing individual strengths and talents than in getting all students to a standard level of proficiency in all subjects. Two of the participants believed it would be more beneficial to the individual; one of the two also believed the potential to derive social benefit (“make a difference in the world in some way”) would be greater. The student who preferred digital to more traditional art mediums, while not believing that individual strengths necessarily needed to be accommodated in school, did express chagrin that computers were not utilized more in school art classes to customize art lessons to students’ preferences.

## Culture of Technology

All of the participants owned or had access to computers at home, which was not a factor in the two previous studies (Csikszentmihalyi et al., 1997; Clark & Zimmerman, 1988). Findings revealed that (like those in the study by Clark & Zimmerman, 1988) artistically gifted adolescents had difficulty finding friends or classmates who shared their interest in art, but unlike the previous research, computers offered adolescents in this study instant access to YouTube art tutorials or online galleries from which to draw inspiration rather than spending time socializing when they had free time. On the one hand, a drawback for these rural students—especially because at ages 12 and 13, they must rely on others to transport them into town—was that they had less opportunity to actively view, discuss, and participate in art with like-minded individuals in their own communities. On the other hand, the internet became the community to which these students belonged and felt comfortable. Moreover, because artistically gifted adolescents tend to prefer doing art alone rather than in a group, this may have offered a richer learning opportunity. Increasing the chance that students find appropriate resources to develop their talent, today’s technological capabilities make access to distant sources of advancement and enrichment more likely. All of the students in the study believed the computer was an effective tool for learning and did not view it as a replacement for in-person events but rather a resource that was customizable to their individual art interests.

## Timeline of Opportunity

Findings showed that three of the study participants believed few opportunities were open to them as middle school students but would be available when they reach high school or beyond. They assumed this was a part of the natural progression of growing up and accepted it without question.

Nevertheless, they were able to identify opportunities they looked forward to as high school students. This is an example of the opportunity cost of lost potential that could have served both individual and society if the factors of increased brain growth (offering a window for new knowledge and skill-building) and importance of offering experiential learning (critical to adolescents' executive and social functioning) had not been ignored (Barnea-Goraly et al., 2005; Blakemore & Cloudhury, 2006; Casey et al., 2010; Casey, Giedd, & Thomas, 2000).

The similarities relating to artistic giftedness revealed that all of the students:

- Reported an individual love of art;
- Related emotional connections to experience which keep them interested in drawing;
- Felt empowered by the personal voice derived from the expressive quality of art;
- Believed family encouragement and support were sufficient at this time in their lives, to incentivize active engagement in art including the fact that all students had at least one relative who did art;
- Had a private space for doing art at home though it was not studio-like;
- Had a limited number of same-age peers who share their interest in art which tended to seclude them from like-minded individuals with whom to collaborate, discuss, and critique artworks;
- Perceived little opportunity for critiquing own work;
- Excluded art teachers as encouragers of talent; stated that teachers critiqued but did not offer guidance for improvement;
- Admitted they were largely “self-taught”;
- Claimed posters assigned by teachers were the primary outlet for expression in non-arts classes;
- Identified constraint of time impacted hours spent on art practice;
- Experienced no differentiation for artistic talent; and,
- Utilized the internet as a primary resource for instructional support associated with art forms, techniques and styles their local art class and community did not offer.

Differences related to how personal time was allocated whether or not students were enrolled in any type of art class; whether or not they believed their community offered enough art-related opportunities; whether they were receiving advanced academic and art instruction; the extent of their multi-potentiality; and how they perceived future commitment to art. Minor differences were observed between perceptions of the adolescents in the eastern Montana community (School B), and the two western Montana communities (School A and C). In School B the students exclusively:

- Referred to their drawing as “doodling”;
- Believed no opportunities existed until high school age;
- Had little awareness of venues exhibiting art in their town;
- Had not enrolled in activities outside of school;
- Had very few art supplies at home; and,
- Had no books about art or showing famous artwork (with the exception of a watercolor demonstration that came with a kit).

The majority of students in Schools A and C located in western Montana:

- Talked about their work as drawing or art;
- Believed opportunities were generally available through school or the community to showcase art, if desire and time permitted;
- Had an awareness of several galleries and summer offerings for art;
- Had enrolled in private lessons outside of school for art and other talent areas;
- Had art supplies at home; and,
- Had at least one art book.

Some of these differences may relate to regional characteristics associated with eastern and western Montana where they are situated. Eastern Montana towns are widely distributed across the open plains; social networks are smaller, families are strong, agriculture is the primary industry with

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most families engaging in farming, and the area boasts an 8-10% higher per-capita income than the western portion of the state. Western Montana thrives on tourism related to nationally acclaimed trout streams, forested and mountainous land, big game hunting, skiing and other winter sports, two integrated biomedical/biohazard research facilities, a photonics hub (employing world-class scientists), and more populous, creative enclaves. Both areas house four-year universities and private colleges.

## Conclusion

The artistic journeys of the adolescent participants demonstrate that families are of primary importance in the initial instigation of artistic pursuit and motivation to repeat art experiences. But by late adolescence, if support is not forthcoming by schools and communities, the level of commitment held to by these students begins to wane. Three limitations were encountered in this study: a) the inadvertent omission of digital or web-based art or design as one area of high ability as criteria for referral; b) an unintended emphasis on traditional art forms in the screening questionnaire which was reflected in student responses; and c) a gender imbalance resulting in female preference among participants which may have been reflected in findings; and should be considered when conducting future research. However, this study brought to light a particularly important gap in research related to artistic talent development that needs to be investigated: the factor of time.

While passion relates to commitment to the talent area, this study did not produce direct evidence of passion. The factors of passion for the area of artistic talent and time available to invest in developing the talent are two areas that could benefit from future research. Findings illuminated adolescent perceptions that their rural communities, their teachers, and their schools in general, do not encourage or support their artistic talent, causing them to resort to accessing online communities to obtain feedback from like-minded high-ability individuals.

In this era of fast-changing, highly globalized commercialization of ideas, study findings confirmed some of the positive aspects of previous research about artistic talent while painting an entirely new representation of the social, political, and educational landscape that affects the development of artistic talent today. The current climate in education does not support the building of individual strengths even though local, state, and international conditions demand it.

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**Dr. Gayle Roege** is a partner at Creative Erg. LLC., consulting agency, focused on the partners' shared interests in education, art and design, engineering, creativity, energy, and resilience, to disrupt the status quo through research, consultation, and teaming to find innovative solutions to today's problems and tomorrow's needs. She is a member of the NAGC Arts Network, served as Legislative Chair for Montana Association for Gifted and Talented Education for two years; served on the Montana Office of Public Instruction decennial standards review and policy revision committees for pre-service teacher standards in visual art, and gifted education; and student standards for visual art in Montana. As an artist and veteran educator, her current focus centers on providing alternative pathways to talent development for youth through community-centered experiential, entrepreneurial learning opportunities. Findings from this study, based on her doctoral research, were presented at the 13<sup>th</sup> International ICIE Conference on Excellence, Creativity and Innovation in Basic and Higher Education, on May 20, 2016.

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# Building and Implementing a Global Citizenship Course for Undergraduate Honors Students

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## Abstract

This pilot study investigates the development and delivery of a 112-hour Dutch undergraduate honors course for global citizenship education, called Society 2.0. The theory-based curriculum guidelines Global Justice Citizenship Education (GJCE) were used to build the course by a development team consisting of two teachers, two honors students, and one researcher. The course was delivered twice. Content analysis of development documents and teacher interviews were conducted to answer three questions: What was the added value of course development with a team including teachers, students, and researcher? How did the model shape a. the formal and b. the operationalized curriculum? and in what way are the honors pedagogies ‘freedom’, ‘challenge’ and ‘community’ shaped in the course? Results indicate that the open atmosphere and equality in the development team positively influenced the atmosphere in class. The curriculum guidelines in the moral and social domains as well as experiential learning and honors pedagogies were applied in the course. Guidelines in the knowledge domain seemed the most difficult to realize, especially gaining insights in root causes of injustice. Results are discussed in light of their potential benefits to curriculum design and teaching for critical global citizenship in undergraduate honors programs.

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**Keywords:** Curriculum development; global citizenship education; honors education; social justice.

Undergraduate high-ability students in the Netherlands and other countries in Europe have increasing possibilities to develop their talents through participation in honors talent programs (Wolfensberger, 2015). These programs target students who are willing and able to go beyond the regular program in terms of academic challenge and personal development (Wolfensberger, 2012; Clark & Zubizaretta, 2008; Hébert & McBee, 2007). Policies emphasize the contribution these students could make to the business and knowledge sectors (Persson, 2011). Learning that addresses global challenges has been marginalized (especially in gifted education) under the influence of industrialism and militarism (Gibson, Rimmington & Landwehr-Brown, 2008).

High-ability students show an above-average interest in moral issues and the wider world (Roepers & Silverman, 2009; Lee, Olszewski-Kubilius, Donahue & Weimholt, 2008; Schutte, Wolfensberger & Tirri, 2014). Honors programs can align with their propensity by offering moral and civic learning. Several authors recognize the importance of wisdom in achieving a common good (Sternberg, Jarvin & Grigorenko, 2011), of giving something back to society (Flikkema, 2016) and of leadership and global awareness (Passow & Schiff, 1989; Lee et al., 2008) when educating high-ability students.

The curriculum guidelines Global Justice Citizenship Education (GJCE; Schutte, Kamans, Wolfensberger & Veugelers, 2015) integrate those issues and relate to three domains: the cognitive, social and moral domain (see Table 1). The curriculum guidelines were used to develop ‘Society 2.0’, a global citizenship course for undergraduate honors students at a university of applied sciences in the Netherlands. The curriculum guidelines GJCE connect to what Westheimer & Kahne (2004) call a justice-oriented citizen: one who is not only engaged in civic society but also looks for structural

causes of injustice. Accordingly, we define global citizenship education as social justice oriented education, aimed at preparing students for their role as engaged citizens of the global world. Justice orientation is an orientation that includes a desire to improve society (Johnson & Morris, 2010).

**Table 1:** Global Justice Citizenship Education.

Domains	Curriculum guidelines
Knowledge domain	<ul style="list-style-type: none"> <li>▪ Gain historical (root causes of injustice) insights and see local-global connections.</li> <li>▪ Focus on one global-justice issue.</li> </ul>
Moral domain	<ul style="list-style-type: none"> <li>▪ Develop ethical and intercultural sensitivity.</li> <li>▪ Recognize own values and reflect on mainstream thinking</li> </ul>
Social domain	<ul style="list-style-type: none"> <li>▪ Contact people with different socioeconomic positions, cultural backgrounds and life chances.</li> <li>▪ Get to know positive role models: active and socially engaged people.</li> </ul>
Experiential learning	<ul style="list-style-type: none"> <li>▪ Spend at least 15 hours in civic contexts.</li> </ul>

The aim of this study is to evaluate the formal and operational curriculum for critical global citizenship by posing three research questions: 1. What was the added value of course development with a team including teachers, students, and researcher? 2. How did the curriculum guidelines shape a. the formal curriculum and b. the operationalized curriculum? 3. In what way are honors pedagogies implemented in the course?

### ‘Society 2.0’

We investigated the development and delivery of a 112-hour undergraduate honors course called ‘Society 2.0, alternative movements and their contribution for a better world’. Alternative movements pursue alternatives to the established order, values and structures, such as a barter economy, green energy, and new approaches to housing. The purpose of ‘Society 2.0’ is to stimulate critical awareness of one's role as a citizen of the world. The course was offered as eight two-hour evening sessions once every two weeks. It was delivered in the autumn of 2014 (ten students) and again in the autumn of 2015 (15 students) as part of an extracurricular honors program (not mandatory).

The structure of the course starts from the student's values and opinions and expands towards the wider world. The learning objectives (and corresponding GJCE- domains) were formulated as follows. Students:

- become aware of how they are influenced by their own socioeconomic background and that of others (social domain);
- gain insight into the historical roots of a social issue and develop a global perspective on it by using different sources and media (knowledge domain);
- formulate criteria for a just and sustainable society (moral domain);
- can make a prediction about the future of the alternative movement where they do their internship, and about its influence, for instance on poverty reduction, climate change or global power differences (knowledge domain);
- learn different perspectives on alternative/social movements (knowledge and moral domains); and,
- can identify ethical dilemmas regarding the theme/issue (moral domain)..

While largely coaching the students in their learning process, the teachers also deliver content, for instance about ethical theory. Besides treating alternative/social movements, they discuss what they are and what they wish to achieve related to global/social issues. Attention is also directed toward ethics, socialization,

conformism, and (sub)cultures. One of the course meetings is dedicated to a current global issue using the 'open space' method, described by Andreotti, Barker & Newell-Jones (2006): students start with a mutual knowledge base, then consider the perspectives of different statements about issues - who could have said



this and why and subsequently consider different new insights.

Students do a 15-hour internship with an alternative/social movement of their choice and interview participants about the ideals of the group and their views on a better world. Students also make a small contribution to that group. They share their knowledge and reflect on their experiences by writing five blogs: 1. How did your background form your opinion about alternative/social movements?; 2. Deepening: Explore a theme that appeals to you; 3. Place your theme in historic/future and local-global perspective; 4. Describe and analyze your experiences with your internship; 5. Reflection and evaluation. Additionally, students comment on blogs of at least two fellow students. Further, they discuss their experiences and insights in the class and in small groups.

The final assessment has an individual and a group component. In a one-minute video message, each student tells how he or she could contribute to a better and more sustainable world. Also, small groups of about four make 'a product for global citizens' (in a form of their choice) to help others gain insights. For the lessons table, see Appendix 1.

## Curriculum levels

Our research design was based on Goodlad's model comprising six interrelated levels (Goodlad, 1979) but highlighted three: the ideal, formal, and operationalized curriculum, as explained below. Although Goodlad's interpreted curriculum was not addressed directly, we did investigate teachers' views on pedagogical goals. Goodlad's experienced and effected levels lie beyond the scope of this study.

**Ideal curriculum.** The curriculum guidelines GJCE (Schutte et al., 2015) are profiled here as the ideal curriculum. The guidelines were used previously to evaluate an international hybrid

honors course (Schutte et al., 2015). They entail a holistic approach, treating values, ethics, and social awareness alongside cognitive development. The importance of such an approach in honors education is underscored by Tirri (2011; 2012) and Tolppanen & Tirri (2014). The curriculum guidelines GJCE are open, giving no guidelines for content, assessment or grouping. It does advocate experiential learning in civic contexts.

**Formal curriculum.** The product of the development team is the formal curriculum. We investigated how GJCE shaped the formal curriculum and what the added value was of development by a team consisting of teachers, students, and researcher. Honors students were included because of their documented interest in developing their own education (Schutte, Weistra & Wolfensberger, 2010; Wolfensberger, 2012). The teachers met beforehand to see if they could work together; they also taught the course. All team members could draw upon their experiences, convictions, and expertise. The development team had nine meetings over a period of three months.

**Operationalized curriculum.** The course as it was delivered is the operationalized curriculum. We investigated how GJCE shaped the operationalized curriculum.

**Honors pedagogies.** The course targets honors students, for whom three pedagogies are of particular significance (Wolfensberger, 2012): 'community', which relates to the importance of a safe learning community for these students; 'academic competence', which entails the importance of academic and deeper learning; and 'bounded freedom', which relates to the need for autonomy and self-regulation in learning. We were interested in how these pedagogies came forward in the formal and operationalized curriculum.

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## Methodology

### The aim of the study

This study investigates the creation of a formal and operationalized curriculum for critical global citizenship by asking three questions: 1. What was the added value of course development with a team including teachers and students? 2. How did the curriculum guidelines shape a. the formal curriculum and b the operationalized curriculum? 3. In what way are honors pedagogies implemented in the course?

## Data collection

**Formal curriculum.** Various forms of data on the development of the formal curriculum were collected: notes of all nine team meetings (made by members of the team); documents/products (17) such as elaborations of the theme and the course outline; and email exchanges (89) between the team members. The information was used to answer research questions RQ1, RQ2a and RQ3.

As teachers' views play a central role in curriculum development (Van den Akker, 2003), they were asked to answer a questionnaire (during interview 1) on pedagogical goals in citizenship education (Leenders, Veugelers & De Kat, 2008). This questionnaire consists of 18 Likert-scale items across four domains: discipline, autonomy, social involvement, and social justice. The overriding question is: How important is it for you to develop these values and behaviors in your students? Items include topics such as honesty, reliability, consideration for others, and solidarity with others. Each item can be rated on a scale of 1 (not important) to 5 (very important).

**Operationalized curriculum.** Data on the operationalized curriculum were collected to answer research question RQ2b and RQ3. The data on the two courses comprised 60 email exchanges between teachers and the researcher discussing content, ideas for student activities, comments and experiences regarding class meetings, and practical issues. Next, three teacher interviews were conducted. Finally, observations by the principal researcher, who attended the course meetings, put the operationalized curriculum into perspective.

Two of the three teacher interviews were held during the first course (after the third and after the seventh lesson), while one was held at the end of the second course (after the last lesson). The interviews were recorded and subsequently transcribed verbatim. The first individual held interview took approximately forty-five minutes, the interviews with both teachers together took about one hour each. The main topics in these semi-structured interviews differed according to the phase of the course (see Table 2). The principal researcher conducted all interviews.

**Table 2:** Topics of the interviews.

Interview 1	How is the implementation of the guidelines GJCE going so far?	<b>All three interviews:</b> What are you most enthusiastic about? What do you have doubts about?
Interview 2	All the curriculum guidelines GJCE were raised; possible differences between formal and operationalized; teachers' views on these differences	
Interview 3	What was different/changed in the second course and why?	

For an overview of the data collection, see Table 3.

**Table 3:** Phases data collection.

Phase	Course	Data collection
April- August 2014	Development 'Society 2.0'	Team notes Team products Email exchanges
September – December 2014	First course (10 participants)	Teacher interview 1 Questionnaire Teacher interview 2 Email exchanges
September – December 2015	Second course (15 participants)	Teacher interview 3 Email exchanges

## Data analysis

The data (team notes, team products, emails, interviews) on the course development and delivery phases were subjected to qualitative content analysis using pre-determined categories that seemed relevant after a first inspection of the data (RQ1) or based on theory (RQ2a, 2b and 3).

However, in line with the iterative character of qualitative data analysis, extra categories were added when important themes emerged during the actual coding. Rating was done by two independent coders and the assigned codes were discussed until consensus was reached.

**Added value of development by team (RQ1).** The data regarding the development process (RQ1) were analyzed using three categories: approach (method of working); roles of participants; atmosphere/spirit. This analysis yielded a supplementary code: dealing with time.

**Relation curriculum to GCJE (RQ2).** The data regarding how GJCE took shape in the formal and operationalized curriculum (RQ2) were analyzed deductively by using the curriculum guidelines as categories and scrutinizing content dialogues and decisions.

**Honors teaching (RQ3).** The honors pedagogies, namely freedom, challenge and community implemented in the course were analyzed by encoding these three characteristics in the data for both development and delivery. The analysis yielded a supplementary code: differences between students.

## Results

### Added value of development by team

Four themes emerged from the data on the added value of development by a team of teachers and students (RQ1): approach, roles of participants, atmosphere, and dealing with limited time. In the second interview, the teachers reflected on its value.

**Approach.** The development team met nine times and used GJCE as its guideline. The members jointly determined the theme (alternative practices) of the course and then individually elaborated what it might entail. Their feedback on each other's documents brought the aims, content and didactics of the final formal curriculum into view. Ideas, proposals, and drafts were discussed during team meetings or in written communication, and all team members participated. Together, they gathered course materials and identified internships.

**Roles of participants.** The researcher elaborated on the guidelines in relation to the course theme and commented on proposals for operationalizing the curriculum guidelines GJCE. The two teachers took the lead in formulating course aims, elaborating the course outline and the lessons. When recruiting participants, the two honors students took the lead by making a recruitment plan, designing a flyer and starting a Facebook group. They emphasized the student perspective: whether the course would be interesting and appropriate for potential participants. They helped out with practical tasks like creating a structure for the Dropbox folder. Finally, they were given an opportunity to attend institutional meetings on honors education and a meeting with the researcher's PhD supervisors.

**Limited time.** Regular work and peak load made it difficult for the team to find points of time to meet up. Also, the one-hour meetings were too short to combine content discussions with arranging to start the course. The solution was communication in writing, exchanging ideas, and giving feedback using email and Dropbox.

**Atmosphere.** Both teachers mentioned in the second interview that the atmosphere and equality in the team helped establish openness and team spirit in the classroom. The teachers were enthusiastic about the course development, saying they liked the theme, could get along well, and were glad to do something they were good at.

**Pedagogical goals.** Finally, the data from the questionnaire on pedagogical goals in citizenship education showed that the teachers held different views, specifically on the importance of discipline and social justice. One teacher considered social justice less important than its role in our GJCE-guidelines.

## Relation curriculum to the guidelines GCJE

This section turns to question RQ2: How did the curriculum guidelines shape a. the formal curriculum and b. the operationalized curriculum? For each domain, the guidelines pertaining to it are described. These guidelines are then evaluated with regard to how they correspond to the formal and operationalized curriculum. Subsequently, the teachers' experiences during course delivery are presented.

**Knowledge domain.** There are three curriculum guidelines in the knowledge domain: Focus on acquiring deep knowledge regarding one global issue instead of more superficial knowledge on several subjects (Davies, Evans & Reid, 2005); Look for possible root causes before thinking about solutions or acting (Westheimer & Kahne, 2004); Make local-global connections between the village, town or region and other parts of the world concerning this issue (Oxfam, 2006). This connectivity extends to the possible impact of one's own behavior or action on other parts of the world.

The *formal curriculum* requires students to delve into a theme of their choice and write a blog about it; in their next blog they give some historical/future and local-global perspective on that theme. They also comment on the blogs of at least two fellow students. Experiences and insights in societal issues are discussed during class meetings and in small groups of three or four. The development team deliberated whether each student should choose a single issue for both the internship and the historical and local-global insights (more in-depth approach) or different issues for these elements (broader approach). The course allows both approaches. Further, one of the course meetings explores a current global issue using the open space method described by Andreotti et al. (2006).

For the *delivery of the course* the open space method was used to address specific issues: income inequality and poverty in the first course; and the proposed Transatlantic Trade and Investment Partnership (TTIP) in the second course. Short films were shown on alternative movements and practices. Students had to underpin their opinions and provide references in their blogs, in keeping with the in-depth approach. The teachers confronted the students with their judgments and asked follow-up questions. Students were expected to present arguments when making statements or giving their opinion. Root causes of global justice issues did not get much attention. Regarding the time (historical-present-future) dimension, the teachers mentioned they gave examples of alternative/social movements that became mainstream. The principal researcher observed all of the above-mentioned teaching behaviors. In the second course, the students were given more time at the beginning of each lesson to share experiences and insights. This part was expanded in the second course because, compared to the first course, the students already knew about alternative movements and could give more input. Dialogue among teachers and the principal researcher yielded ideas on how to achieve more in-depth knowledge.

In the *teachers' experience*, allowing more time for students to tell about their experiences and insights led to interesting conversations and a further elaboration of the topics. Teachers mentioned the difficulty of combining the broad scope of the course, which included two themes and several curriculum guidelines, with in-depth knowledge. One teacher noted that students find it difficult to form an opinion: 'Most students talk more easily about themselves, their lives, what had happened in their lives, rather than about a global issue or global perspective'. To facilitate the latter, this teacher had to be more directive.

**Moral domain.** The guidelines in the moral domain involve both ethics and values. One guideline relates to ethical sensitivity, the awareness of the ethical aspects of a situation, which includes the ability to see something from the perspective of someone else. This is an aspect of intercultural sensitivity (Holm, Nokelainen & Tirri, 2009), another guideline in the moral domain. Intercultural sensitivity is the competence to act in different cultural situations and contexts. With regard to values, the curriculum guidelines are a consciousness about one's own values as well as the different values that underlie approaches to current societal and global issues. Attention should be

drawn to values concerning the dominant ideology of neo-liberalism and mainstream thinking (Andreotti, 2006).

The *formal curriculum* includes a lecture on the history of ethics (the great thinkers of antiquity) in the fourth course meeting, accompanied by a homework assignment on ethical experiences. The team discussed whether to focus on ethical choices at the level of the individual or in the aggregate: ethical behavior of persons or groups in society, like the media, politicians or action groups. Both levels were featured in the formal curriculum.

Regarding values in the *formal curriculum*, the theme 'alternative movements' entails contact with non-mainstream values; the formal curriculum includes contact with students from a non-western country to discuss the value and significance of ideas and findings in another context. The development team discussed the concept of justice and agreed that the course was meant to help students discover the meaning of a more just society. The team gathered materials on alternative, non-mainstream approaches and opinions such as articles, documentaries, magazines, and web links.

Ethical sensitivity was a recurrent topic in the *delivery of the course*. One teacher started a conversation in which students shared examples of what they perceived as their own unethical behavior, and students were given an article about ethics in research in another cultural context (on children in South Africa).

Regarding values in the *delivery of the course*, contact with students from another (non-western) country could not be arranged in time. However, the teachers regularly shifted the perspective in class, asking for instance how something would be perceived by a girl in India. Different layers of culture were discussed; for instance, several maps of the world were shown, each with a different projection depending on what was considered the 'center'. Teachers raised the question 'how do you view the world?' at the beginning and during the course. In each instance, they said there is no right or wrong answer; all insights are okay, just keep an open mind. Students could formulate their own definition of alternative movements, for example. Attention was devoted to critical reflection on values and opinions in specific lessons, for instance on where values and norms originate, on awareness of judgments and prejudices and on conformism. In the second course, lesson 7 was dedicated to helping students connect more strongly with the course content by exploring what it meant to them. Students answered straightforward questions: what are your values and norms?; what is your ambition?; and what would you like to change and how can you do that?

The main thrust of the course, in the *teachers' experience*, is showing different perspectives, their possibilities, and restrictions. Teachers indicated that several students discovered that there are many sides to alternative/social movements and that these are much more complex than expected. At least some students were willing to look critically at themselves and sometimes talked to a teacher about this. Facilitating a stronger connection between students and course content in lesson 7 of the second course turned out to fit in well at that stage. By then, the students knew each other and there was trust and openness in the group. The students were attentive to each other, asking questions and discussing the answers, which helped them make choices and be honest and open.

**Social domain.** A curriculum guideline regarding the social domain is contact with people outside the students' own social/cultural group. Such contacts can broaden the students' world by raising awareness of their relatively privileged position (Strand, Marullo, Cutforth, Stoecker & Donahue, 2003). In the Dutch context, this is especially important because of early tracking in the educational system and socioeconomic segregation in the school system (Schmidt, Burroughs, Zoido & Houang, 2015).

Another guideline in the social domain is meeting positive role models. These are active and socially engaged people who possess the courage, persistence, and confidence that they can make a change for the better. By setting an example, such people can strengthen the students' belief that

change towards more justice is not only possible but worth aiming for and committing to (Colby, Ehrlich, Beaumont & Stephens, 2003).

Regarding the *formal curriculum*, the theme of the course combines elements of the social and moral domains of GJCE. Alternative movements can provide positive role models and their ideals are not mainstream. Examples of alternative movements students learned about are: Mieslab, a social laboratory experimenting with concepts for the economy and society, for instance ‘unconditional basic income’; and ‘Grunneger Power’, a cooperative providing green energy by and for people from the province of Groningen. This encounter with alternative values can help students clarify and develop their own beliefs. Some other guidelines in the social domain are pursued by doing an internship at such an alternative movement, where students are likely to meet up with people outside their own social/cultural group. Learning from community leaders (positive role models) underpins the assignment to conduct an interview during the internship. The team reconsidered *the name of the theme*: ‘alternative/social movements’ or ‘alternative practices’, noting that the former embraces collectivity and justice (Collom, 2007).

When *delivering the course*, the teachers used the wording alternative practices and showed short films of such practices and movements. Further, contact with people from different social or cultural backgrounds did occur during the internship. Teachers emphasized the importance of the interview about the ideals of the group where the students did their internship.

In the *teachers' experience*, the students' interest and empathy was triggered by contacts during their internship. Several students said it affected them; one, for instance, said she did not simply walk past a homeless person anymore.

**Experiential learning.** The *GJCE-guidelines* include experiential learning in civic contexts, as students should be active and emotionally engaged in their work to enhance civic and moral learning (Colby et al., 2003). Moreover, the social and conceptual ambiguity and complexity of civic contexts challenge students to think deeper and refrain from drawing superficial and obvious conclusions (Colby et al., 2003).

The *formal curriculum* calls for a 15-hour internship at an alternative/social movement. Students conduct an interview about its ideals and views on a better world. They also make a small contribution to that group. The internship can be done alone or with a fellow student. Students reflect on their experiences in Blog 4: Describe and analyze your experiences with your internship.

*Teachers consider* the internship as a key element of the course. They heard enthusiastic reactions to the internship and think it might have influenced the students' image of the world.

**Honors teaching.** Three conditions of the learning environment are considered especially important for high-ability students (Wolfensberger, 2012): freedom, academic challenge, and community. All three were met in the formal and in the operationalized curriculum, as follows.

*Freedom* was offered by giving students the opportunity to choose both a global issue and the subject of and place for their internship. They could choose from the prearranged internships or find one themselves. Several students took the opportunity to organize their own internship. Furthermore, for the final assessment, students were free to choose the form in which to present their insights (a ‘handbook’ for global citizens). This freedom was appreciated by several students, one of whom did not have possibilities for this kind of creativity in his own program.

*Academic challenge* was incorporated in several ways. First, the group had a heterogeneous background regarding the content and subcultures of their education. Furthermore, delving into a global justice issue and alternative/social movements was both novel and challenging. The teachers

noted that students were not used to talking about such issues. Besides, students had to characterize an alternative movement themselves without being provided with a definition. In the same vein, they had to find their own criteria to answer ‘what is a more just society?’. They were not accustomed to this, so the challenge was difficult for some students, as the teachers perceived. Finally, the teachers often made a change of perspective. For instance the change from the students’ perspective to that of someone else, when asking ‘How would this be for a girl in India?’

*Community* was addressed in the following ways. The course was scheduled to meet one evening every two weeks in keeping with the regular planning of these programs at the institution, not by choice of the development team. Also, students followed their regular program at their own department, so they normally did not meet in the interim. These circumstances required extra attention for community-building. The first assignment was to write a blog called ‘where do you come from?’ and to make a mood board and elucidate it in small groups. Also, reacting to each other's blogs can stimulate the exchange of knowledge, discussion, interest in one another and curiosity about each other's viewpoints and perspectives. The Facebook group set up by the student members of the development team was used to communicate news, interesting readings, lectures and meetings or TV programs. Finally, students were encouraged to meet up in between course meetings.

*Differences between students.* The teachers noted that the participating honors students differed in their knowledge, awareness, and ambition regarding social (justice) issues. Reflecting on how they handled this divergence, the teachers concluded that it might be alright that not everybody could immediately process questions or information. Giving students the freedom to do things their own way, for instance find their own internship, probably helped serve different levels of knowledge, awareness, and ambition. Facebook was used to provide input (information, articles, events) for the eager students. Sometimes students formed pairs and could support each other's decisions, for instance about the approach. Also, when students were especially interested in a topic, the teachers could lend them a book. One teacher was struck by the differences between honors students in their pro-active stance.

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## Conclusions, discussion and limitations

In this pilot study we investigated the development and delivery of a 112-hour undergraduate honors course for critical global citizenship entitled Society 2.0. It was built on theory-based holistic curriculum guidelines Global Justice Citizenship Education (GJCE) involving the knowledge, moral and social domains and advocating experiential learning. The study was conducted at a university of applied sciences in the Netherlands. This pilot study can inform similar programs all around the world and help them to develop contents and methods for the holistic citizenship development of honors students.

Regarding our first research question: What was the added value of a development team including teachers and students? The results indicate the importance of equality and team spirit. The two teachers experienced that these conditions positively influenced the atmosphere in class. The team's composition and way of doing things further enabled each member to contribute and take the lead in aspects of their competence. The teachers mentioned that they liked the theme, could get along well, and were happy to do something they were good at. It seems that autonomy, relatedness, and competence were addressed, all of which are important for self-motivation (Ryan & Deci, 2000).

Regarding the question (RQ2a): How did the curriculum guidelines GJCE shape the formal curriculum?, it can be concluded that most of the guidelines in the moral and social domains as well as experiential learning in civic contexts are manifest in the formal curriculum. However, attention for root causes of injustice, a key guideline in the knowledge domain, was not manifest in the formal curriculum of ‘Society 2.0’. In part, this may be due to the theme of the course. Indeed, alternative movements do not necessarily seek to change the existing social structure, since they might rather create an alternative to it (Collom, 2007). The teachers also felt that the short duration and wide scope

of this course made it difficult to go into more depth. When developing a similar program, it could be of importance to consider both the length and theme of the course in relation to possibilities for students to gain insights in root causes of injustice. Another explanation for the lacking attention to root causes of injustice might be that for one of the teachers, social justice was not a main pedagogical goal in (honors) teaching. Therefore, taking time to discuss the importance of the political dimension in global citizenship education (Veugelers, 2011) between course developers is recommended.

Regarding the question (RQ2b): How did the curriculum guidelines GJCE shape the operationalized curriculum?, the results indicate that the teachers elaborated on the curriculum guidelines in each domain. Teachers confronted students for making ungrounded judgments (knowledge and moral domain); kept asking for arguments (knowledge domain); gave examples of alternative movements accompanied by questions (social domain); posed reflective questions (all domains); and devoted much attention to perspective (moral domain). Further, the teachers emphasized open-mindedness. These teaching behaviors correspond to features of justice-oriented education (Westheimer & Kahne, 2004). Although the findings reported here are based on teachers' self-report, which may be considered a limitation of this study, the researcher's informal observation while attending the lessons are consistent with the teachers' self-reported behaviors.

The data also provided suggestion for adjustment of our GJCE-guidelines. Attention to collectivity is an aspect of justice-oriented civic education (Westheimer & Kahne, 2004), as social change is often the result of a collective effort (see also Friedman, 2000, on identity groups). The dialogue between teachers and the principal researcher indicates that attention to collectivity could not be taken for granted. It seems that explicitly adding the role of the collective with respect to social change to our

guidelines GJCE might improve its possible value as a basis for courses aimed at critical global citizenship.

Regarding our third research question, about honors pedagogies (Wolfensberger, 2012), bounded freedom and academic challenge seem to be a good fit with justice-oriented citizenship education, which does not aim to impart a fixed set of truths or critiques about society and its structure (Westheimer & Kahne, 2004). Indeed, freedom for students in choosing content and form is manifest in the formal and operationalized curriculum. Challenge was embedded in the multiple disciplines represented in the group, the interdisciplinary themes 'global justice issue' and 'alternative movements' as well as the multiple perspectives teachers incorporated. The third aspect of honors pedagogies, community, was implemented as teamwork, both in class and for homework, and in the assignment to react to each other's blogs. Since students asked for more contact, a Facebook group was started. Community-building warrants extra attention when students don't meet up on a daily basis and course meetings are held just once every two weeks.

Other lessons from our pilot study that can be used when designing a similar course are the following. First, although the formal curriculum was structured in a way that it started with the students (relating their background to their values and opinions) and expanded to embrace global society, teachers observed that students sometimes kept a distance in discussions where they did not make the connection with themselves, their lives, and attitudes. The teachers therefore introduced a method to support students in helping each other to strengthen this connection. Second, honors students differ considerably in pro-activity, knowledge, and awareness of (global) societal issues (Achterberg, 2005; Rinn & Plucker, 2004; Schutte et al., 2014) and teachers have to find ways to deal with these differences between students.

Equality and openness in the development team and the use of theoretical based curriculum guidelines, resulted in a course teachers have faith in and are enthusiastic about. We hope our work helps others build courses preparing students for their future role in society as critical, well-informed, and committed global citizens. Especially their commitment is imperative, given the severity of global issues our world is facing.



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**Appendix 1:**  
Lessons table ‘Society 2.0’

1	Making acquaintance, identifying reasons for participating, expectations. First exploration theme; introduction final questions and assessment. Introduction assignment: <i>present yourself in a mood board: which messages did you get? Write about assignment 1 in Blog 1.</i>
2	Sharing experience: mood board Theory, definitions: Socialization and conformism. Assignment: <i>Alternative practices: map what you think is included in this. Which sources did you use? Why those? Ask at least three other persons.</i>
3	Sharing experience: alternative practices. Theory (sub)culture and examples current themes (basic income; refugees). Define and refine: definitions needed to be able to gather in-depth knowledge ? Introduction assignment: <i>Choose an internship. Why this one? Define a learning goal and make an action plan. Determine theme. Why this one? Write Blog 2.</i>
4	Sharing experience: choice internship, plan and purpose and theme. Introduction ethics: origin, definition, ethical behavior, ethical sensitivity. Assignments: <i>Be alert to and write down: ethical behavior of yourself and others; statements in the media regarding ethical aspects. Choose a dimension and further explore your theme. Write Blog 3.</i>
5	Sharing experience: inspiration, internship, ethical dilemma.... Discussion/debate: Open space methodology. Assignment: <i>Look for information about interviewing, write abstract to use as guideline. Bring it to course meeting six.</i>
6	Sharing experiences: ethical experiences. Introduction views, convictions, paradigm shifts: How do you go about it; theory ethical sensitivity: how can you deal with...; Assignment: <i>interview(s) at your internship. Write Blog 4.</i>
7	Sharing experiences on interviews/ internship Introduction final assignment. Assignment: <i>Preparation of final presentations; Write Blog 5.</i>
8	Final presentations and evaluation.

# Mathematics and Science Olympiad Studies: The Outcomes of Olympiads and Contributing Factors to Talent Development of Olympians

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## Abstract

The purpose of this article is to review *Mathematics and Science Olympiad Studies*. The studies undertook the task of evaluating the effectiveness of chemistry, math, and physics Olympiad programs by tracking down their participants from the inception of these programs. The main research questions were: Do these competitions generate creative professionals in Science, Technology, Engineering and Math (STEM) and do their graduates make important contributions? What are the crucial factors for their success in STEM careers? To answer these questions, surveys and instruments were synthesized and administered to Olympians and to their parents. For 11 years, 1,093 Olympians in six countries were tracked down to find out their careers and their accomplishments and the factors contributing to these successes. These academic competitions were found to make a strong contribution to STEM talent development and produce creative STEM professionals. Crucial contributing factors commonly found across countries were:

1. Early recognition of STEM talent and conducive home environment;
  2. Specialized challenging programs for developing strong STEM foundations and opportunities to participate in STEM activities and competitions during the schooling period; and,
  3. Strong motivation and efforts on the part of the Olympians for success throughout the developmental stages.
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**Keywords:** Mathematics and science; STEM; olympiad; talent development; cross-cultural.

## Introduction

Every educator's ultimate goal is to develop children's talents. This goal becomes especially challenging for teachers and parents when children exhibit extraordinary talents. This article is about an alternate approach (academic competitions) to nurture STEM talents.

Plato recommended providing such programs for the gifted, but it was China (Han dynasty 141-87 BC) that instituted examinations to identify the gifted for civil service positions. Other dynasties (Tiang, 920-1127; Sun 629-755) expanded and codified the extent of these examinations.

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With the development of intelligence-testing instruments (1890-1918), Lewis Terman [48] and Leta Stetter Hollingworth [24] realized that gifted students with exceptional talent could be identified. Using the newly developed Stanford-Binet test, Terman [51] launched his Genetic Studies of Genius in California. His research team tracked high IQ students over decades and concluded that these IQ tests do not predict what direction the achievement will take. Both interest patterns and special aptitudes play important roles in the making of a gifted scientist, mathematician, mechanic, artist, poet, or musical composer [53].

In New York city, Hollingworth [24] used this test to isolate over 100 exceptionally-gifted students. She also started a special school for such students. The one alternative available in the 1920s to 1950s for gifted students was acceleration (grade skipping). Placing such students in advanced grades provided challenges. But American schools did not initiate programs for the gifted and talented until after World War II. After the war, schools instituted a number of alternatives that included separate classes within schools, enrichment programs, compacting, self-pacing, Advanced Placement (AP) courses, pull-out programs,

cluster grouping, summer programs, and full-time schools for the gifted.

These programs, unfortunately, did not produce enough Science, Technology, Engineering, and Math (STEM) scientists to meet national demands. Eventually, the need for STEM personnel instigated International STEM Olympiads. Professional organizations undertook programs to foster the development of talent in their own technical domain. Three professional organizations (American Chemical Society, The Mathematical Association of America, and the American Institute of Physics) initiated programs to identify the most talented students in their domains (Chemistry, Math, and Physics Olympiad competitions). In these programs authentic performance, not IQ tests, were essential in selecting students. These programs provided extremely talented individuals in STEM with in-depth domain experiences and social supports.

The nature of these programs is aligned with theoretical and empirical studies which are based on the Talent Development Paradigm [13, 21, 39, 43, 44]. The Talent Development Paradigm acknowledges that STEM talent takes a unique developmental trajectory. STEM talent is demonstrated early with strong interest and abilities in mathematical and spatial reasoning (30). This paradigm emphasizes motivation, timely opportunity for training, coaching, in-depth domain experiences, and technical and social support as crucial factors for STEM talent development [12, 15, 17, 20, 36, 37].

The fundamental question that needs to be answered for these school-based or professional organization-based talent development programs is, "Do these programs achieve their objectives; i.e., do their graduates select STEM careers?" Researchers need to follow yearly cohorts into adulthood to quantify any contributions. Terman's (51) Genetic Studies of Genius followed this pattern, but this

was not the case for other alternative innovations. Only one alternative -- the Study of Mathematically Precocious Youth (SMPY), a summer program, did any systematic follow-ups [31, 32, 42, 59].

Another intriguing question for educators and researchers is, "What are the influential factors for STEM talent development?" Several studies investigated factors that are influential for talent development. Various psychosocial factors were found to be related to productive creativity of talented individuals. They include general and specific abilities [30], interest [33, 41, 46], motivation [14, 39], and opportunities for appropriate learning [41, 45, 47, 59, 65].

Not many studies examined the influential factors along the developmental stages of STEM talent. Influential psychosocial variables change as talented individuals go through developmental stages across their life-span [44]. In order for abilities to be transformed into competencies, parents' recognition of talents and early provision of rich and conducive home environment will help talented children fall in love with activities in specific domains such as music, mathematics, or figure skating. However, there is very little literature about the influence of family and teachers in the early stage of STEM talent development. During the middle stage when most of the Olympians participate in competitions, their competencies are transformed into expertise. During this process teachers and mentors are crucial. For example, in specialized science high schools, students are engaged in research involving real problems and nurturing the modus operandi of a profession [9]. STEM talent development requires long-term involvement in STEM domains. It is necessary to proactively develop an agenda in educational programming that addresses unique advancing needs of talented students [16, 31, 59].

Most innovations in education by the schools do not evaluate their product to any extent. Follow-ups are rarely built into the evaluation process. To fill this void, the academic *Olympiad Studies* undertook the task of evaluating the effectiveness of the Chemistry, Math, and Physics Olympiad programs by tracking down their participants from the inception of these programs. Do these competitions generate STEM scientists? Do their graduates make important contributions?

To answer these questions, surveys and instruments were synthesized and administered to Olympians and their parents. We spent 11 years tracking down 1,093 Olympians in six countries to

find out the careers they chose and their accomplishments. As of 2006 the oldest Olympian was 41 and the youngest was 16.

## Methods and Data Sources

The international Olympiad studies began in 1995 with research teams in Taiwan (Wu-Tien Wu), Mainland China (Zha Zixiu), and the United States (Campbell). In 1997 additional teams joined the project from Germany (Kurt Heller), Finland (Kirsi Tirri), and Korea (Seokhee Cho) (see Table 1 - found at the end of the research on p. 21). Furthermore, researchers in Japan [Hirano, 23] and Russia [Kukushkin, 28] contributed articles about the Olympiad programs in their countries.

Table 1: International Academic Olympiad Principal Investigators and Samples.

Samples	N
American Olympians (1998-2007) <i>PI: James Reed Campbell, St. John's University</i>	335
German Olympians (1998-2007) <i>PI: Kurt Heller, University Munich</i>	235
Finland Olympians (1998-2007) <i>PI: Kirsi Tirri, University of Helsinki</i>	165
P.R.C./R.O.C. (1998-2000) <i>PI: P.R.C. Zha Zixiu Chinese Academy of Science</i> <i>PI: R.O.C. Wu-Tien Wu, Taiwan Normal University</i>	71
Korean Olympians (2005-2007) <i>PI: Seokhee Cho, St. John's University</i>	277
Totals	1,093

Our studies are retrospective in nature because we asked the Olympians and their parents to supply information about the Olympians when they were growing up. Our fundamental research question was, "What factors contributed or hindered the development of their talents?" Our inspiration for doing these studies originated from a deep appreciation of the Terman longitudinal studies that began in the 1920s-1930s and continues to this day [48, 49, 50, 51, 52].

Terman [51, 52] wanted to find out if developing talent early led to early burnout (early ripen, early rot). He found that many of his gifted subjects did not burn out and led productive lives. Some, however, did not. His subjects were mainly high IQ individuals.

The Olympiad programs require extensive domain knowledge. High school students take a series of technical exams to emerge as the top 20 students in their country. We have representations from the US, Asia, Europe and from one of the Nordic countries.

The Olympiad studies are unique in devoting so much effort to parents. We sent parallel surveys to parents and included an instrument that captures the parental-involvement dimensions used during the development years. These surveys used mixed methods producing both quantitative and qualitative data.

The principal investigators and their talented colleagues collaborated extensively with data collection, analyses, statistical methods, and publishing throughout the many years of contact. This collaboration deepened our own research expertise.

In getting the same information from the Olympians and their parents, we were able to validate the information that was collected. In order to secure qualitative data, we included open-ended questions for the Olympians and their parents.

For researchers not familiar with the Olympiad studies, the excerpts below list key findings from some of the articles and research papers presented at international meetings. For each listing the author's contribution is included in the reference section.

## Major findings of Mathematics and Science Olympiad Studies

### Evaluation of Olympiad Programs

The first round of studies with the Math Olympians asked the question, “Would you have achieved as much without the Olympiad program?” In Mainland China, 89% of their Olympians and 90% of their parents expressed the view that the Olympians would not have accomplished as much [64, p. 538]. The Taiwan Olympians (66%) expressed the same view [60, p. 530], and 76% of the American Math Olympians and 70 % of their parents voiced the same belief [3, p. 504]. To understand these conclusions consider the national recognition provided by Olympiad programs which helped them to get into elite universities.. The American Olympians were recruited into ongoing research programs under way at these universities. In subsequent rounds of data collection, the same findings occurred. Keep in mind that our principal investigators had no connection to these programs and were seen by the Olympians and their parents as objective evaluators.

### Gender Gaps

After the second round of data collection, our international researchers reported large gender gaps in the three STEM domains. The German Olympians had the largest gaps between males and females (math 35:1; physics 95:0; chemistry 10:1). Math had the least female Olympians. We then conducted five qualitative follow-up studies [54, 29, 18, 6, 63, 11]. One introductory article [2] and a summary article [35] accompanied these articles. These studies interviewed both male and female Olympians and asked their views about these gender gaps. The key findings attributed the causes to cultural forces in each of the countries.

In Germany the male Olympians placed the blame on the bias by teachers against girls. The male Olympians believed there was really no talent differences between the sexes. In Korea, female Olympians attributed their success to the support from their family members. Finnish-male Olympians identified early reading and math experience as influential more than females did. The male Olympians had been given more early encouragement in mathematics and the sciences [54] and had taken part in more competitions than the females [54, 58]. Both males and female Olympians identified international co-operation as the single most influential factor for academic success and then a supportive partner as critical to their success [58].

### Peoples Republic of China Olympians

Mainland China started their Olympiad programs in 1985. Nevertheless, by 1996 ten million students participated annually. Special programs for the gifted are credited with nurturing the Math Olympians [64]. These programs are initiated because the Chinese believe that these gifted students will emerge as leaders in the next generation. This research team isolated four factors that they believed are responsible for developing such extraordinary math talents:

- Positive home atmosphere and parents’ influence on early education;
- Solid foundation in math provided by the schools;
- Guidance and encouragement of excellent teachers; and,
- Psychological stability and effort by the Olympians.

### Republic of China (Taiwan) Olympians

In Taiwan, due to the Chinese cultural tradition, gifted education is a top priority with the expectation that children in such programs will become the leaders in the next generation [60, 61, 62]. Taiwan began its Olympiad program in 1991. Most of the math Olympians identified were first-born in their families, came from higher SES (Socio-Economic Status) families, and reported that their teachers were critical in the development of their talents. Most of these Olympians can concentrate easily, prefer thinking to memorizing, are curious about many things, were involved in extracurricular activities, were largely independent, and were good time managers. Also critical in their development were conducive home atmospheres where mothers provided more intellectual resources and more monitoring than fathers.



## **Japanese Olympians**

As of 1996, in Japan there were no gifted programs for the academic Math Olympians [23]. Hirano [23] believes that the system of standardized and conformist education is not able to develop fully such children's full potential. Math is taught at a high level in Japanese high schools, which assures a steady stream of talented students to participate in the Olympiad contests. Hirano [23] points out that 40% of the less-talented students cannot understand the math that is being taught.

## **Russian Olympiad Competitions**

The U.S.S.R. (Union of Soviet Socialist Republic) initiated academic Olympiad programs in 1934 [28]. This innovation spread first to the satellite countries surrounding Russia, then to western countries, and eventually around the world. Kukushkin [28] provides information about how Russian mathematicians and STEM scientists developed the program that became so successful and replicated worldwide.

## **German Olympians**

The German Olympians come from intact families (2-3 children) where parents are highly educated with high-status jobs. Over 50% of the mothers stayed at home during the child-rearing years [22]. Parents recognized the child's talent by 7-8 years of age. The most important factor during the developmental years was a conducive home atmosphere where high levels of literacy existed. Additionally, many of the Olympians attributed their success to their own motivation, effort, initiative, and curiosity. Furthermore, German Olympians put more stock in ability than effort. Male Olympians greatly outnumbered females in Germany (highest gender gap). The German Olympians also reported hindrances in their schools that included classes taught at low levels of instruction, and schools not providing sufficient challenges. The German Olympians mostly stayed with their academic domain throughout their careers.

## **Finland Olympians**

Finland's Olympians were mostly the first-born child in large higher SES families [55]. The mothers in Finland had the highest level of education than any of the other countries participating in these studies. Parents and Olympians reflecting on the three most important factors that contributed to the development of their Olympians' talent were as follows: 1. conducive home atmosphere; 2. homes that included abundant reading resources; and 3. excellent teachers. Finland is known for its excellent teachers. Finland provides no special programs for the gifted because it is believed that every child has gifts. Instead, equity is emphasized. The Olympians reported few school hindrances with the exception of courses being taught at too low a level. However, some of the Olympians reported bullying, harassment, ignorance, envy, and jealousy. Asked to identify the most important person in the development of their talents, the Finnish Olympians in all SES groupings rated themselves.

The Finnish Olympiad participants in particular have been highly independent learners, and they attribute their academic success to both ability and effort [56]. Their own interests and efforts have been the key factors in developing their talents and in their career orientations. According to the Olympians themselves, the Olympiad program increased their self-confidence and confirmed the career choices they had already made. Finnish Olympians have been motivated largely by their own inner drive. A favorable home atmosphere and the supportive teachers were helpful, but the Olympians viewed themselves as the most influential person in developing and actualizing their mathematical talents (57). In higher SES families they also rated their parents. Furthermore, middle and low SES families, also listed their teachers.

## **Korean Olympians**

Korean Olympians were mostly the first-born or only child (54.5%) in families with high literacy where their mothers recognized their talents during the preschool years [10]. Most of these Olympians did not attend programs for the gifted, but 71.4% attended specialized science high schools. The most important factors that fostered the development of their talents included: parents'

recognition and encouragement, conducive home atmospheres where high levels of literacy existed, acceleration (skipping grades), taking advanced courses, and teachers’ support. Almost all of the Korean Olympians enjoyed reading books. These Olympians, however, reported certain negative school influences such as poor and disrespectful teachers and not enough challenges in their high school classes. Shim and her colleagues [40] found 277 Korean Olympians in 2005. Among the sixty Olympians who responded to the survey, 74.4% majored in natural sciences and engineering, 20.4% in medical science, and 5.2% in other fields.

**American Olympians**

The doctoral degrees earned by the American Olympians are listed in Table 2 (last page of research or p. 22). We included law degrees because some of the Olympians transitioned to careers outside their domains. Most of them got their doctorate at age 30. As the years proceed we believe that more Chemistry, and Physics Olympians will get their doctorates so that the American average is 50%. Most American Olympians graduated from the most prestigious universities (in rank order: 1. Harvard, 2. MIT, 3. Princeton, 4. U.C. Berkley, 5. Stanford, 6. U. Chicago, 7. U. Illinois, 8. Duke, 9. Cambridge (UK), 10. Cal. Tech.).

**Table 2:** American Olympians’ Doctoral Degrees (Ph.D., MD, JD) (2007).

Domain	Age Range	Percentage
Mathematics	15-51	57
Chemistry	15-42	49
Physics	15-39	41

We have data from 70% of the Physics and Chemistry Olympians and 90% of the Math Olympians. Virtually 100% of these individuals have earned college degrees. In terms of careers, most of the Olympians end up in three STEM areas: university professors, computer, or scientific occupations.

In terms of publications, the 90 young Olympians (ages 16-22) averaged 5.09 publications; the 131 early career Olympians (ages 23-29) averaged 15.86 publications; and the 124 mature career Olympians (ages 30-41) averaged 49.14 publications. By 2007 the total publications for these Olympians was 8, 629.

The American culture places value on sports and competitions [7]. Some Chinese educators see this as a major weakness, but the Americans have turned it into an advantage. There are 265 academic competitions in the United States in every academic domain [25]. Eighteen percent of American secondary students (grades 9-12) participate in competitions [7].

Over 50% of the American Olympians were immigrants or the children of immigrants [3]; therefore, this was a way for levelling the field of opportunity to newcomers. Most competitions are not run by the government but maintained and nurtured by teachers who do so to provide challenges to these talented students. This grass roots origin is one of America’s strengths. The Olympians were mostly the first-born child (66%) in small (1.4 children) professional families with high-status jobs. However, some Olympians came from very low SES families. Most of them attended public schools (84%) where 56% of these schools provided programs for the gifted.

Two negative hindrances were reported by the Olympians about their schools: 1. negative effects in the elementary schools where precocious children were taunted for their talents; 2. school hindrances (poor or disrespectful teachers, classes taught at too low a level, boredom). The factors that had positive effects on the Olympian long-term productivity included a conducive home atmosphere when they were growing up and early recognition and encouragement of their talents by their parents [4, 8].

## Discussion

The key finding is that home-based/school-related factors account for the development of Olympian's talents as adults [33]. Regarding home factors, a conducive home atmosphere during their growing-up years was largely responsible for the development of their talents. Another home factor, namely, the family's SES, also contributed to their development. High SES families provided the needed intellectual resources.

With regards to school factors, negative effects during the early school years had damaging consequences on the development for some of the American Olympians. The young prodigies had serious negative confrontation with their peers. Hindrances by teachers and administrators were also experienced by many Olympians. These obstacles proved frustrating to the Olympians and their parents. In almost every country the Olympians mentioned teachers that were disrespectful to their talents. Some Olympians reported knowing more about their subject than their teachers; classes taught at too low levels; and schools not providing enough challenges.

It was surprising to find some Olympians with low motivation. Our recent studies have labelled this factor as Low Ambition. Our studies of adult Olympians found that low ambition continues into their careers and lowers their productivity [4].

Crucial factors for STEM-talent development emerged along the developmental stages as well as suggested by various theories based on the Talent Development Paradigm [12, 15, 17, 20, 36, 37, 44]. Concerning the early developmental stage, positive or conducive home atmosphere, parents' recognition of talents, and high SES of families providing rich intellectual stimuli were very critical. These findings are very similar to what many other

studies [1, 30, 31, 41] found. On the middle developmental stage, establishing solid foundation in math through challenging programs and encouragement by excellent teachers were reported as critical factors for successful STEM- talent development [41, 45, 47, 59, 65].

In addition, psychological traits and efforts of the Olympians at all stages were essential for their success as found in previous studies [14, 38]. The psychological traits include motivation, initiative, curiosity, independence, time management skills, and strong concentration. However, attribution of their success or failure was different among Olympians from different countries [5]. European and Nordic Olympians attributed their success to their own motivation, effort, initiative, and curiosity, whereas, more Asian and American Olympians attributed their success to parents and teachers [34]. These differences could be from the cultural influence of individualism versus group collectivism.

In early school years some Olympians experienced negative school atmospheres and teachers. European Olympians responded low-level instruction as a hindering factor, whereas in China, Japan, Korea, and the United States, Olympians responded that they were provided with challenging programs regardless of the existence of gifted education programs. More than half of the American schools provided programs for the gifted. Some Korean and American Olympians reported disrespectful teachers toward their talents as hindering factors.

Would it be unrealistic to expect school teachers to provide appropriately-challenging programs to these STEM talented students in the school setting? If formal recognition of the STEM talent is made, would it be possible for them to be provided with appropriate programs?

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## Conclusions

Our Olympian studies confirm crucial factors for talent development along the developmental stages. In different countries different factors were reported as more crucial for success of the STEM Olympians and their subsequent productivity. However, there were some commonalities. The crucial factors commonly found were:

- Early recognition of STEM talent and conducive home environment;

- Specialized challenging programs for developing strong STEM foundations and opportunities to participate in STEM activities and competitions during the schooling period; and,
- Strong motivation and efforts on the part of the Olympians for success throughout the developmental stages.

Developmental trajectory of STEM talent starts early [13, 31, 44]. Since early recognition of STEM talent by parents is crucial, more attention needs to be paid to the STEM-talented children from socioeconomically disadvantaged families. In addition, many STEM-talented students might still have negative experiences in their schools due to lack of respect for their talents and lack of challenging programs. In this environment, Olympiad programs and competitions are essential for developing STEM talent of youths outside of their schools. Gender gaps still exist in most countries. Female students need more support and encouragement from teachers and parents for participating in STEM-related activities and competitions.

When our studies were underway, we were not aware of the built-in bias among psychologists and educators against competitions. Alfie Kohn's [26] book "*No contest: The case against competition*," gained national and then international prominence. His book focused on extrinsically-structured competitions, and he assumed that competitions were based on aggression and incompatibility. However, the book had a chilling effect for researchers doing competition studies. Marta Fulop (Hungarian Academy of Sciences) saw our publications as a significant blowback against this bias [19]. She found very little empirical evidence to support Kohn's [26] book. Our data-driven studies provided the support she needed to fight back.

## Limitations

None of these international studies assembled control groups to bolster their claims of increased productivity for their academic Olympians. The U.S.S.R. initiated the Olympiad competitions in 1934 without any thought of including control groups, and the nations that have adapted these programs over the next decades have followed the same framework. The goal was identifying talent within the STEM domains and then to nurture it for the good of the state.

How many of the thousands of Olympiad participants should be recognized and selected for advanced training? The Olympiad competitions limit the numbers to only 20 individuals for most nations, and then to only six for the yearly international competitions. Such drastic cut-offs obviously miss many talented STEM high school students. The principal investigators for our Olympiad studies acknowledge this shortcoming. But there is a cost for increasing the numbers selected, and governments find it hard to justify this cost when their schools are supposed to be the main pipelines for STEM talent.

Another limitation of these studies concerns women and minorities that are underrepresented in the STEM professions in all the countries that joined us in this project. This is an issue for the people that run these Olympiad programs. Our studies were done by researchers not connected with the programs. Consequently, we can only communicate these concerns to the policy makers running the programs.

Our studies are retrospective by design. We asked the Olympians and their parents to remember their childhood and share with us how their talent was developed. Much of the information we collected concerned factual matters that were verified. But some involved critical incidents that had consequences for the Olympians and their parents. One limitation of this approach is that maybe the memories of the adult Olympians or their parents are not accurate.

The final limitation concerns the "losers" of these competitions. Since there are so many participants and so few winners is it fair to the overwhelming number of participants who do not win? Every student that enters the competitions must gain some advanced-domain knowledge. Some students gain a great deal of subject matter, while others just gain some extra knowledge beyond what

is already available in their high school STEM courses. *However, is learning such advanced knowledge ever a liability?*

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# Diverse Insights Revealing Nuances of the Culture-High Ability Nexus: An Interdisciplinary Search

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## Abstract

Discovering the cultural dimensions of high ability is analogous to a large-scale creative problem-solving initiative. Just as the early phases of the creative-problem-solving process require broad-scope searches through diverse data sources, understanding the culture-giftedness nexus requires broad-scope excursions through interdisciplinary scholarly sources that can enable deeper understanding of culture. Here, we engage in such an excursion and borrow insights from leading thinkers in cultural anthropology, English studies, political science, ethical philosophy, and history, and use these insights to generate new ways of thinking about the cultural aspects of giftedness. The foreign concepts analyzed include anti-anti-relativism, mythological archetypes, the artificial reification of culture, distant proximities that influence personal identity, ethnocentrism and particularist morality, differing views of nature, and the influence of critical communities and motley coalitions in a globalized world.

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**Keywords:** Interdisciplinary; giftedness; culture; ethnocentrism; morality; ethics; globalization.

The creative problem-solving process requires problem solvers to engage in a broad search for all relevant data even before defining the problem, let alone formulating and implementing a solution (Isaksen, Dorval, & Treffinger, 2011; Treffinger, Isaksen, & Dorval, 2006). Analogously, scholars who want to understand the nature and nuances of the cultural dimensions of high ability also should engage in very broad explorations that will turn up hidden information about culture. Part of this broad, exploratory process should entail excursions through multiple academic disciplines in search of research findings, theoretical perspectives, and philosophical constructs that might be relevant to theory, research, and practice in high-ability fields such as gifted education and creativity studies.

Admittedly, such a search will take us far and wide, and add convolutions to already complex considerations of the giftedness-culture nexus. Unlike scholars of centuries past who could become polymaths without too much difficulty because the inchoate academic disciplines of those eras encompassed much less knowledge than we have today, scholars in high-ability fields could become swamped by large masses of data and constructs from foreign disciplines. The rapid growth of knowledge in the 20th and 21st centuries makes this problem a likelihood.

Nevertheless, ignoring insights from foreign disciplines is unwise because much can be gained from interdisciplinary work. First, interdisciplinary searches for insights about culture can turn up discoveries in fields such as cultural anthropology, political science, history, and ethical philosophy that could reframe some of the ideas we have about giftedness, talent, and creativity. Second, discoveries about concepts and inquiry methods that are influential in foreign disciplines but differ from predominant constructs and methods in our own field can break us free of dogmatic thought frameworks. Dogmatic insularity is one of the most difficult and ubiquitous barriers hindering academic progress and high-ability fields certainly are not immune to its clutches (Ambrose & Sternberg, 2012; Ambrose, Sternberg, & Sriraman, 2012). Third, very complex problems and issues

require syntheses of insights from multiple disciplines (Ambrose, 1998, 2005, 2009a, 2015, 2017a, 2017b, 2017c; Ambrose & Sternberg, 2016a, 2016b; Mäki & MacLeod, 2016; Midgley, 1998; Nicolescu, 1996, 2002; Suresh, 2013?). Here are some examples:

- The study of ancient cultures is enriched by the mutual corrections generated when historians' studies of ancient scripts come together with archaeologists' studies of material artifacts (Chippendale, 2000; Lowenthal, 2000).
- The growing field of bio-archaeology draws together and synthesizes insights from chemistry, geology, physics, biology, forensic science, and archaeology to shed light on human origins and long-range human development (Larsen, 2000, 2010, 2015). Of course, access to these synthesized insights would be impossible from within the borders of a single discipline.
- The interdisciplinary field of cognitive science combines contributions from psychologists, linguists, neuroscientists, philosophers, artificial intelligence researchers, and anthropologists, among others (Baumgartner & Payr, 1995; Cowan, Pines, & Meltzer, 1999; Johnson, 2009; Rose, 1998; Spivey, 2008; Thagard, 2012).
- The interdisciplinary field of complexity theory brings together chemists, physicists, mathematicians, biologists, political scientists, philosophers, urban planners, and economists, among others, to generate understanding about the ubiquitous phenomenon of the complex adaptive system (Ambrose, Sriraman, & Pierce, 2014; Cowan, et al., 1999; Miller & Page, 2007; Morowitz, 2004; Pullman, 1996).

Scholars who wish to understand ancient cultures, human origins and development, cognitive processes, and complex adaptive systems must grapple with immense complexity and that is why the more insightful among them gravitate toward interdisciplinary exploration and collaboration. It would be difficult to argue convincingly that high ability (operationally defined here as any blend of outstanding giftedness, talent, and creativity) is significantly less complex than the phenomena addressed in the examples above. Consequently, we feel justified in carrying out a broad interdisciplinary search, which can be viewed as the mess-finding and data-finding phases of creative problem solving applied to the task of discovering more about the cultural dimensions of high ability.

Our intent here is not to be comprehensive. That is virtually impossible in an interdisciplinary search addressing a highly complex topic. Instead, the insights provided in the subsequent subsections are only examples provided to illustrate the potential of expanding cultural awareness through interdisciplinary borrowing. Additional examples can be found in Ambrose (2009a).

## **Moving Beyond the Notion of Brains in a Vat**

Consistent with the enthusiasm for brain-based learning in general education, professionals in the field of gifted education have been borrowing insights from neuroscience to shed light on various dimensions of high ability.

For example, a special issue of the *Roeper Review* attracted leading scholars of cognitive neuroscience who addressed: relationships between brain structure and human intelligence, neuropsychological profiles of savants, functional brain patterns of mathematical processing in gifted adolescents, and functional brain patterns of fluid analogizing to a proposed, expanded model for locating studies of twice-exceptional individuals within medical models of disability. (Kalbfleisch, 2008, p. 160)

Such interdisciplinary work is noteworthy and sorely needed in our field. At the same time, Robert Sternberg (2008) published a counterpoint article in the same issue warning about excessive adherence to the reductive-mechanistic approach to understanding high ability.

Consistent with Sternberg's analysis, the eminent cultural anthropologist Clifford Geertz (2000) argued that the growing field of cultural psychology provides a helpful counterweight to reductive, neurobiological assumptions about human thought and action. The field of cultural psychology breaks from predominant thinking in psychology and cognitive science, which portrays cognition as emergent from intra-cranial electrochemical processes. Of course, these processes are foundational to cognition but the excessive emphasis on intra-cranial dynamics marginalizes attention

to context. Geertz (2000) and Sternberg (2008) contend that context matters. Geertz (2000) put it simply: “Our brains are not in a vat, but in our bodies. Our minds are not in our bodies, but in the world” (p. 205). We must remember that cultural context plays a big part in the development and dynamics of the gifted mind. Culture is not a mere overlay on the fundamental mechanics of the brain but instead it is intricately intertwined with, and largely constitutive of, cognitive processes.

Paying heed to findings in cultural psychology, scholars in our field can gain much from excursions into Geertz’s (2000) discipline of cultural anthropology. For example, many gifted but iniquitous leaders throughout history have been culturally insular, viewing belief systems foreign to their own as less worthy (Foss, 2006). Moreover, Persson (2012) insightfully revealed implicit, cultural insularity in the scholarship of gifted studies. But if we borrow an insight from cultural anthropology we can move somewhat beyond dogmatism. Intrigued by the phenomenon of cultural insularity and concerned about the shortsightedness of those who claim to possess immutable truths while denigrating cultural relativism, Geertz (2000) came up with the notion of *anti-anti-relativism*. He based this idea on the phenomenon of anti-anti-communism, which arose during the McCarthy era in the United States. In reaction against anti-communist McCarthyites who claimed that anyone who opposed their dogmatic overreaction to the communist threat within American borders must be pro-communist, anti-anti-communists showed their displeasure with *both* extremes, the fanatical right-wing McCarthyism and the communist totalitarian regimes of the era. Along similar lines, Geertz (2000) argued that anti-anti-relativists could stake out a similar middle ground between extreme, academic anti-relativists who adhere strongly to a favored set of cultural values and relativists who portray all cultural systems as being of equal value.

If we follow Geertz’s (2000) advice, we will look for ways in which conceptions of giftedness can be shaped neither by dogmatic cultural anti-relativists nor by relativists. The former will be prone to confining definitions of giftedness within the tenets of a particular culture while the latter will be unable to perceive ethical problems in the behaviour of gifted individuals whose minds are shaped by cultures that tolerate or encourage unjust or exploitative behaviors.

## **Mythological Archetypes and Hidden Artistic Talent**

Leeming (1990, 2004, 2013), a scholar of English studies, has carried out intensive analyses of mythology, showing that its impact on culture is difficult to overestimate. For example, he concluded that much of the devastating, long-term conflict in the Middle East derives from cultural dogmatism, which is rooted in the mythologies embedded in the three monotheistic religions. To the extent that gifted political and religious leaders initiate and sustain these conflicts, we can conclude that the mythological dimensions of culture can warp the behavior of gifted leaders and their followers with calamitous consequences.

One other insight from Leeming, (1990, 2013) is particularly relevant to high ability. According to his analyses, creative artists are most effective when they tap into the archetypes or myths of a culture (Leeming, 1990, 2013). When we apply this insight to gifted education, we can hypothesize that gifted young artists growing up in a society dominated by a culture different from their own will have trouble gaining recognition for their work and will not be identified as highly talented. Their misdiagnosis as “less talented” will derive from two problems: (a) their own lack of immersion in the mainstream culture, which prevents them from accessing the mythological archetypes of that society; and (b) the inability of adults in the society to perceive their brilliant cognitive and aesthetic connections with deeper mythologies of the minority culture.

This raises questions about the consensual assessment technique, which is used to identify creative ability (Amabile, 1983; Baer & McKool, 2009; Hennessey & Amabile, 1999; Hickey, 2001). Unless the experts employing the technique are steeped in the minority culture that nurtured the development of these talented young people, the expert evaluators will be missing an important dimension of the expertise needed in the evaluative process. Consequently, they will be much less “expert” as evaluators than they appear to be even though they may be recognized as “experts” by their professional peers in the relevant artistic domain. The sad result is that gifted young artists from

a culture that is a minority in a particular nation might be ignored by the talent-screening mechanisms of that nation.

## Culture as Reified and Bounded

According to political scientist Seyla Benhabib (2002, 2017), both conservative and progressive thinkers tend to make the same conceptual error in arguments over the drawbacks or merits of multiculturalism. Conservatives tend to argue against multiculturalism because they believe that recognizing and embracing the values of other cultures will undermine the security of their own, and this will lead to instability. Progressives tend to argue in favor of multiculturalism because they want to shield minority cultures from domination by the mainstream sociocultural system in a society. Both of these arguments are preservationist in the sense that they are aimed at protecting and preserving one or more cultures from intrusion by competitors.

Benhabib (2002, 2017) argued that both of these opposing perspectives on cultural dominance are based on simplistic portrayals of culture itself. Both conservative and progressive cultural preservationists oversimplify culture by assuming that a particular culture is internally homogenous and can be defined clearly. As such, its borders can be delineated with precision. Benhabib (2001, 2017) used the term *reductionist sociology of culture* to designate this conceptual error of cultural oversimplification.

One of Benhabib's (2002, 2017) primary purposes in the analysis was to warn against accepting simplistic cultural interpretations that might be used to legitimize the hoarding of power by cultural insiders. If powerful ideologues can oversimplify our notions of culture they can manipulate us into accepting their marginalizing of "outsiders" who do not perfectly fit the reified pattern that they establish as the ideal for a nation or region. They can establish repressive demands for conformity.

Implications for the field of gifted studies include the danger that a particular group of ideologues can define what giftedness is or is not, making selection and education of those with high ability conform to a reified set of unfairly favoured cultural values that do not accurately reflect the cultural nuances of the region. In actuality, the dominant culture and the minority cultures in that region are much more flexible and fluid, evolving over time by borrowing ideas from one another and from outside the region. The cultural dimensions of giftedness are far more adjustable than we assume they are.

## Globalization and Dynamic Tensions in Identity Formation

As the phenomenon of globalization has brought the world together through ever-tighter integrative communication networks, the problem of cultural and ethnic conflict has been magnified. While new developments in information technology and the increasing internationalization of corporations have generated these integrative, international connections, individuals and populations throughout the world also are inclined to align themselves with the tenets of a particular cultural identity. The result is the dynamic tension of *distant proximities*, the simultaneous magnetic outward pull of international, global influences (most notably the attraction of Western trends and commercial products) and the inward pull of local identity and the social cohesion and security it provides (Rosenau, 2003, 2015).

Implications for the gifted can include turbulence and angst in identity formation. Before the globalization of the late 20th and early 21<sup>st</sup> centuries, gifted individuals did not have to wrestle much with cultural identity because they tended to automatically align their belief systems and aspirations with the tenets of their home cultures.

Now they must make decisions about the extent to which they tie their identities to local, cultural traditions or the competing Western cultural forces of globalization.

## **Ethnocentrism, Particularist Morality, and Demonization**

Conflict based on cultural dogmatism has been a major problem throughout human history and persists into the 21st century. According to critical thinking experts, the gifted are not immune to dogmatism, including its cultural variety (Elder & Paul, 2012). Actually, the moral influence of an individual in the world can be mapped onto a conceptual model of moral-ethical impact (Ambrose, 2009b), which synthesizes aspects of morality based on constructs from the following:

- There are the conceptions of universalist morality, relational altruism, quasi-altruism, amorality, particularist morality, immorality, and malevolence (from the field of ethical philosophy).
- There is the Presby-Arendt continuum (from ethical philosophy) which portrays the degree of freedom or constraint individuals enjoy or suffer in a particular society. The continuum ranges from free consent, to manipulation and propaganda, to coercion and constraint, and finally to violent repression.
- There is the degree of influence the individual has within a society. This influence can be “earned” through talent, intelligence, and creativity (insights here can be gleaned from gifted education and creative studies), or “unearned” through birth into the networks of privilege in a highly stratified society controlled by an elite (insights here can be gleaned from economics, sociology, and history).

Based on conceptions drawn from this model, an individual with benevolent or malevolent dispositions and little talent, creativity, or intelligence can do very good or very harmful things within a small circle of influence, but likely will have little impact on the world. Conversely, an individual with benevolent or malevolent dispositions and very strong talent, creativity, or intelligence has the power to exert much more beneficent or harmful impact on the world. This is especially the case if the individual of high ability is a member of an elite in a stratified society because the networks of privilege can magnify one’s influence on the world exponentially. Consequently, the moral responsibility of gifted individuals, especially those who come from privileged backgrounds, is higher than that of individuals with less ability.

Given these notions of moral impact and responsibility, attending to the cultural dogmatism influencing gifted minds becomes more important. Cultural traditions often have the disturbing effect of confining an individual’s benevolent actions narrowly to members of his or her own identity group while making it more likely that the individual will engage in malevolent acts toward outsiders, up to and even including genocide (Chiro, 2012; Chiro & McCauley, 2006; Moore, 2000). Otherwise kind individuals and groups are capable of horrific acts toward those they deem impure or polluting. The “impurity” comes from the outsiders’ differences in terms of political, religious, or other cultural beliefs.

Yet another set of concepts from ethical philosophy applies to this analysis. Gewirth (1998, 2009) distinguished between particularist and universalist morality. Those adhering to particularist morality typically have no problem extending kindness and generosity to others, as long as those others are from their own identity group. However, in interactions with individuals or populations beyond their own identity group, particularists tend to see the outsiders as less worthy and subject to anything from dismissive exclusion to exploitation and extermination. In contrast, universalists cannot draw strong distinctions between their identity groups and outsiders. While they might favor those who share their identity to some extent, when crises occur and outsiders need help universalists feel compelled to provide generous assistance, even when such action poses danger to themselves. Political philosopher Kristen Renwick Monroe (Martin & Monroe, 2009; Monroe, 1996, 2003, 2004, 2011) also has done considerable research on these dynamics.

There are implications here for those attempting to understand the cultural dimensions of high ability. Aspects of culture such as religious beliefs and sociopolitical and ideological values usually are the most important factors in distinguishing one’s identity group from outsiders. If gifted individuals subscribe to particularist identity frameworks they will be inclined to apply their impressive talents and thinking skills to malevolent ends when crises magnify the differences among identity groups. They could use their intellectual abilities to build convincing justifications for

malevolent actions toward outsiders. Those with leadership talents could encourage large numbers of followers to attack and to destroy outsiders as did the malevolent leader, Adolf Hitler, who showed himself willing and able to catalyze the Holocaust (Koonz, 2003; Popper, 2005).

In contrast, the powerful talents and cognitive capacities of gifted individuals with universalist tendencies can be employed for the protection of vulnerable outsiders and in the healing of divisive, intercultural conflicts within and beyond national borders. Nelson Mandela's universalist approach to the healing of inter-cultural conflict in the aftermath of the dismantling of South African apartheid is an iconic example (Popper, 2005).

## Differing Cultural Interpretations of Nature

The musty, archival mining of historians also can contribute valuable insights about the cultural dimensions of high ability. For example, Coates (1998) carried out in-depth analyses of the ways in which various cultures conceive of the natural world and its interactions with society. Ultimately, he developed the following categorizations (among others) of nature as a:

- Principle, quality, or essence that shapes the ways in which events unfold in the world;
- Physical place, which is separate from humanity; and,
- Guiding inspiration, which can serve as a source of authority for human action.

While these differing conceptions of nature appear benign or non-influential on the surface they actually can exert powerful influence over entire societies moving them in one direction or another over long periods of time. In addition, they can shape cultural conceptions of talent, intelligence, and creativity. In terms of influence on entire societies, Coates (1998) argued that the current, predominant Western view of nature as a physical place separate from humanity is actually a minority view when placed in the context of history. Most other civilizations have seen themselves as much more integrated with nature than do Western societies in the 20<sup>th</sup> and 21<sup>st</sup> centuries. A consequence of this notion of separation from nature is that nature is to be exploited as a resource. Arguably, many gifted, creative young people grow up to become influential corporate leaders who see their mission as exploiting resources and the natural world (e.g., executives of major oil companies). Consequently, they apply their talents to the profitable extraction of resources while remaining dismissive of, or oblivious to, the long-term ethical implications of their work (e.g., the looming disaster of climate change).

Another example of the impact of these differing perspectives on nature can have on societies and individuals comes from the ways in which Nazi Germany aligned with the idea of nature as a guiding inspiration and source of authority. Coates (1998) viewed this conception as underpinning the Nazi's belief that war was a natural state of being and the conquest of others was justifiable because their ideology was imbued with a natural worthiness. Many gifted and talented individuals in the Nazi regime were caught up in the fervor derived from this conception of nature.

## Critical Communities and Motley Coalitions

Finally, some other dimensions of culture can come into play when gifted individuals perceive ethical problems and injustice in the larger society and attempt to correct them. Many gifted children are sensitive to moral issues (Ambrose, Sriraman, & Cross, 2013; Hague, 1998; Lovecky, 1997; Piechowski, 2003a, 2003b; Roeper & Silverman, 2009; Seider, Davis, & Gardner, 2009; Silverman, 1993) so it is natural for them to perceive serious flaws in a culture or society before their less-able peers gain such awareness. Consequently, they often are in a tiny, fragmented, ethically sensitive minority and must push against enormous obstacles to effect any kind of societal change.

Fortunately, at least two rays of hope have become visible through the work of scholars from disciplines outside of gifted education and creative studies. Rochon (1998), a political scientist, showed how small groups of vibrant critical thinkers were remarkably effective in creating new idea systems and disseminating them throughout larger populations. In one example, he compared the state of race relations in pre-civil rights America as similar to the oppression of serfdom in the European

Middle Ages. In spite of this daunting barrier, gifted thinkers and leaders in the civil rights movement generated new ways of thinking and transformed the minds of large swaths of the American population.

If we combine Rochon's (1998) notion of critical communities with anthropologist Anna Tsing's (2001, 2004) discovery of globally integrated *motley coalitions* there is enormous opportunity for ethically sensitive gifted individuals to have significant impact throughout the world, and to redress large-scale injustices. Tsing (2001, 2004) found that the integrated networks of globalization are making it possible for widely dispersed, concerned individuals to collaborate in attempts to solve problems of injustice in distant places. For example, when corporate forces were expropriating large tracts of Southeast Asian rainforest from indigenous populations and causing large-scale environmental devastation, *motley coalitions* of concerned individuals came together to combat the problem. These coalitions were comprised of cosmetics entrepreneurs, democratic reformers, representatives of indigenous peoples, union activists, and others, many of whom would never interact under any other circumstances.

Gifted individuals, especially those who are sensitive to large-scale ethical problems in the world, no longer have to feel like they are loners in the world. If they discover these findings about the power of critical communities and motley coalitions they will be better able to interact with like-minded peers around the world through the networks of information technology. In essence, these findings from political science and anthropology, combined with the newfound power of global integration, offer the gifted the opportunity to shift and to transform their cultures for the better.

## Conclusion

This interdisciplinary exploration just scratches the surface. There are many more theories and research findings in disciplines relevant to cultural understanding that could be accessed to give us additional insight about the cultural dimensions of high ability. While cultural anthropologists, political scientists, ethical philosophers, historians, and scholars of English studies likely do not think much about the field of gifted education, there is much in their work that can be borrowed and applied to the theory, research, and practice in our field. We intend to continue the exploration, and invite others to engage in similar conceptual expeditions.

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# Common Sense about the Under-Representation Issue: A School-Wide Approach to Increase Participation of Diverse Students in Programs that Develop Talents and Gifted Behaviours in Young People

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*It is better to have imprecise answers to the right questions than precise answers to the wrong questions.*

Donald Campbell

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## Abstract

Changing demographics in schools around the world have raised questions about the nature and role of gifted education programs. An intense interest in the underrepresentation of students from low-income families and minority groups in gifted education programs has caused the field to re-examine both identification and services. In this article, the authors discuss the larger issues related to identification and programming, including data about the extent of the problem in American schools. We review the recommendations and suggested practices made by other researchers and writers in the field for improving the representation of diverse students in gifted programs and provide examples of efforts taking place in schools that are dealing with this challenge. The authors conclude by describing how a specific approach developed over decades shows promise in addressing the problem of under-representation.

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The education landscape in public schools around the world is adapting to increasingly diverse demographics with rising numbers of low income, language-minority, and cultural-minority group populations. These changing populations include the talent pool of high potential young people who are and should be the focus of gifted education programs. One of the biggest challenges facing our field is how to develop policies and procedures that are more responsive for finding and serving these under-represented students. Although this article draws on data about the under-representation issue in the United States, colleagues from other nations, such as Chile, Switzerland, India, Italy, China, and several countries in the Middle East have indicated that similar concerns are being raised in their own countries.

In the United States of America (USA), half of the 50 million children in public schools are members of minority groups (National Center for Education Statistics, 2016c) and 51% of children nationwide live either in or near-poverty (Suitts, Barba, & Dunn, 2015). Many students from low socio-economic status families attend schools where a majority of students live in poverty, including 42% of children of colour (National Equity Atlas, 2016). More than 4.5 million of today's students are English Language Learners (ELL) and more than 6.5 million young people have special needs

(National Center for Education Statistics, 2016a, 2016b). These new American school demographics have raised questions about the nature and role that gifted education programs can and should play in accommodating the dramatic changes that are taking place. It is little wonder that the hottest topic and single-most controversial issue facing the field of gifted education today is the continued under-representation of students from low-income families and minority groups. According to a 2016 report from the U.S. Department of Education's Office of Civil Rights, Black and

Hispanic students make up only 28% of students enrolled in gifted and talented programs, despite making up 42% of students in schools that offer gifted and talented programs. English learners make up only 3% of students in these programs, even though 11% of students in schools offering gifted and talented programs are English learners. At the high school level, fewer advanced math and science courses are available in schools whose population is 75% or more Black or Hispanic than in schools whose population is 25% or less Black or Hispanic.

In spite of longtime recognition of the limitations of IQ testing (e.g. Ford, 2004; Green, 1975; Sternberg, 1985, 2015), admission to school-based gifted programs is still dependent in many places on scoring 130 or above on an IQ test or above a given percentile on a standardized achievement test (generally, 2 standard deviations above the mean of the test). Sternberg (2015) points out that IQ tests, in assessing primarily analytical abilities, are limited in their effectiveness for selecting students for special programs. This type of admission requirement has historically favoured White children from high socio-economic status (SES) families over all other populations, leading to the term “historically under-represented groups” to describe both the children and the problem. Across the country, White and Asian students comprise the majority of the population in gifted classes, regardless of the composition of the rest of their school or district (Yoon & Gentry, 2009).

In this article, the authors use the term “historically under-represented groups” to mean students from low-income families, English learners, and students of Black, Hispanic/Latino, Native American, Native Alaskan, Native Hawaiian, and Pacific Islander origins, whose participation in gifted programming has been and continues to be disproportionately low in many U.S. schools. Many of the studies cited here focus on students of Black and Hispanic origin, and the authors acknowledge the need for

further study into the status and needs of students of Native American, Native Alaskan, Native Hawaiian, and Pacific Islander descent, as well as those from the many, varied Asian subgroups. A number of articles (e.g., Erwin & Worrell, 2012; Ford, 2014; Ford & Whiting, 2016; Lakin, 2016) and literally dozens of commentaries in the popular press have called attention to the problem of under-representation. This article defines the general nature of the problem and offers suggestions that might be worthwhile in attacking this complex issue.

A persistent inability to address the continued under-representation in gifted programs of students from historically under-represented groups in practical and sustainable ways may place the field of gifted education in danger of program eliminations or cutbacks; however, further research is needed to determine the policy ramifications of a failure to find a reasonable solution. It is, nevertheless, necessary to explore various options for providing services to a long neglected but rapidly growing segment of the American school population. Because of variations in local school demographics and state regulations for identification, funding, and the provision of services, there is probably no single best way to address the challenge of including diverse student groups in gifted and talented programs. In this article, the authors discuss the larger issues related to identification and programming and a broadened conception of the meaning of “data” when it comes to identifying under-represented students.

The authors describe general solutions recommended for improving the representation of diverse students in gifted programs and also provide an example of an award-winning school dealing with this challenge. The authors conclude with a description of how the Schoolwide Enrichment Model (SEM), an approach that been developed and refined over decades, shows promise of addressing the problem of under-representation.

## **The Problem in Perspective: Labelling versus Talent Development**

### **Key Questions**

The essence of addressing the under-representation issue concerns both how the field views the concept of giftedness for identification purposes and how it provides services for students in special programs. This twofold manifesto of gifted education can be brought into clearer perspective by the ways in which both educators and laypersons talk about both issues. A starting point is a

hypothetical yet realistic set of key questions usually raised when discussing identification and programming at the local level, including an examination of the meaning of the word “gifted.”

Imagine that you have been asked to address parents and teachers about planning (or revising) a gifted program in your school or district. Although the first question below is bound to be the main issue, further imagine that your audience has done some background reading and will “drill down” into identification and programming issues that are conceptually deeper than the “words on paper” of state and local regulations. Consider how you might respond to the following questions:

1. How does this district define and identify giftedness?
2. Must this district officially designate a student as “gifted” before providing any supplementary services?
3. Is the goal of the program to label students as “gifted” or “non-gifted” or is it to develop the strengths and talents of any young person who shows the potential for benefiting from supplementary services that are beyond the regular curriculum?
4. Can teachers use certain general enrichment activities (e.g., Thinking Skills, Creativity Training, and Problem-Based Learning) with all students and use their levels of response to determine for whom and in what way advanced level follow-up is warranted?
5. Does the program allow for gifted education services to be provided to certain students, at certain times, and within certain contexts or domains of their demonstrated potentials, regardless of whether or not they have the official label?
6. Would the program serve, for example, a young Steven Spielberg, who was doing exceptional things with a movie camera at a young age but was not a traditionally high-achieving student?

Although there are many other questions that might be raised, these questions should be examined by any state or school district that is developing or re-examining its policies and regulations, especially in light of the nation’s changing demographics and the continuing and concerning under-representation of students from minority groups and low-income families. These questions are also appropriate for middle-class districts that are interested in providing services for the “Steven Spielberg” students of their population, who have potentials that don’t show up through traditional identification criteria. The answers to these questions undoubtedly will be influenced by what people actually mean when using the word “gifted.”

## **It’s All a Matter of How the Word is Used**

What is the goal in using the word “gifted”? A practical understanding of what the term “gifted” means raises the question of what heuristic purpose the term serves once it is deprived of the aura that surrounds its use in many professional education groups and lay communities. A heuristic technique is an approach to problem solving, learning, or discovery employing a practical systematic method. Although a heuristic technique is not necessarily optimal or perfect, it should be sufficient to pursue an immediate goal; in this case, to plan special programs and processes to determine which young people are eligible to participate.

When considering the heuristic meaning of the word, “gifted,” one must first examine the parts of speech assigned to the g-word in the dictionary (Merriam-Webster, 2016). It is categorized as both a noun (giftedness) and an adjective (gifted). When used as a noun, the

word refers to an *entity* or state of being, for example, “He or she is one of the gifted.” Synonyms for the word as a noun are almost non-existent but “blessed” or “preordained” might come close. The noun “giftedness” often takes an adjective (such as scientific, or academic) to specify the area in which a person has achieved superior accomplishment.

When used as an adjective, it refers to high potential in a particular area of human performance and usually has reference to a criterion or comparison group (e.g., “She is a gifted writer for her age.”). Synonyms frequently found when the word “gifted” is used as an adjective are also adjectives that usually take an object (e.g., superior mathematician, advanced reader, innovative designer, exceptional artist, persuasive speaker, compelling writer), all words that helpfully provide direction when talking about the types of services advocated when developing special

programs and opportunities. Indeed, the word is even used as an adjective when the field is referred to as “Gifted Education,” reminiscent of the root word, that a gift is something to be given rather than a state of being. The student receives the gift when the school provides opportunities, resources, and encouragement to transform his or her potential into gifted behaviours.

Persons advocating the entity perspective argue that someone must first officially label students as “gifted” before the students can receive any special services. One may contrast this with a responsive orientation, where students react to presented opportunities and teachers respond to students’ demonstrated talent potentials at any time. Those with an entity perspective may assert that they are using a “multiple criteria” approach; but oftentimes, the label will not be bestowed unless the student achieves a predetermined cut-off score on an IQ or ability test. In such cases, the preliminary nomination and screening serve as a ticket to take a test, and the strengths and evidence of talent potential that led to the nomination and/or screening are disregarded unless one hits the cut-off score. Thus, claims about a multiple criteria approach end up being a smokescreen for the same old test-based, entity-oriented approach.

A case in point is an article that discusses the impact of the nomination stage on identifying under-represented students (McBee, Peters, & Miller, 2016). Although an excellent analysis is made of issues related to nominations for gifted programs, referral to the “actually gifted” and the “not-actually gifted” clearly indicates an entity orientation, even at the very early nomination stage of identification. Use of terminology such as “truly” and “actually” gifted in scholarly publications, with or without whatever disclaimers may be noted, could easily lead the casual observer to believe that there are people who do indeed have “a gifted chromosome.”

As a heuristic, “gifted education” conveys a process that *may* lead to the

enhancement of abilities and skills. As a less than perfect heuristic, “gifted assessment” for identification *may* identify students who can benefit from enhanced programming, but it may also miss many who would benefit. Recent studies (Grissom & Redding, 2016; Lu & Weinberg, 2016; McCoach et al, 2016) provided evidence that students from historically under-represented groups continue to be less likely to be identified as “gifted.” Grissom and Redding (2016) found that Black students are half as likely as other students with equal achievement to be assigned to a gifted program and that Black students are three times as likely to be assigned to a gifted program if taught by a Black teacher. Likewise, McCoach et al. (2016), in research that controlled for school characteristics, found that students who are Black, Hispanic, from low-SES families, or English learners whose achievement scores were just as high as students who were White, non-ELL, and not from low-SES families were significantly less likely to be identified as “gifted.” Lu and Weinberg (2016) found that across all students, those who attended free public pre-kindergarten in New York City were 4.5 times as likely as those who did not attend public pre-kindergarten to be tested for admission to a gifted kindergarten. However, even though Black and Hispanic students were more likely to be enrolled in full-time public pre-kindergarten, these students were 35% and 45% (respectively) less likely to be tested than White students, and overall, low-SES students were 46% less likely to be tested than students not from low-SES families. Hamilton et al (2017, ms under review) reported that students from historically under-represented groups are also less likely to attend schools that offer any sort of gifted program. In the absence of available programming, teachers may have less incentive to put time and effort into identifying students; conversely, without a population of students identified as having a need for special services, the school may have less incentive to expend resources on a gifted program. Naturally, these complexities influence the number of students from historically under-represented groups that will be represented in any actuarial analysis of the issue.

The traditional entity usage and primary reliance on teacher nominations and ability-test scores have resulted in remarkable under-representation of high potential students from historically under-represented groups in the United States, as previously cited (Erwin & Worrell, 2012; Ford, 2014; Ford & Whiting, 2016; Lakin, 2016; U.S. Department of Education, Office of Civil Rights, 2016; see also National Research Council, 2002). This approach also leaves out students of all

backgrounds who are highly creative, those who think and pursue tasks with a different approach to learning, and those who have highly specialized talents, interests, creativity, or motivation. S. Nicholson-Crotty, Grissom, Nicholson-Crotty, and Redding (2016) suggested that the reason that Black students are more likely to be assigned to gifted programs if a Black teacher teaches them (Grissom & Redding, 2016) may be because Black teachers may perceive (and rate) some Black students' behaviours, such as self-control and interpersonal skills, more positively than White teachers do. A dramatic example of a creative young scientist whose teacher overlooked his strengths follows in the teacher's comments about John Gurdon, winner of the 2013 Nobel Prize for medicine:

His work has been far from satisfactory. His prepared stuff has been badly learnt and several of his test pieces have been torn over: one such piece of prepared work scored 2 marks out of a possible 50. His other work has been equally bad, and several times he has been in trouble, *because he will not listen, but will insist on doing his work in his own way*. I believe he has ideas about becoming a scientist: on his present showing this is quite ridiculous (Collins, 2012, October 8, emphasis added).

Some people who became creative producers as adults were not traditional high achievers in school. For example, although Oprah Winfrey was a precocious child, she suffered from extreme poverty, turbulent living arrangements, and abuse throughout her childhood; she became a troublemaker. She spent time in juvenile detention and became pregnant at age 14, after which she went to live with her disciplinarian father. In high school, Winfrey's talents were able to blossom and she joined the honour society, visited the White House, and participated in a contest that led to her first broadcasting job (Harris, 2005, November 19).

The authors believe that young people showing creative potential should also participate in programs for talent development. A quotation attributed to Albert Einstein, the personification of scientific (adj.) "giftedness," explained that "Not everything that can be counted counts, and not everything that counts can be counted." If decision-makers only base student placement on things that can be easily counted, how many John Gurdons, Steven Spielbergs, and Oprah Winfreys will society lose by failing to heed Einstein's advice?

The commentary sections of popular education news outlets have featured a number of point/counter-point articles about the usefulness of the term "gifted" over the years (e.g., see, for example, the Commentary section of Education Week: Samuels, C. A. 2008, October 14; Peters, S. J., Kaufman, S. B., Matthews, M. S., McBee, M. T., & McCoach, D. B., 2014, April 14). The following conclusion reached by Peters et al., (2014) represents the general direction the field is taking toward the under-representation issue and is compatible with the distinction made between the entity and talent development perspectives described above.

The time has come to create K-12 models that consider how to properly challenge all students who—at any point in time—are ready for more advanced curricula; not just those we deem "gifted" in some global, unchanging fashion divorced from the educational needs of the child. By focusing less on the child's label and more on the child's needs, we will better serve those students in our schools who are ready and hungry for greater academic challenges. (para. 21)

Practitioners "can't wait" for theorists and researchers to agree on all possible ramifications of the identification challenge. Fortunately, much research has been conducted on possible solutions, so practitioners can draw from these to find a more equitable solution to identifying children who will benefit from special services. A brief review of general recommendations for change follows.

## **General Recommendations for Change**

General discussions and commentary about under-representation fall into the areas discussed in this section. Although these areas of concern are important starting points and much has been written about them in the literature, the ways in which words are used in the identification process will determine if thoughtful answers are put forth to the questions raised above. It is easy to offer

generalizations and make broadly sweeping comments about their importance, but the biggest challenge is in the ways scholars, commentators, and practitioners “drill down” to the actual practices that schools can use to implement one or a combination of the three general recommendations.

- **Non-Verbal Tests**

One potential solution to address the problem of under-representation is the use of nonverbal measures of ability to identify students with high ability. Nonverbal tests are intended to be fair to test-takers with limited English proficiency and regardless of academic background, because they require students to solve abstract visual puzzles, rather than to define vocabulary words or to solve math problems. The Raven Progressive Matrices, the Naglieri Nonverbal Ability Test (NNAT), and the Nonverbal Battery of the Cognitive Abilities Test (CogAT) are popular, well-researched examples of this type of test that were normed and have been re-normed with large demographically representative samples (e.g.,  $n > 180,000$  in Lohman, 2008;  $n = 20,270$  in Naglieri & Ford, 2003;  $n = 1,407$  in 1938,  $n = 11,621$  in 1952,  $n > 60,000$  between 1983 and 1989 in Raven, 2000). Additional common nonverbal tests are the Test of Nonverbal Intelligence, 4<sup>th</sup> edition (Brown, Sherbenau, & Johnsen, 2010), the Leiter International Performance Scale-Revised (Roid & Miller, 1997), and the Universal Nonverbal Intelligence Test (Bracken & McCallum, 1998). These tests are sometimes used as alternatives to IQ tests for students with limited English proficiency on the assumption that by removing the requirement for students to produce verbal or written responses (and in some cases, to follow verbal or written directions), score variation that is due to cultural and linguistic differences will be reduced or eliminated (Pfeiffer, 2012).

Nonverbal tests alone, however, do not eliminate all disparity in identification between students from over- and under-represented groups. In a study comparing the NNAT and CogAT Composite tests and their relationship to the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), Giessman, Gambrell, and Stebbins (2013) found that using the NNAT to screen students for gifted programs increased identification of Hispanic, but not of Black students. In a sample of kindergarten students who took the NNAT as a screening test, Carman and Taylor (2010) found that when controlling for ethnicity, students from low-income families (identified on the basis of free/reduced lunch status) were recommended for the next stage of gifted identification at about half the rate of other students. Another study by Lohman, Korb, and Lakin (2008) compared scores of 1,198 elementary-age children (40% ELL) on the CogAT Nonverbal Battery, NNAT, and Raven and found that ELL students scored .5 to .6 SD lower on average than non-ELL students on all three tests, even when controlling for ethnicity. In short, nonverbal tests do show score differences among subgroups, and so they are insufficient for mitigating representation differences, even though they may provide useful information, especially along with a broader portfolio. Space does not permit a full discussion of non-verbal tests; however, more information can be found in McCallum (2017), Pfeiffer (2012), and the discussions in Naglieri and Ford (2003), Lohman (2005a,b), Lohman and Gambrell (2012), and Naglieri and Ford (2015).

- **Universal Screening and Local Norms**

Another popular suggestion currently being offered to solve the under-representation issue is the use of “automatic referrals” (McBee, 2006) or “universal screening” (Card & Giuliano, 2015; Lakin, 2016). McBee (2006) and Lakin (2016) use the term *screening* to mean that a standardized test is used to gather data. In this article, the authors use the term *universal screening* to mean simply that some information that might be used to support a gifted identification or an assignment to participate in gifted programming is both gathered on everyone and considered in light of the question of whether each student might benefit from special programming. Clearly, any standardized measure selected for universal screening should have well-established reliability and validity for identifying students who would benefit from the offered program. In the U. S., for example, all states administer standardized achievement tests in math and reading or language arts to all public school students annually from third to eighth grade (Elementary and Secondary Education Act, 2016). Any district looking for students who might benefit from an advanced math program could use the state math test score as a universal screening measure. However, according to the National Association for Gifted



Children's *State of the States in Gifted Education Report* (NAGC, 2015), this information is *not* often used as a screen through which students might move to an identification process, even though achievement data is sometimes used for gifted identification. Only two of the 42 states that responded to the NAGC (2015) questionnaire reported that gifted identification procedures are initiated based on scores from tests that students take for reasons other than gifted identification (e.g., state achievement tests), while 13 reported that they require achievement data to be used for identification.

Lohman (2005c), Renzulli (2005), and Pfeiffer (2015) recommended the use of local norms when using an ability or achievement test to assess students for special programs: "The need for special services depends not so much on a student's standing relative to age- or grade-mates nationally, but on the student's standing relative to the other students in the class" (Lohman, p. 13). In schools with highly varied populations, Lohman (2005c) demonstrated that this can mean not only comparing students to others in that local school, but also comparing students within subgroups, in order to compare each student to others with similar prior experiences, as recommended by the U.S. Department of Education's *National Excellence Report* (United States Department of Education [U.S. DOE], 1993). In this case, students entering the program might be prepared for very different levels of challenge. Any school which identifies students for programming differentially by subgroup should also plan to differentiate supports and challenge for students who demonstrate needs well beyond others of their subgroup but whose ability or achievement scores are not as high as others who are also identified for special programming, as would be advisable in any classroom (Tomlinson, 2001). A program that uses local norms will always be able to find students whose educational needs are sufficiently different from the local average to benefit from special programming tailored to their needs.

Teacher-rating scales can also be the basis of universal screening. Researchers have found that teacher bias can lead to inequitable referrals when the referrals are based only on teacher impressions and not on valid and reliable scales with clear definitions (Fish, 2017; Powell & Siegle, 2000). However, several such teacher rating scales exist (e.g., Peters & Gentry, 2012a; Pfeiffer & Jarosewich, 2007; Renzulli et al, 2010; Sarouphim, 1999) and they can be used concurrently with locally-normed tests to identify students for special programming (Lohman & Renzulli, 2007; Peters & Gentry, 2012b).

In practice, IQ scores still dominate the identification process. NAGC (2015) reported that of the five states which require *identification processes* to take place after parent, teacher, or student referral, all require IQ scores for *identification*, and three of these states also require portfolio information. Seven states, including two of the above, require data on the student's behaviour or characteristics of giftedness (i.e., the type of information reported on teacher rating scales) for identification. These seven states all also require a "multiple measures" approach to identification for gifted services, and require IQ scores, achievement measures, or both in addition to the behavioural/characteristics data.

Only two states require screening to take place once at the elementary level, and only one of these also requires screening upon entering middle school. Eight states reported that identification processes for gifted services can begin at multiple points during K-12, but it is unclear whether this means that universal screening takes place at multiple time points or that a non-universal mechanism, such as nomination, is available at multiple time points. In 21 states, decisions about how and when to screen and identify students for gifted services are under local control, with or without guidance from the state (NAGC, 2015).

A "natural experiment" on the effect of universal screening on recommendation and identification for gifted services occurred in a large district in Florida (Card & Giuliano, 2015). The district implemented universal screening for five years by administering the Naglieri Nonverbal Ability Test (NNAT) to all second grade students as a screening tool. Students who met the cutoff score on the screening test proceeded to IQ testing that determined entrance to the gifted program. By Florida law, there are two eligibility levels for gifted services: Plan A, for students who are not English Language Learners (ELL) and who are not eligible for free or reduced lunch (FRL), and Plan B, which may be used by districts that develop a plan for

increasing representation of students who are ELL or FRL in gifted programs (Special Instructional Programs for Students who are Gifted, 2002). Each district using Plan B to identify students may develop their own plan. In the district studied by Card and Giuliano, Plan A students needed an IQ score of 130 or higher, while Plan B students needed an IQ score of 116 or higher, allowing for measurement error in both cases. Students with a qualifying score also had to be rated as showing evidence of “gifted indicators” including motivation, creativity, and adaptability, and Plan B eligibility also considered academic achievement and family background.

The district in question eliminated funding for follow-up IQ testing after the first two years due to budget difficulties. The district ended universal screening altogether three years later in response to continued budget problems. During the first two years of the program, referral rates and gifted identification of Plan B students increased by 180%, with a 130% increase for Hispanic students and an 80% increase for Black students. Within three years of ending universal screening, referral rates and identification of Plan B students returned to pre-implementation levels, while referral rates and identification of Plan A students continued to increase.

Card and Giuliano (2014, 2016) also examined the results of a policy in the same district which used state achievement tests to screen students for class placement. Each school placed students who scored the highest on state exams together in a class with identified gifted students and a teacher trained in gifted education pedagogy, but only if at least one student in the grade level was identified as gifted using an IQ test. Card and Giuliano (2014, 2016) found that placement in these “Gifted/High Achievers” (GHA) classes led to increased achievement growth among high-achieving students from historically under-represented groups who were not identified as gifted as compared to their academic peers in heterogeneous classrooms. Specifically, the achievement scores of high achieving students from historically under-

represented groups were about 0.5 standard deviations higher in both reading and math, with persistent effects to at least 6<sup>th</sup> grade, if they were in a GHA class in fourth grade than if they were not. Additionally, placing the highest achievers (ranks 1-20) in a separate class with up to 4 Plan A gifted students had no effect on the performance of students in the next highest achievement cohort (ranks 25-44); that is, the benefit to the high achievers did not come with a detriment to the next-highest achievers who would have been their classmates in the absence of a GHA class.

In Total School Cluster Grouping (Gentry, 2014), another model that uses universal screening for class placement, all students are rated (screened) by their teachers as “high achieving,” “above average,” “average,” “low average,” or “low achieving” prior to placement in the next years’ classrooms. Students identified as “high achieving” (including those identified as “gifted”) are placed together in one classroom along with “average achieving” students but without students identified as “low achieving”, with a teacher trained in gifted education pedagogy. Students identified as “low achievers” are placed in other classrooms with “average achieving” students.

In original and follow-up research on the model (Gentry & Owen, 1999; Brulles, Peters, & Saunders, 2012; Matthews, Ritchotte, & McBee, 2013), more students were identified as “high achievers” over multiple years of implementation, and overall achievement increased as teachers were better able to target instruction to the narrowed range of student ability in all classes.

Universal Screening is undoubtedly a potentially useful practice for identifying high potential students from historically under-represented groups, but the devil is in the details. Before implementing a universal screening procedure, decision-makers must first address the questions of when and what information will be gathered on all students and how this information will be used in making selection decisions.

Even the “when question” raises challenges. Most states don’t begin any kind of standardized testing for all students until the third grade, but it is important to implement a universal assessment as early as possible because research has shown that with students from low-income families, the longer they stay in school, the more they fall behind (Parlady, 2008). However, testing young children is

difficult. The inflexible format of IQ tests makes them less reliable for testing young children (Porter, 1999, p. 97), and kindergarten scores on early literacy tests show significant variability even among high-IQ students from middle-to-upper-class families, making them a poor choice for students from historically under-represented groups (Hernández Finch, Speirs Neumeister, Burney, & Cook, 2014). Additionally, a lack of opportunity to learn means these students often start out behind on academic measures (Morgan, Farkas, Hillemeier, & Maczuga, 2016; Magnuson & Duncan, 2016). For screening young students, Espinosa (2005) recommends that a series of observations and/or a portfolio assessment may be more appropriate. Additionally, she notes that children from cultural groups whose organizational and interactional styles, such as where a child looks when speaking to an adult or how quickly a child follows directions, are different from those of the dominant culture must adapt to the school environment. Until they learn the patterns of discourse used in school, they may not show their abilities in traditional ways, such as by readily answering questions. For young children from historically under-represented groups, she recommends that assessments be culturally and linguistically responsive and include evidence gathered over time.

- **Performance-Based Assessment and Providing Additional Support to Targeted Students**

Performance-based assessment differs from the entity approach in that it predominately uses actual examples of students' performance to inform future decision making. Although the term performance-based assessment has been used to describe ability tests (Acar, Sen, & Cayirdag, 2016), in this article, it is used in a way similar to VanTassel-Baska's (2015) recommendation to assess gifted students through advanced, open-ended tasks that require students to think and to solve problems and that allow students to demonstrate their creativity. This method of assessment is a responsive approach because teachers observe how students react to opportunities to learn and to perform, and then respond to students' demonstrated talent potentials. As any good basketball coach knows, if team selection is based only on height, then good ball handlers, playmakers, defenders, passers, and those with a talent for sinking three pointers from beyond the arc will be overlooked. In a performance-based system of assessment, potentially gifted students are recognized for their aptitudes in particular areas of performance, motivation, creative behaviours, and executive function skills, which are all traits that may not show up on intelligence or achievement tests. In addition to, or in replacement of a standardized-ability test, teachers and content area specialists observe students interacting with conceptual rather than memory-oriented material in science, art, mathematics, theatre, writing, history, and other areas that lead to making *need-for-service decisions* based on actual performance.

Performance-based assessments have been developed and evaluated for reliability and validity with students from historically under-represented groups. The DISCOVER assessment (Maker, 1996), which is based on Multiple Intelligences Theory and a conception of giftedness that emphasizes problem solving, includes a series of performance tasks on which trained observers decide whether students show evidence of being superior problem solvers. After training, inter-rater reliability is between 75 and 100% (Griffiths, 1996, as reported in Sarouphim, 2000, April). Maker (2005) reported that the DISCOVER assessment has predictive validity to correctly identify students as having high potential in logical/mathematical, naturalistic, and verbal/linguistic intelligences. Students identified as gifted in the related intelligence in kindergarten went on to show higher scores on math, science, and reading assessments in the 4<sup>th</sup> and 6<sup>th</sup> grades than students who were not identified, even in the absence of a gifted program. However, in a study examining ethnic and gender differences in the use of the DISCOVER assessment, Sarouphim and Maker (2010) noted that while there was a great increase in the percent of students of all ethnicities identified as gifted, the proportions were still unequal. Although between 20 and 25% of students in most groups were identified as gifted (higher than the predicted 15-20% across the intelligences), African-American students were still identified with less frequency (14.5%) and South Pacific Islanders were still identified with greater frequency (37.5%). The DISCOVER assessment shows promise for use as a culture-fair assessment of potential, but further research is needed to determine why these differences in identification rates occurred and whether observer training might make a difference. It is also important to keep validity in mind: for DISCOVER to be a valid tool for gifted identification, the

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special programming for each identified student must align with the student's identified strengths (Sarouphim, 1999).

Structured auditions are another form of performance-based assessment that have been used to identify students from under-represented groups for special programming with results suggestive of predictive validity. In Oreck, Owen, and Baum's (2003) D/M/T TAP assessment<sup>1</sup>, teachers and teacher-artists observed students as they participated in authentic arts training and improvisation activities, using a rubric to score the students on general and discipline-specific potentials, such as rhythm and pitch for the musical tasks. Inter-rater reliability was above .8 for all three categories. To assess validity, researchers followed students for two years. A two-year post-test revealed that selected students who participated in advanced programming received ratings significantly higher than non-selected students and wait-listed students (those whose initial scores were very similar to the selected students). Additionally, selected students went on to receive scholarships to elite arts programs, despite having had limited arts experience prior to the initial assessment (Oreck, 2005; Oreck, Owen, & Baum, 2003).

Project POTENTIAL (Delcourt, 2008) used a similarly structured audition process to identify students for follow-up targeted instruction in science, math, visual arts, or music. Selected students participated in small-group advanced instruction in their talent area in a pull-out class during the school day. Ninety-two to 100% of students who participated in Project POTENTIAL courses scored at or above mastery on state achievement tests in their talent area. More studies dealing with this approach would add immeasurably to the field's knowledge about identification procedures.

Some districts have found success by providing targeted students with additional opportunities to learn (OTL) prior to assigning the gifted label or selecting students for special classes (see Peters & Engerrand, 2016, for a discussion of OTL). In the Young Scholars Model (YSM; Horn, 2015), an adaptation of the Schoolwide Enrichment Model (SEM; Renzulli & Reis, 2014) and Treffinger's (1998) Levels of Service Model (LSM) developed in collaboration with Fairfax County Public Schools, young students from historically under-represented groups who show high potential are placed in enrichment programs with teachers trained in gifted education pedagogy. In "Young Scholars" schools, a committee of teachers, administrators, and specialists identifies students as "Young Scholars" through a combination of student work samples, non-verbal ability tests, anecdotal records, and observations of students engaging with lessons on critical and creative thinking skills (Level I services, which all students receive). All "Young Scholars" receive Level II services, which consist of curricular modifications provided by the classroom teacher in consultation with the gifted specialist. Based on performance and additional screening, some "Young Scholars" move on to participation in pull-out programs featuring advanced academic services provided by the gifted specialist (Level III), and some qualify for full-time Gifted and Talented Centres for highly gifted students (Level IV). "Young Scholars" can also attend summer school programs that extend and enrich the regular curriculum.

Since its inception in 2002, the number and proportion of students from historically under-represented groups who have been identified for all levels of gifted services in Fairfax County Public Schools has increased. The representation of Black students receiving Levels II and III services increased from 475 (5.3% of all students in Level II and III) in the year 2000 to 2,064 (9.1%) in 2014, and the representation of Hispanic students increased from 311 (3.5%) to 4,079 (18%) students in the same timeframe. In Level IV centres, the representation of Black students increased from 76 students (2.2%) in the year 2000 to 928 students (4.8%) in 2014, and the representation of Hispanic students increased from 66 students (1.9%) to 1,419 students (7.4%) in the same timeframe (for full report, see Horn, 2015). When compared to the district demographics, the representation of Black and Hispanic students in gifted programs is much closer to proportional than it had been prior to implementing the Young Scholars Model. In 2000, Black students made up 10.7% of the district population, and

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<sup>1</sup> Dance/Music/Theater Talent Assessment Process

Hispanic students made up 13%. In 2011, Black students made up 10.5% of the total district population, and Hispanic students made up 21% (Fairfax County Public Schools, 2015, November).

Project EXCITE, a collaborative project between researchers at Northwestern University's Center for Talent Development and educators at local Evanston Township High School and its feeder K-8 school district, aims to improve Black and Hispanic students' achievement in math and science and to increase their enrolment in advanced math and science courses at the high school level (Olszewski-Kubilius & Steenbergen-Hu, 2017). The district invites all third-grade Black and Hispanic students, regardless of family SES, to take a test to qualify for participation. About 80% of Project EXCITE students come from low-income families. Students qualify with a score at the 75<sup>th</sup> percentile on the NNAT or Iowa Tests of Basic Skills. Students with scores just below the cutoff who have strong recommendations are also considered. Qualified students are required to participate in about 445 hours of after-school, Saturday, and summer enrichment and supplemental instruction in math, science, and reading throughout grades three to eight, with up to 180 additional optional hours available.

A longitudinal study of Project EXCITE (Olszewski-Kubilius, Steenbergen-Hu, Thomson, & Rosen, 2016) reported results that suggest this is an effective way to identify and to support high-potential students from historically under-represented groups. Over 13 years of implementation, Project EXCITE students, despite having initial (3<sup>rd</sup> grade) achievement scores equal to the district average in math and reading achievement, consistently scored higher than the district average after the first year (with effect sizes ranging from .21 to .53, at each grade level). Additionally, 76% of Project EXCITE students qualified for above-grade-level math in ninth grade, compared to 50% of all Black and Hispanic students in the school. Initial data on college enrolment for Project EXCITE students is also very positive. Over the first five cohorts, 84.5% of students whose college placement information is available enrolled in 4-year colleges.

The very challenge of examining under-representation should motivate practitioners to cast a wider net by looking at information beyond the easily-measured basic skills assessed by standardized tests. If these instruments "did the job" of identifying all students from historically under-represented groups who could benefit from advanced programming, then universal screening with traditional instruments would be sufficient and there would be no need to examine alternative or additional information. If any actual progress is to be made in addressing this challenge, it is necessary for educators in the field of gifted education to be more creative themselves in examining the identification issue. Less reliable but equally important considerations of students' potential for creative productivity (cf., Spielberg, Winfrey, and Gurdon) should take into account a broader range of characteristics. Such characteristics might include some non-cognitive factors such as creativity, motivation, and executive function skills, which may manifest in performance-based assessment. Casting a wider net does not mean that educators will overlook traditional measures. Rather, considering a portfolio of all available strength-based data enables educators to make personalized programming decisions for individuals.

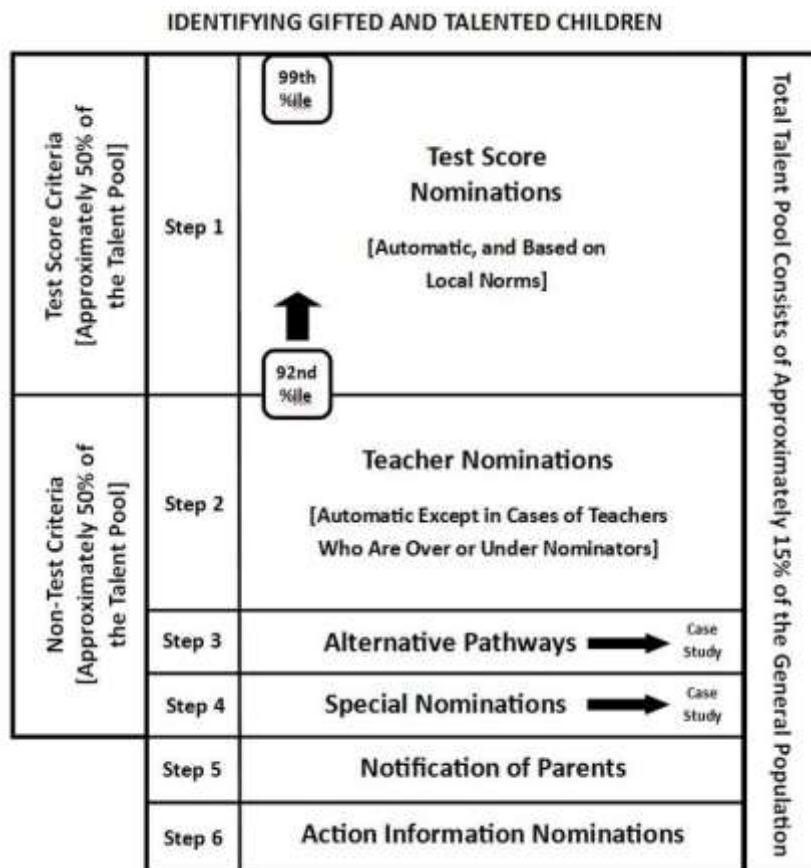
## **Identifying Under-represented Groups Using Performance-Based Assessment in the SEM**

The Schoolwide Enrichment Model (SEM; Renzulli, 1985; 1997; 2014) uses an identification system that integrates several of the above recommendations, and so it may be useful for addressing the under-representation issue. This model focuses on performance-based assessment, but also recommends universal screening and the use of local norms. The model has been used for more than three decades in schools ranging from high scoring and mainly white populations to schools with mixed populations and schools that serve predominantly students from historically under-represented groups. In the SEM, the category of "under-represented students" includes both students from historically under-represented groups *and* students who think and learn differently. These students may not be the highest-scoring students in their schools, but non-test score information and the ways they respond to various types of performance-based assessment clearly reveal that they are candidates

for selected supplementary services (e.g., Baum, Renzulli, & Hebert, 1995; Baum, Schader, & Hébert, 2014; Oreck, Baum, & McCartney, 2000; Reis, Gentry, & Park, 1995).

Because of the variety of state regulations with which all identification systems must contend, the SEM’s identification system was built to be flexible enough to deal with both differences in school populations and variations in state regulations (Figure 1). Three features of the SEM are: (1) an identification system that uses both test score and non-test score information to identify a talent pool of high potential students who are candidates for supplementary services; (2) the use of local norms for any standardized measures that might be used; and (3) a programming model that provides general enrichment for all students and opportunities for advanced level follow up for students who show high motivation and creativity in response to general enrichment experiences, the regular curriculum, or non-school interests and activities (cf. Spielberg, Gurdon). This third feature is an example of the process described above of making individual programming decisions based on performance based assessment (VanTassel-Baska, 2015).

The SEM identification system (Renzulli, 2005) is grounded in the Three-Ring Conception of Giftedness (Renzulli, 1978) and the Enrichment Triad Model (Renzulli, 1977) and supported by both the broad usage and opinions of teachers, administrators, and leaders in the field (Brown et al., 2005) and a review of research dealing with identification practices (Gubbins, 1995). The system is flexible enough to accommodate talent potentials in different domains and populations, and it attempts to respect regulations made by district policy makers and state departments of education, which is especially important at this time of greater concern about diversity in gifted programs. It takes into consideration the fact that there is no perfect identification system and it assumes that there should be congruence between the criteria used in the identification process and the goals and types of services that constitute the day-to-day activities that students will pursue. The accompanying service model also attempts to activate a much broader range of services and teaching practices, many of which are meant to develop creative and innovative talents in young people.



**Figure 1:** The Renzulli Talent Pool Identification System (Renzulli).

## A Specific Application of this Identification Approach

In urban school districts with student populations predominantly from historically underrepresented groups, the SEM identification system that uses both local norms and universal screening can enable schools to provide highly-effective enrichment services. For example, most of the students selected for the academy described below would not have qualified for gifted programs in surrounding suburbs, most of which use an entity conception of giftedness based on an IQ cut-off score. The school's outcomes, both in terms of test scores and in terms of student portfolios of creative accomplishments, provide support for using this identification system, along with appropriate programming, to identify more students who could benefit from enriched school programs.

The Renzulli Academy, a small public school in Hartford, CT for students in grades 4-8 that opened in 2009, offers enrolment to rising 4<sup>th</sup> grade students in Hartford Public Schools (HPS) who achieve in the top 15% of the district on state-mastery tests. Many of these students are not those who scored at the highest level ("Exceeded") on the test; in HPS, the two passing score levels combined ("Met" and "Exceeded") include only 18.6% of 3<sup>rd</sup> graders in math and 24.1% of 3<sup>rd</sup> graders in reading. Invited students submit an application that includes school grades, teacher ratings, and short essays wherein the students demonstrate their interest in attending and their potential for creativity and task commitment. This identification method has resulted in selecting students representative of the overall population in the Hartford Public Schools. In HPS, 89% of students are Black, Hispanic, Asian, or of two or more races, (84% Black or Hispanic) and 90% of Academy students are members of these groups (78% Black or Hispanic). Similarly, 78% of students in HPS qualify for free or reduced lunch, as do 73% of Academy students (Connecticut State Department of Education, 2016). The school's programming is based on the Schoolwide Enrichment Model (SEM; Appendix A [pp. 56-57]; see also Renzulli & Reis, 2014) and uses curriculum developed primarily for gifted learners: M<sup>3</sup> enriched mathematics units (Gavin et al., 2007), the Schoolwide Enrichment Model-Reading program (Reis, 2009), investigation-based science (e.g., Heilbronner & Renzulli, 2016), and project-based social studies (e.g., National History Day; see Sloan & Rockman, 2010), as well as fine arts and foreign languages are offered. Differentiated instructional strategies such as curriculum compacting and Response to Intervention strategies are used to support each student (for a detailed description, see Reis & Morales-Taylor, 2010). After the first year, 89% of students scored at goal or mastery level on state tests. By 2013, 98.6% of students scored at goal or mastery level. In 2014, the school was designated as a Connecticut School of Distinction for highest overall performance on state tests. Beyond test scores, the school's success is evident in students' performance in academic and creative competitions and exhibitions, including:

- Students have competed at the state level in the National Geography Bee and MathCounts competitions;
- Students have competed at the national level in the National History Day competition;
- Student art work has been selected for display in the Long Island Sound & Its Watershed drawing contest, Hartford Youth Art Renaissance Exhibition, Connecticut Association of Schools Celebration of the Arts Festival, and District's Greeting Card;
- Students have won the state level Invention Convention;
- Students have won the City of Hartford Creative Youth Essay Contest;
- Students have placed and won in every category of the Hartford Public School District STEM Fair;
- Students have produced news clips for CT Public Television; and,
- Students have been selected to participate in the University of Hartford's Hartt School of Music ensemble.

[www.renzulliacademy.com](http://www.renzulliacademy.com)

This successful school's student body is composed primarily of students from historically under-represented groups and whose initial performance on state-mastery tests was below the threshold for identification in more traditional systems (i.e., below the top 5%). The school's excellent state test results and the many creative and competitive accomplishments of this school's students provide evidence that this identification system is a valid approach for schools with programming based on the SEM. Students identified using this system can be successful in an

advanced program that is designed to both challenge traditionally high achieving learners and to promote success in creative productive accomplishments. Additional research on the effectiveness of the SEM with various school populations can be found in Reis, Eckert, McCoach, Jacobs, and Coyne (2008) and Reis and Renzulli (2003). Because so many public school students are members of historically under-represented groups (cf. National Center for Education Statistics, 2016a,b,c; National Equity Atlas, 2016; Suitts, Barba, & Dunn, 2015), it is imperative that gifted identification procedures and follow-up programming in schools that serve these students be of a type that works for under-represented populations. When schools develop talents among more students from traditionally overlooked groups, the talent pool of the nation will grow accordingly.

## How the Schoolwide Enrichment Model Offers Additional Opportunities for Talent Identification

The Schoolwide Enrichment Model (SEM) was originally developed in the 1980s and was revised and expanded during the last three decades (Renzulli & Reis, 2014). The focus of the SEM is on the development of thinking skills, creative productivity, and an investigative mindset on the parts of all students. In this model, the role of the student is transformed from that of a learner of lessons to one in which she or he uses the *modus operandi* of a firsthand inquirer to experience the joys and challenges of creative productivity, the application of knowledge and thinking skills, and the development of an investigative mindset. This work is based on developing individual strength-based profiles and providing advanced level targeted personalized services based on each student's profile. The SEM doesn't get rid of the word, "gifted," but the focus of services is on *the development of gifted behaviours (e.g., Type III projects, see Appendix A)* in any student who shows advanced levels of potential in one or more curricular or special interest areas. In this section, the authors expand the discussion of identification to ways in which the SEM's pedagogical structures provide opportunities to identify more talented students than might be recognized in a more traditional system. For a more detailed description of the components of the School-wide Enrichment Model referred to below, see Appendix A [pages 56-57] or the book, *The Schoolwide Enrichment Model* (Renzulli & Reis, 2014).

When general enrichment is offered to all students, it provides them with the 21<sup>st</sup> Century skills necessary for academic and career advancement in today's rapidly changing knowledge economy, and it also serves as a form of performance-based assessment. The SEM approach is a comprehensive system of enrichment using Types I and II Enrichment for all students and all school/all student enrichment clusters to provide performance-based assessment opportunities for teachers to observe students as they participate in various types of enrichment activities. During these events, teachers and content area specialists can observe students interacting with more challenging thinking skills activities in all content areas. Teachers can subsequently make decisions about more advanced gifted or enrichment program opportunities based on actual performance as students interact with content in new contexts outside of the normal classroom routines. Enrichment clusters are a particularly valuable environment for observing opportunities for advanced follow-up, because they make use of highly engaging Types I and II activities rather than focusing mainly on received content.

Types I and II enrichment and enrichment clusters are essential parts of the SEM's potential for increasing the recognition of talented students from historically under-represented groups because they provide opportunities for problem-based learning to all students, regardless of whether the students have previously been identified for special services. These activities focus on recognizing potential and aptitude in a specific area rather than making judgments about advanced opportunities solely based on test scores. Additionally, by experiencing these enrichment opportunities throughout the school year and across grade levels, each student has many opportunities to become interested in a topic and to demonstrate his or her talents. This perspective is critical in locations where students have disadvantages that may be limiting their achievement on standardized tests or performance in required curricular areas. In a performance-based identification system, like the basketball coach conducting try-outs, classroom observations of challenging performance situations play an equal part to ability and achievement information for making decisions about advanced services. By recognizing



and developing the unique strengths of children across and within domains, schools provide students with the opportunities to develop a sense of self-efficacy that promotes a growth mindset (Dweck, 2006), which often carries over to higher success rates in other areas. In other words, identification and nurturance of talents and special potentials may lead to the kinds of access to advanced opportunities that have been denied to students from historically under-represented groups and students who show their potentials in non-traditional ways that include learning and expression style differences.

The field of gifted education must become innovative enough to take the bold step of reassessing the labelling issue and defining itself as one that develops gifted behaviours and talents in any student whose performance-based assessment indicates the need for advanced opportunities, resources, and encouragement. This does not mean that continued support for the highest achievers is not a priority, that the field should minimize AP or honours courses or pull-out programs, or that there is no longer a need for highly-trained gifted education specialists in schools. It simply means that the common-sense approach to identification routinely used by basketball coaches, band directors, arts teachers, and teachers directing school theatre productions should be a part of the overall talent development process.

### **Broadening the Definition of Data-Based Decision Making**

One of the larger issues confronting all of education today is the way in which practitioners and scholars define and use data about students. Data-based decision making is a popular topic in today's education conversation and endless articles about "data-driven this..." and "data-driven that ..." continuously appear in the education literature. A working definition of data is "recorded information on student learning," with a focus on what can be written down or systematically collected to inform instruction and the use of data in making decisions about student assessment (Emma, 2015). Most of the commentary on this topic focuses almost exclusively on things that can easily be counted (e.g., attendance, test scores, free and reduced lunch). But like others (Marsh, Pane, & Hamilton, 2006; Spillane, 2012), the authors believe that this definition is too narrow because it excludes softer data such as students' motivation, interests, learning preferences, creativity, executive functions, and the ways in which students like to express themselves. A broader definition would even legitimize softer observations like perpetual boredom or the joyful looks on students' faces when they are excited and highly involved in something that is personally meaningful (Renzulli, & Reis, 2007). This observational data may be most valuable for decision making related to identifying students for talent development opportunities that may not fit neatly into traditional academic subject areas. Broadening the types of data that practitioners collect and consider to be potentially evidence of student strengths will have significant relevance to the issue of identifying students from historically under-represented groups who can benefit from special services for talent development. As the Donald Campbell quote at the beginning of this article suggests, researchers and practitioners need to examine both quantitative and qualitative information when making decisions about opportunities for identification and special service purposes.

### **Asking the Right Questions about Gifted Identification and Programming**

As stated earlier, an intense interest in under-representation has caused the field to re-examine both the identification and services that will tap into the vast talent potential that is being lost when historically under-represented students are excluded or overlooked. America's school population is dramatically changing and society is losing out on the talent potential of people from historically under-represented groups, just as a talent loss occurred 100 years ago when young women with high potential had more limited opportunities for high-level education and employment. The recommendations described here are termed a "common sense" approach for three reasons. First, research has shown that teachers, administrators, and leaders in the field (Brown et al., 2005) are in general agreement that a broader look at what is considered to be meaningful talent identification data is necessary. Second, the key questions raised above make sense when it comes to the discussions that must take place among academics, practitioners, and policy makers. Finally, the recommendations are reasonable in terms of the amount of time, teacher training, and resources required to implement a

more flexible system that will give a fairer opportunity for students from historically under-represented groups to participate in special programs.

## Some Concluding Thoughts

Changing demographics mean that gifted educators must recognize that America's talent pool is also changing. If scholars and educators are to remain true to the purpose of producing the next generation of leaders, scholars, and creative innovators, then they must explore ways of providing equally high-level opportunities to anyone who can benefit from the advances in teaching and learning that have characterized the field of gifted education. From the abundance of discussions both in the popular press and special editions of academic journals, it is clear that both educators and scholars recognize the challenge. Resources, research, and flexibility in state and local regulations and guidelines are necessary next steps. The kinds of innovation and experimentation that have differentiated the field of gifted education must once again be brought to bear to the challenge of identifying and supporting these students. Validation of new and different approaches takes time, innovation, and experimentation; but both the challenge and the climate in the field show that the need to address the under-representation issue is critically important.

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## About the Authors

**Dr. Joseph S. Renzulli** is a Distinguished Professor of Educational Psychology and director of the Renzulli Center for Creativity, Gifted Education, and Talent Development at the University of Connecticut. His research has focused on creative and investigative learning, talent development, and organizational models for total school improvement. Although the American Psychological Association named Dr. Renzulli among the 25 most influential psychologists in the world, he lists as his proudest accomplishment the numerous innovative applications of his Schoolwide Enrichment Model in schools around the world. He considers himself to be an on-the-ground communicator who always approaches his work from the practical perspectives of teachers. In 2018, Dr. Renzulli was listed as one of the world's top 30 International Education Professionals.

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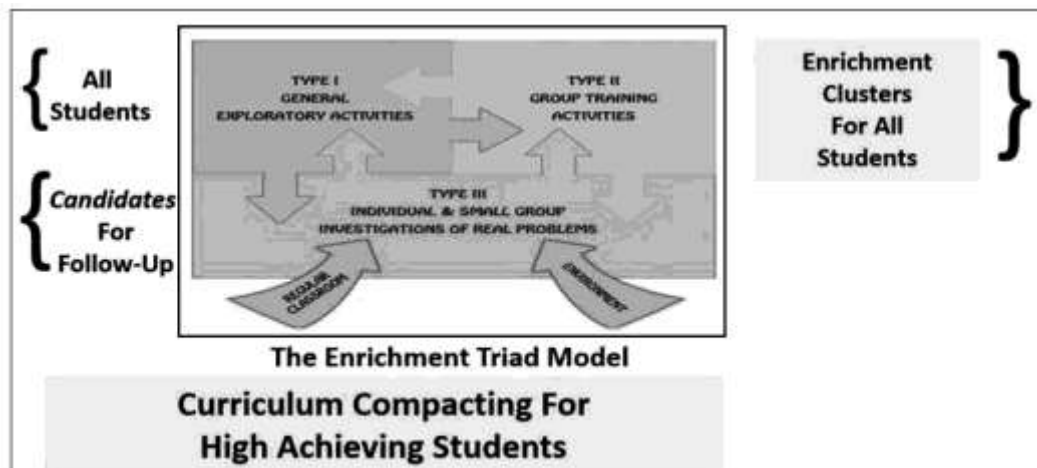
## Appendix A

### The Schoolwide Enrichment Model

The SEM has three major service delivery components for students. The first is a Total Talent Portfolio that documents the academic strengths, interests, learning preferences, and preferred modes of expression. The instruments used (with all students) to identify these strengths include academic achievement tests, teacher ratings and student questionnaires across a broad range of potential talents including interests, creativity, high motivation to excel in a particular academic or artistic area, learning style preferences, and preferred modes of expression. Targeted services for individuals or small groups who share common strength-based profiles in one or more of these areas are provided with opportunities, resources, and encouragement by resource teachers with specialized training in developing gifted behaviours and whenever possible, with classroom teachers working in cooperation with the resource teachers.

The second component of the SEM is designed to promote acceleration and enrichment opportunities to students with advanced academic/lesson-learning strengths by using a differentiated teaching practice called Curriculum Compacting. This process allows high achieving students to cover regular curricular material at a faster pace at and a more advanced level of comprehension than other students (Reis, Renzulli, & Burns, 2016). This elimination or streamlining of curriculum enables above average students to avoid repetition of previously mastered work and guarantees mastery while simultaneously minimizing boredom and finding time for more appropriately challenging activities.

The third component is a series of enrichment opportunities organized around the Enrichment Triad Model (Renzulli, 2016). These three types of enrichment experiences are delivered in various organizational settings (regular classes, pull out programs, enrichment clusters, cluster groups within regular classes). Figure 1 illustrates how the model creates performance-based assessment opportunities for all students, and at the same time, allows highly interested and motivated students to pursue individual and small group investigative and creative projects at advanced levels of involvement. In schools in which supplementary personnel are available, teachers with special training in gifted education guide the development of these projects. This model differs from most other approaches to talent development in that general enrichment (Types I and II) and enrichment clusters are provided to all students through a process called infusion of enrichment activities into the regular curriculum (Renzulli & Waicunas, 2016).



**Figure 1:** The Enrichment Triad Model

Type I Enrichment is designed to expose students to a wide variety of disciplines, topics, occupations, hobbies, persons, places, and events that would not ordinarily be covered in the regular curriculum. In schools using this model, an enrichment team of parents, teachers, and students often organizes and plans Type I experiences by contacting speakers, arranging mini-courses, demonstrations, or performances, or by ordering DVDs, video streaming services, or other print or non-print media. Type I experiences are designed to motivate students to such an extent that they will act on their interests in creative and productive ways. The major purpose of Type I enrichment is to include, within the overall school program, selected experiences that are purposefully developed to be motivational. This type of enrichment can also expose students to a wide variety



of disciplines, topics, ideas, and concepts. Typical Type I methods of delivery include bringing in a guest speaker, creating an interest centre, showing videos, directing students to websites, or hosting a debate.

Type I enrichment experiences can be based on regular curricular topics or innovative outgrowths of prescribed topics, or they can be stand-alone exposure topics in which teachers think students will have an interest. But in order to qualify as a bona fide Type I experience, any and all planned activities in this category must be designed to stimulate new or present interests that may lead to more intensive follow-up on the parts of individuals or small groups of students. Students are aware that successful Type I activities are *invitations* to various kinds and levels of follow-up. These engaging Type I experiences are dynamic in nature, include some hands-on activities rather than a “straight lecture” approach, and demonstrate investigative and creative opportunities in the topic area. A systematic debriefing of the experience will enable students to envision further involvement and the ways that follow-up might be pursued. During a Type I experience, teachers observe students’ reactions to the opportunity to learn and respond by providing additional opportunities to interact with the topic to students who demonstrate interest in doing so.

Type II Enrichment includes group-training activities in the six areas listed in . Most educators agree about the need to blend into the curriculum more training in the development of higher order thinking skills and what are popularly being called 21st Century Skills. Type II enrichment includes materials and methods designed to promote the development of thinking and feeling processes. Some Type II enrichment is general, consisting of training in areas such as creative thinking and problem solving, learning-how-to-learn skills, classifying and analyzing data, advanced research, reference, and communication skills and meta-cognitive technology skills. Other Type II training is quite specific, focusing on a particular discipline or projects upon which students may be working. Type II training is usually carried out both in classrooms and in Enrichment Clusters and includes the development of skills outlined in Figure 2. Type II experiences are often thought of as “How-To”, active learning experiences, and teachers who are trained to notice and respond to the characteristics and behaviours that are indicative of high potential can use a Type II experience as a performance assessment to identify candidates for follow-up.

<b>TAXONOMY OF COGNITIVE &amp; AFFECTIVE PROCESSES</b>										
<table border="1"> <tr><td><b>I. Cognitive Thinking Skills</b></td></tr> <tr><td>A. Creative Thinking Skills</td></tr> <tr><td>B. Analytic, Problem-Solving &amp; Decision-Making Skills</td></tr> <tr><td>C. Critical and Logical Thinking Skills</td></tr> </table>	<b>I. Cognitive Thinking Skills</b>	A. Creative Thinking Skills	B. Analytic, Problem-Solving & Decision-Making Skills	C. Critical and Logical Thinking Skills	<table border="1"> <tr><td><b>II. Character Development and Affective Process Skills</b></td></tr> <tr><td>A. Character Development</td></tr> <tr><td>B. Interpersonal Skills</td></tr> <tr><td>C. Intrapersonal Skills</td></tr> </table>	<b>II. Character Development and Affective Process Skills</b>	A. Character Development	B. Interpersonal Skills	C. Intrapersonal Skills	
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<table border="1"> <tr><td><b>III. Learning How-To Learn Skills</b></td></tr> <tr><td>A. Listening, Observing, &amp; Perceiving</td></tr> <tr><td>B. Reading, Notetaking, &amp; Outlining</td></tr> <tr><td>C. Interviewing &amp; Surveying</td></tr> <tr><td>D. Analyzing &amp; Organizing Data</td></tr> </table>	<b>III. Learning How-To Learn Skills</b>	A. Listening, Observing, & Perceiving	B. Reading, Notetaking, & Outlining	C. Interviewing & Surveying	D. Analyzing & Organizing Data	<table border="1"> <tr><td><b>IV. Using Advanced Research Skills &amp; Reference Materials</b></td></tr> <tr><td>A. Preparing for Research &amp; Investigative Projects</td></tr> <tr><td>B. Library &amp; Electronic Reference</td></tr> <tr><td>C. Finding &amp; Using Community Resources</td></tr> </table>	<b>IV. Using Advanced Research Skills &amp; Reference Materials</b>	A. Preparing for Research & Investigative Projects	B. Library & Electronic Reference	C. Finding & Using Community Resources
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**Figure 2:** The Type II Enrichment Matrix.

Type III Enrichment provides enrichment opportunities for advanced level follow-up to any individual or small group based on their demonstrated motivation, abilities and interests. Students are identified for advanced learning opportunities based on their potential to demonstrate gifted behaviours as defined in the Three Ring Conception of Giftedness (Renzulli, 1978), which may be observed during or after a Type I or Type II experience, through a students' reaction to ordinary classroom activities, or outside of school (e.g., by taking the lead in a community service project or submitting a piece of personal writing to the local newspaper), and the specifications for a *bona fide* Type III Enrichment project (Renzulli, 1982). Essentially, these specifications require that the project be based on:

1. Personalization of Interest;
2. Use of Authentic Methodology;
3. No Existing Solution or "Right" Answer; and,
4. Designed To Have an Impact on an Audience Other Than or In Addition to the Teacher

The most important goal of Type III Enrichment is to create an investigative and creative mindset on the parts of students and to change the role of students from one of being a lesson learner to one of a young person thinking, feeling, and doing like a practicing professional, even if at a more junior level than adult professionals.

Another unique feature of the SEM model is a series of interest-based grouping arrangements called Enrichment Clusters that are open to all students. These clusters are planned and organized to accommodate various levels of cognitive ability and use all three types of the enrichment pedagogy mentioned above. The clusters have made SEM schools more exciting, enjoyable, and engaging places to such an extent that enrichment clusters have become the "growth stock" of the model.

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# What about Creativity in Computer Science Education?

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## Abstract

Not all educational institutions encourage creativity and it is therefore vital that more attention be placed on the importance of understanding specific strategies that foster creativity at all levels in the classroom. Creativity conferences and workshops have become internationally common and have resulted in positive change-based initiatives in the field of creativity. These creativity research initiatives have attempted to provide a framework for educating “digital natives” and this framework provides the knowledge and skills necessary for students in the 21<sup>st</sup> century. We suggest that the development of creativity should be fostered with students through creative thinking and problem solving. This targeted development of student creativity may increase their personal fulfillment and increase their employability in our changing knowledge-based societies. In addition to creativity representing an important 21<sup>st</sup> century skill, it is a field that has experienced increased awareness, and it is fundamental to who we are as human beings. This paper presents definitions, theories, and achievements in the field of creativity from the educational domain of computer science.

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**Keywords:** Creativity; evaluating creativity; computer science; computer science education; e-learning.

## Introduction

Over the recent decades, there has been a substantial increase in the topics, perspectives, and methodologies related to creativity literature. Recently, the psychological understanding of creativity has become more sophisticated although the field of creativity has become increasingly fragmented. A concern within creativity scholarship is the issue that arises when researchers in one subfield of creativity are often entirely unaware of the advances in another subfield of creativity (Hennessy and Watson, 2016). Since creativity is considered to be an essential 21<sup>st</sup> century skill, the study of the creativity concept referred to as idea generation (ideation) has gained importance. Significantly, idea generation (ideation) is necessary when information and knowledge are available anywhere and anytime. Without establishing an educational and operative culture that understands the importance of creativity, we are unable to adequately “prepare young people for jobs that do not yet exist, using technologies that have not yet been invented, to solve problems of which we are not yet aware” (Jones, 2014, p. 2).

Computer science education (CSE) is an effective starting point for implementing changes in learning and teaching that support creativity. CSE supports the development of creative skills and problem solving in educational areas such as school subjects, university courses, and everyday life. As opposed to teaching to the test and memorization, educational goals should promote the application of knowledge and skills in novel and unfamiliar conditions (e.g., new situations, new surroundings, limited resources). In order for researchers to determine a way to support creativity in CSE, they posed questions regarding the connection between computer science (CS) and creativity. These questions included CS students' experiences reflecting creativity, creativity supporting teaching and learning in CSE (formal, informal, e-learning systems, mind mapping), criteria for creative CS lessons, frameworks for fostering creativity in higher education, and in developing Creativity Support Tools. The results of this research suggested a solid foundation for changing CSE that includes creativity supports. However, these changes may also be applied to other educational domains. Some

of these changes that may be applied include the use of simple creativity techniques and include creativity supports applied to complete course changes.

E-learning is beneficial for supporting creativity in CSE but requires an innovative pedagogy that emphasizes the engagement and the motivation of students. Ubiquitous IT is useful for evaluating creativity and is especially useful in developing new instruments appropriate for CSE. However, the most frequently used instruments are intended to only measure creativity in a general context. Using technology to assist learning is complex and requires careful planning. In addition, using technology has the potential to enhance implicit, informal, and formal learning. Technology may be applied to strengthen the connections between perceiving, learning, knowing, and action while providing scaffolding for unsteady attempts at tackling new problems. Technology may also be designed to shape our behaviors in ways that we only subsequently come to understand, to endorse, or to reject (Goodyear and Retalis, 2010). The rich and growing possibilities for connecting technology, creativity, and CSE, to enhance human creativity should therefore be of great interest to education professionals.

## **Creativity: Definition and theories**

Modern creativity research began in the 1950s and 1960s (Sawyer, 2012) and Guilford (1950) was credited with the earliest research defining creativity. Guilford (1950) identified two phases of the creative process, divergent thinking and convergent thinking. Divergent thinking was characterized as the ability to produce a broad range of associations to a given stimulus or to arrive at many solutions to a problem, while convergent thinking was characterized as the capacity to quickly focus on the one best solution to a problem (Guilford, 1950). Torrance (1966) recognized that cognitive variables such as ideational fluency, originality of ideas, and sensitivity to missing elements form the basis of the creativity phenomenon. In addition, Torrance Tests of Creative Thinking (TTCT) were developed to measure creative thinking in verbal and nonverbal ways (Hebert et al., 2002). Although there has been no consensus regarding the definition and the assessment of creativity (Walton, 2013), the most widely used working definition of creativity states that “creativity is the ability to generate ideas and artifacts that are new, surprising, and valuable” (FET Workshop, 2013, p. 1).

According to Ruth Noller<sup>1</sup>, a symbolic equation for creativity may be represented as  $C = fa(KIE)$ . In this equation, creativity is generated by the interaction between Knowledge (K), Imagination (I), and Evaluation (E), where (a) represents the individual's attitude. The Creativity term (C) may be distinguished as everyday creativity, historical creativity (h-creativity), psychological creativity (p-creativity), group creativity, non-human creativity, technological creativity, artistic creativity, or spontaneous creativity. Creativity has a multiplicity of definitions and as a result, there are many questions that remain unanswered in the field of creativity research. Some of these unanswered questions include the following: What is the priority of person-centered or systemic methods in creativity research?, What methodological significance do quantitative or qualitative approaches to analyzing the phenomenon provide?, Is creativity a general or a context-specific phenomenon?, Can animals or machines be creative?, and Should the development of creativity be the primary research focus or should the conditions under which creativity originates be the focus?

## **Creativity and computer science**

Saunders and Thagard (2004) examined the question, How is creativity related to CS? The study analyzed historical examples of creative problem solving in CS and analyzed 50 research interviews<sup>2</sup> conducted with working computer scientists in academia and industry. The research

<sup>1</sup> Ruth Noller (1922-2008), distinguished Service Professor Emeritus of Creative Studies, State University College at Buffalo [SUCB], leveraged her background as a former professor of mathematics to develop a formula that elegantly described the factors that produce creative behavior.

<sup>2</sup> Published in the on-line student magazine "Crossroads" (Association for Computing Machinery (2002).

determined that when a computer scientist (with the appropriate background and ideas) becomes frustrated with a repetitive, boring, and difficult task, their frustration could be ameliorated through the incorporation of new technologies and through the creative contributions of computer science. In addition to technological frustrations with CS, other areas of interest include the intrinsic pleasure of building computers, financial interests, and the writing of computer programs. An example of the application of creative problem solving within CS includes the use of local and distant analogies. Local analogies (LA) relate problems from the same domain or from very similar domains (e.g., Engineers from Apple Computers were influenced by the 1979 Xerox Palo Alto Research Center and their development of menus, windows, and user-friendly word processors.) while distant analogies (DA), relate problems from different domains (e.g., the application of biological genetic algorithms to CS neural networks). Both local and distant analogies may be combined to provide new pathways of thinking and invention within the field of CS. One such example of this combination is Alan Kay's invention of Smalltalk, an object-oriented, dynamically-typed, and reflective programming language. The principles of Smalltalk could be traced to Sketchpad and Simula (LA), and to the distant analogy (DA) Kay recognized between object-orientated programming and biological cells.

In addition to understanding the historical cases of human creativity in computer science, it is also important to understand how creativity in computer science relates to the creative processes of working computer scientists. To understand the creative processes of computer scientists, 50 interviews were conducted where computer scientists were asked the following questions: What do you do to get yourself thinking creatively? and What is your problem-solving strategy? The analysis of the interviews revealed that computer scientists exhibited two modes of creative work, an intense mode and a casual mode. The *intense mode* was described by the participants as the mode that most looked like work while the *casual mode* was described as the mode where creative thinking usually involved inspiration striking during a break from work.

**Table 1:** Intense and casual mode activities performed during creative work of interviewed computer scientists in academia and industry.

	INTENSE MODE	CASUAL MODE
A C T I V I T I E S	<p><b>writing</b> (“writing stuff down, often free-flow”; “blank paper lets you develop an idea in any form you can scribble”; the pencil and paper help to capture thoughts and preserve them beyond the span of short term memory)</p> <p><b>experimentation</b></p> <p><b>examples</b></p> <p><b>pictures</b></p> <p><b>lists</b> (a list of the various issues; numbered list of the steps to take when solving a problem)</p> <p><b>problem solving</b> (restatements of the problem; “anything that could help crack it open”; “first lay out all the options”; “ask myself questions”; “determine the components and parameters of the problem”)</p> <p><b>relatively rational and systematic work</b></p> <p><b>creative communication</b> (conversation; “bouncing ideas off”; “brainstorming with”; whiteboards)</p>	<p><b>physical exercise</b> (running, hiking, bike riding, “Go to the beach and run and run and run! Then think and jot things down quickly, saving the refinements for later.”)</p> <p><b>martial arts</b></p> <p><b>driving</b> (“...gives me a lot of time to contemplate and just let my mind range from topic to topic...”)</p> <p><b>subway ride</b></p> <p><b>shower</b> (“Once I have a problem, it becomes part of me, and ideas come up mostly in non-work situations. I came up with a major idea for my thesis while in the shower.”)</p> <p><b>lying in bed</b> (getting great ideas in the middle of the night or on waking)</p> <p><b>getting stimulated creatively by any kind of creative work</b> (“A good film or art exhibit or any creative work done with excellence can inspire me as much as computing. ”, “Reading someone else's creative material starts the juices flowing again. ”, “Reading articles in Science magazine about biology or something else completely outside of what I usually do is also stimulating.”)</p>

Although the intense mode appears to be less creative than the casual mode (when ideas come out of the blue), the intense mode appears to be a critical component of a computer scientist’s creative work. The research determined that creative researchers will typically organize their days to provide

time for both modes but the intense mode remains most responsible for many important discoveries. Herman Helmholtz would agree and suggests that “Creative ideas...come mostly of a sudden, frequently after great mental exertion, in a state of mental fatigue combined with physical relaxation.”<sup>3</sup>

Romeike and Knobelsdorf (2008) examined the characteristics of creativity by exploring if creativity forms a possible pathway into the field of CS. For this study, the computing<sup>4</sup> experiences of students majoring in CS and Bioinformatics were examined. A biographical research approach was employed where 135 computer biographies, written by CS majors and Bioinformatics majors (all novices), were examined. The research defined the *Computer biography* as a personal narrative where the participant described his or her computing experiences. The student biographies revealed information about the students' knowledge and beliefs about computer science and their interactions with CS artifacts.

The term “creative” is referred to by Romeike and Knobelsdorf (2008) as an action that leads to original, adaptive, and useful ideas, solutions, or insights. The term also includes the typical characteristics of creativity and these include high interest, intrinsic motivation, enjoyment, and the challenges individuals encounter as the result of the work itself (Ruscio and Amabile, 1996). In contrast to historical creativity, which describes ideas that are novel and original, p-creativity (psychological creativity) refers to ideas that are fundamentally novel to the individual (Boden, 2004). From an educational perspective, p-creativity is based upon practical knowledge and the willingness of the individual to acquire and to use this knowledge. Romeike (2007a) proposed a model where three comparable dimensions of creativity in the field of CS and their impact on CS education were described and illustrated:

1. Person - A dimension that describes the influence of creative work on motivation and interest.
2. Subject/Activity - A dimension that identifies creative processes as being central to software development.
3. Environment - A dimension that describes the impact of computer software and its creativity supports.

The three dimensions Romeike (2007a) describes may affect the CS learning process. Therefore, the three dimensions of this model were combined with the structuring content analysis<sup>5</sup> developed by Mayring (2004) to help describe the role of creativity in pathways to CS found in Table 2. Table 2 presents a framework of the study and the research questions, the codes, and the results are further sub-divided into the three dimensions according to Romeike's model.

The results of the Romeike and Knobelsdorf (2008) study indicated that the characteristics of creativity were reflected in the biographies of the students who chose to major in CS. The biographies revealed that students perceived CS, from the context of programming, as fun, creative, and autonomous. Students identified that when they engaged in programming their main motivation was to produce effective and working software. In the majority of student programming processes, students identified some chosen tasks as meaningful and identified some products as irrelevant. Students identified the process of programming as most important to them, which is typical of creative artists. The computer science students were fascinated and interested in the possibilities that the computer offered them. The students represented highly-creative student factors and they expressed a strong desire in gaining further knowledge, exploration, and understanding about the computer. In addition, some of the students who enjoyed becoming involved in creative activities,

<sup>3</sup> A quote by Hermann Helmholtz (1821–1894), a German physician and physicist who made significant contributions to several widely varied areas of modern science: physiology, psychology, physics, philosophy.

<sup>4</sup> Term computing refers to all kinds of computer usage and interaction.

<sup>5</sup> Structuring content analysis is qualitative research method which seeks to filter out particular aspects of the material and to make a cross-section of the material under ordering criteria that are strictly determined in advance, or to assess the material according to particular criteria.

often described their CS lessons as disappointing. Therefore, CS education must emphasize creativity in the classroom to ensure greater student intellectual engagement and to reduce student withdrawal from these CS classes. It is anticipated that more CS students may choose to pursue further study in CS when they discover the creative benefits to be gained in the CS classroom.

**Table 2:** A framework of the study whether creativity forms a possible pathway into the field of Computer Science (CS).

	PERSON	SUBJECT/ACTIVITY	ENVIRONMENT
<b>Research question</b>	<i>Is the motivation that encourages students to become involved with CS connected with creativity?</i>	<i>Do students perceive CS and the activities that characterize it as creative?</i>	<i>Do student biographies reflect ICT as a creative environment?</i>
	<i>In addition, students' reflection on the role of the school and CS classes were considered.</i>		
<b>Codes</b>	<p><b>Motivation:</b> challenge, fun, interesting, producing for usage, identification with a group or with an artifact, doing original work, reputation, relevance, altruism</p> <p><b>Habits:</b> ability to think critically or evaluative, to sense problems, to see opportunities, to explore, to experiment, to behave actively in school and outside school</p>	Creative subject, art, problem solving, product (artifact) – oriented, building blocks, incentive, knowledge, restrictions, experiments	Possibilities for creative work, atmosphere of diversity, creativity support
<b>Results</b>	In 1/3 of the biographies descriptions of students' motivation for computing and habits corresponding to characteristic factors of creativity were found. Interest for computers is the most frequently expressed motivational characteristic. Two groups were identified; one group is fascinated by the possibilities computers offer (originality, experimenting, autonomously exploring computers are important aspects) and the other one is interested in computers in more pragmatic way (efficient computer usage is central; knowledge gathering is necessary for using the computer and solving problems more efficiently). All the negative comments refer to CS classes -generally described with a negative shade (teacher's lack of knowledge and poor communication skills are mostly criticized).	<p>Product (artifact) orientation is the most frequently mentioned creativity characteristic of CS.</p> <p>Problem solving was described implicitly in students' programming experiences.</p> <p>CS class meets students' expectations when the subject matter contains programming and working on projects; computer usage per se is evaluated very negatively.</p>	<p>Computer is seen as a creative tool – it supports user in gaining relevant knowledge; provides the basis for exploration and experimentation; offers immediate feedback; allows dissemination of results to others.</p> <p>Internet serves as a source of information, inspiration and stimulation.</p> <p>Only in few biographies a related person is mentioned as relevant: a parent from the CS field, a friend with the same interest or an inspiring teacher.</p>

## Applying creativity in computer science education

Jahnke, Haertel and Wildt (2015) determined that creativity is difficult to teach. However, the culture, the broader “environment”, the teaching methods, the learning scripts, and the “structures” may be arranged in such a way that fosters learners to become more creative. An optimal creative learning culture includes the following six aspects and they have been developed from empirical findings:

1. Fostering student independent and self-reflective learning.
2. Enabling students with the ability to work autonomously.

3. Supporting research curiosity and increasing the motivation to learn.
4. Fostering constructive learning environments where users create a product.
5. Fostering a new culture of thinking through the pursuit of multi-perspectives.
6. Providing students with the opportunity to develop original and entirely new ideas.

According to Resnick (2007), the spiraling cycle of imagining, creating, playing, sharing, reflecting, and then finally returning to imagining is ideally suited to the needs of the 21st century. Resnick (2007) also contends that such a spiral cycle assists learners of all ages to develop their creative-thinking skills.

A number of EU funded projects began in 2012-13 with the goal of facilitating a positive impact on technology-enhanced learning. The projects were specifically designed to assist computational environments for educational purposes and their focus centered upon current understandings of creativity in education and creative thinking. This creativity research has led to the development of Creativity Support Tools (CSTs). These tools were developed as a means to enhance creativity beyond the classic psychological methods and the combination of learning models served to provide creative learning environments. Some of the Web-based CSTs available at no charge include the following: (1) HatParty<sup>6</sup> for brainstorming and to motivate students to produce new ideas; (2) Bright Sparks<sup>7</sup> to provide students with new problem solving points of view; and (3) C-book<sup>8</sup> to ignite student creative mathematical thinking (Zizic, Granic and Sitin, 2016).

### Criteria for designing CS lessons

Romeike (2007b) concluded that school-based CS lessons provided fertile ground for creativity and he described specific criteria for designing creative CS lessons (Table 3). A sample lesson is presented for introductory programming in a German high school where a creativity framework based upon these criteria is applied. The criteria for creative CS lessons are based upon the findings from psychological and educational literature and may be implemented when designing and evaluating computer science lessons. In addition, the criteria reflect and combine general pedagogical principles that are essential and beneficial for creative practices in CSE.

Romeike (2007b) applied the Criteria for Creative CS Lessons to an eleventh grade German high school class by introducing them to computer programming. The visual programming language Scratch<sup>9</sup> was chosen as the programming language and it was additionally used as the creativity supporting tool. Student attention and motivation were fostered within students by explicitly indicating to them the relevance and intended use of their programming. Students were given the opportunity to choose meaningful programming topics and some of these topics included animating their names, animating the story of their everyday lives, animating topics from their imaginations, and in developing computer games they could play. Scratch was appropriately suited for the student-programming tasks because a building block metaphor could be used as a visual representation to introduce students to the CS content. The programming concepts were available to students in the form of blocks that could be snapped together thereby avoiding programming syntax errors. Importantly, before the students were formally taught some programming concepts, the research reported that many students regularly discovered these concepts by working on their projects.

Initially, students were provided with an example program to spark their creativity and the teacher encouraged them to brainstorm this program's possibilities. In so doing, the teacher demonstrated to the students what they could achieve with learned concepts. Students were

<sup>6</sup> <http://hatparty.eu/>

<sup>7</sup> <http://brightsparks.city.ac.uk/>

<sup>8</sup> <http://www.mc2-project.eu/index.php/technology>

<sup>9</sup> The visual programming (mini) language Scratch was originally designed for young students to develop 21st century skills. Mini languages are said to provide an insight into programming and teach algorithmic thinking for general computer science in an intuitive, simple, but powerful way.



challenged with open-ended tasks, with variable solution complexity, and with independent working time. Some of the student tasks were provided with specific directions. An example of such a task was described to students as: Design a program that displays your name and animates the letters to interact with the mouse or keyboard! This student task was designed to familiarize them with the concepts they had just learned, to explore the programming environment, to find solutions to their ideas, to implement their ideas, and to test their ideas. The teacher would circulate in the classroom, would encourage the students to explore possibilities, and would only intervene if they were asked. Such a work period usually concluded with the end of a lesson. However, for those students who wanted to elaborate on their work or extend and modify their programs, students were encouraged by the teacher to continue their work at home.

**Table 3:** Criteria for Creative CS Lessons according to Romeike (2007b).

<b>Criteria for Creative CS Lessons</b>			
<b>Requirements for the SUBJECT</b>	<b>Requirements for the TASKS</b>	<b>STUDENT-ORIENTED Requirements</b>	<b>Requirements for the TEACHING- ENVIRONMENT</b>
<p><b>Relevance</b> As creativity requires personal involvement, the subject of a lesson needs to be appealing to the students (or presented that way).</p> <p><b>Problem management</b> Typical creative activities for CS which should be present in creative lessons are problem solving and the creation of a product, followed by the implementation of a model.</p>	<p><b>Subjective novelty</b> Even if it is unlikely that a student will come up with a general new solution or product, subjectively new (p-creative) ones should be aimed for.</p> <p><b>Openness in possible results, approaches and solution methods</b> Creative processes are characterized by problem finding, creative problem solving, exploring and discovering, hence tasks should allow several approaches to the problem, diverse solutions and different degrees of elaboration of the problem.</p> <p><b>Application of concept knowledge</b> A solid foundation of knowledge is essential to creative practice. Concept knowledge needs to be emphasized in contrast to product knowledge or factual knowledge.</p> <p><b>Inspiration</b> A creative achievement is always preceded by a stimulus (content, formulation or circumstances of a task, learning situation). In CS lessons this means revealing to the students which software will be used and which 'broader' problems it is supposed to solve.</p>	<p><b>Identification</b> Identification of a person with the task is fundamental for creative practice which can get a person enthused, deeply involved with a task and trigger a flow-condition. For CS lessons this implies that the content needs to be (or can become) meaningful to the student (e.g. by taking over responsibility and/or later presentation).</p> <p><b>Originality</b> Every student is a unique individual with his or her own ideas, visions and preferences. Obeying this criterion means allowing space for a student's originality demands, i.e. letting the student bring in a personal touch.</p>	<p><b>Experimenting</b> Being creative means to experiment with ideas, to explore the space of possibilities and to test solution possibilities. A tool used should provide meaningful feedback; for example, the compiler of a programming environment supports experimenting in CS lessons as it gives detailed feedback to the learner.</p> <p><b>Freedom in time</b> Creativity is hard to realize under time pressure, as time is needed to gather, evaluate and realize ideas. Projects in CS lessons support this criterion.</p> <p><b>Climate of diversity</b> Group pressure, early evaluation and expected perfection are known to oppress creativity. Instead the lesson should allow encouragement and inspiration among students. New ideas should be welcome and diverse solutions supported and presented.</p> <p><b>Teacher as a coach</b> The teacher needs to diminish the leading role of transferring knowledge, correcting and assessing and assisting only when a problem cannot be solved by a student himself. Teacher motivates and encourages the students.</p>

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Finally, the students uploaded their programs to the Scratch webpage and some programs were presented to the class at the beginning of the next lesson. Such student presentations included a discussion of their ideas, their problems, and a description of their programming strategies. However, if students discovered and applied new concepts in their programs, they then explained these discoveries to the rest of the class. At the end of the course, every student developed a game with the condition that all of the learned concepts were to be applied within the game. The task resulted in a variety of computer games ranging from pong games, memory games, sport games, and shooting games.

The introductory computer programming teaching unit fulfilled all of its expectations. Importantly, the students enjoyed the lessons, the learning objectives were met, and the students' overall perception of CS improved. As a result of the lesson, students concentrated their efforts and were intrinsically motivated. As evidence of this intrinsic motivation, students remained in the classroom in order to continue working on their projects even when the class time had expired. In addition, the presentation and dissemination of the students' programs led to increased motivation in the next day's lesson.

As the result of this creative teaching experience, Romeike (2007b) suggests that creativity should be applied in programming courses and creative teaching lessons are worth implementing into those courses. The suggestion is also made that creativity may additionally serve as a principle in other fields of CS. Romeike (2007b) contends that students exhibited increased motivation and interest with the creative and low-risk programming lessons. Importantly, female students exhibited an improved performance within the creative teaching setting.

### **Fostering creativity in universities**

Universities are also important in fostering student creativity because these institutions are expected to educate students to innovate and to help develop their creative ideas. In order to transmit specialized knowledge to students, institutions of higher education are challenged to develop or even to enhance their students' creative potential. Students must be encouraged to learn to think in multiple dimensions and to reach beyond the spectrum of available options. It is also important that students form new relationships between established elements and discover entirely new concepts or previously unconsidered connections.

To accommodate creativity in the university context, project teams from the DaVINCI project "Designing creativity-supported learning cultures in higher education" (2008-2011), collected interview data about the understanding of creativity at UAMR Germany, 2009. The interviews were conducted with 10 exceptional expert university teachers and 10 university teachers active in pedagogy. In addition to the interviews, each participant completed an online survey. In terms of higher education, the concept of creativity was understood in a multitude of ways. The understanding of creativity ranged from viewing it as a phenomenon which may be influenced by a change in attention, to viewing it as the development of one's own conception.

The understanding of creativity was also understood as a creative linking of previously unconnected ideas or thoughts, as the ability to see objects and relationships from different perspectives, as the ability to abandon habitual patterns of thinking, and as the ability to create and to implement entirely new ideas. As a result of the interviews<sup>10</sup>, the project team developed a number of approaches for fostering creativity. These approaches form a conceptual framework and allows for individual strategies to be developed (Table 4).

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<sup>10</sup> The interviews were analyzed by means of "open codings" and the empirical data was used to formulate a theoretical model entitled „Conceptual Framework for Fostering Creativity: 6 Ingredients “by following the Grounded Theory. This was done as part of DaVINCI sub-project Didactics”.

**Table 4:** Fostering creativity in higher education - “Conceptual Framework for Fostering Creativity: 6 Ingredients”.

<b>Richness of creativity in higher education</b>	<b>Description (Enabling students to do...)</b>
6. Original, entirely new ideas	The production of many ideas can be encouraged through creativity techniques and an appropriate environment: “enable the possibility of arrival”; allowing and encouraging mistakes.
5. Fostering a new culture of thinking	Change of perspective; break through routines and patterns of habit; take a different attitude; reduce prejudice; integrate provocations; dealing with ambiguities; reflection on one's own creativity and thought-structure; knowledge about the inner-workings of the brain.
4. Fostering constructive learning	Where students create something (e.g. creation of interconnections in theses); research-mode learning projects, aid and outreach projects (e.g. planning a congress).
3. Fostering fascination, increasing motivation to learn	Fostering of “research curiosity”, learn to ask right questions; enabling situated learning, use experiences of students, developing interesting ways to pose questions or problems; variety; establish a link to practice; use of metaphors, humor; individualization in larger courses.
2. Fostering the ability to work autonomously	Enabling the individual student to set the acquisition of knowledge in motion; enabling students to learn that they are responsible for steering the processes of learning; enabling to make one's own decisions.
1. Fostering independent, self-reflective learning	Critical thinking, learner “constructs” knowledge oneself rather than adopting it; enabling students to hold an internal dialog, breaking out of a receptive posture, supporting lateral and critical thinking.

The teacher must ultimately decide which level of creativity richness to pursue in the classroom and the teacher should learn strategies to structure courses that promote creativity-supportive learning. The implications of designing such creativity-supportive courses may include changing elements of a session<sup>11</sup>, changing elements of a complete session, changing elements of multiple sessions, changing elements of an entire course, or changing elements of the curriculum for the entire university.

Three essential elements should be considered when applying creativity supporting actions in education:

1. Technical Elements (e.g., learning management systems, social media, community platforms, and Web 2.0 tools).
2. Social/Organizational Elements (e.g., forms of communication and participation, roles of instructors, students, and student group size).
3. Educational Elements (e.g., formal and informal learning, problem-based learning, and creativity-supportive concepts) (Jahnke, 2011).

Table 5 presents examples of fostering creativity with respect to educational, social, and technical elements.

<sup>11</sup> Individual meeting of a course during the semester.

**Table 5:** Examples of fostering creativity: Educational, social, and technical elements.

Element	Examples of fostering creativity	
<i>Educational elements</i>	Mode of the course	Discussion walls, circular seating arrangements, several assessments instead of one exam, evaluation of progress throughout the course.
	Learning process	Student involved in: creative process, creative process and creative product, defining a problem and the way to solve it.
<i>Social/organizational elements</i>	Altering the classroom setting depending on the strategy for promoting creativity.	
<i>Technical elements</i>	Using cognitive techniques (synectic technique, headstand method, thinking hats), discussion, brainstorming, facilitating a shift in perspective, encouragement in establishing distance between oneself and the situation, breaking down barriers to creativity (lateral thinking).	

Jahnke (2011) describes creativity-fostered teaching and learning in higher education in the following three examples.

### 1) Experimental online learning in production engineering (PeTEX<sup>12</sup>)

The educational design advanced by Jahnke (2011) included both reflective and constructive student learning. *Reflective learning* consisted of student activities where they created hypotheses, parameters, and reflected on their results by observing an online telemetric experiment in Mechanical Engineering. *Constructive learning* consisted of student activities where they planned a remote experiment, conducted a remote experiment, and wrote a diary about the learning process. The Platform for e-Learning and Telemetric Experimentation (PeTEX) was integrated into existing courses and was used as a standalone course. For the *integrated into existing courses* component, homework and questions were provided to guide students through modules. The grading of students consisted of online assessments (40%) and consisted of existing assignments. For the *used a standalone course* component, students wrote a report about their results and wrote a learning diary. There were differences in instructions given to students depending on the level of their knowledge when creativity was required in the learning process. The beginner level students received more support with instructions where the given task reflected a given experiment. The intermediate level students received less instructions and included tasks such as solving a problem that required creativity. Finally, the advanced level students found an appropriate question, developed the problem and solution, and reflected upon the process. For this activity, the social context consisted of individual learning (first phases) and collaborative learning where students discussed the results of the experiments online with community members.

### 2) Informal learning supported by online forums (InPUD<sup>13</sup>)

An information and communication system from Germany called, Informatics Portal University of Dortmund (InPUD), was implemented to solve information deficiencies by supporting knowledge sharing among novice and expert computer science students, study advisors, and faculty members. InPUD includes an information space and communication opportunities for students. The information space was where students shared CS knowledge, discussed how to learn successfully, and discussed their study management skills. The communication opportunities included online discussion boards with more than 1500 participants. The online discussion boards provided students

<sup>12</sup> Platform for eLearning and Telemetric Experimentation. PeTEX project (2008-2010) aimed to develop online learning (interactive live experiments) within remote laboratories (the physical-real laboratories in Germany, Italy and Sweden).

<sup>13</sup> Informatics Portal University of Dortmund (Germany).

with opportunities to discuss course contents, study groups, examinations, and organizational issues. The fostering of creativity in InPUD was accomplished by providing students with the opportunities to share their knowledge and concerns. Some of the knowledge and concerns shared in InPUD included: (1) a forum about how to study successfully; (2) a forum that allowed students to open up about problems; (3) a general discussions forum; and (4) a forum to pose questions to the group and to receive an answer. A longitudinal study was undertaken to gauge student satisfaction with the InPUD community and the study revealed positive student satisfaction. Some of the positive student comments from the study include the following: (1) InPUD is a helpful and appropriate way of sharing knowledge; (2) InPUD helps in organizing information; (3) InPUD provides a flexible communication space for learners; and (4) InPUD fosters critical and reflective thinking.

### **3) Mind mapping scenario**

The mind-mapping scenario supported multi-perspectives where students collaborated to create a mind map. After the activity, students were directed to persuade other students why their definition of the concept (or any given task) was superior by providing arguments and/or statements. The result was a complex mind map consisting of many different perspectives. The activity was significant because it reinforced to students the desirability of being both flexible and open. These preceding three examples demonstrate the multi-layered dimensions of creativity for a specific context.

## **Evaluating creativity in computer science education**

There are several aspects related to the measurement of creativity and these aspects may assist the researcher when choosing an adequate measurement instrument. Firstly, the component of creativity that is to be measured must be defined. Secondly, the specific context in which creativity will be measured must be defined. Recent scientific literature suggests that existing measures of creativity have come under criticism and this criticism has been identified as stemming from both a conceptual and practical basis (Lubart et al., 2009). Numerous studies indicate that creativity is primarily domain specific and scholarship suggests that creativity should therefore be measured from within each of these specific domains. Significantly, it has become clear that a simplified and a continuously up-to-date scoring system is required when measuring creativity. It is apparent that as the originality of some of these measurement ideas evolves over time, the results include outdated test norms based upon tables, and outdated test norms with a statistical rarity of ideas. In most cases, the norms used to measure creativity tests are outdated.

From an educational context, there is a great demand for instruments that detect creative potential and for instruments that monitor the development of this creative potential (Lubart et al., 2009). One of these recently developed instruments is the Evaluation of Potential Creativity (EPoC)<sup>14</sup>. The EPoC is an international battery of evaluation of creative potential and it allows creative giftedness to be measured. The EPoC includes verbal and graphic subtests that measure two key modes of creative cognition, divergent-exploratory thinking and convergent-integrative thinking. Therefore, to measure creativity in the context of CSE, we recommend that specialized instruments be developed or existing specialized instruments such as EPoC be modified. In addition, standardized tests should be produced for different cultures and countries. However, until these tests are accessible, the measurement of creativity in a general context should be considered.

## **Conclusion**

The use of creativity techniques in CSE may range from implementing paper and pencil tasks (e.g., brainstorming and mind mapping) to adopting ICT-based techniques that reflect different cultures, teaching styles, and domains. An individual's creativity depends upon their deep conceptual

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<sup>14</sup> EPoC is initially developed in France for elementary students. It is available in five languages: French, English, German, Turkish, and Arabic, but there are developmental trends across school-grade levels and it is being translated in other languages and normed for other countries.

understanding of a given field and their creativity develops with increased time and effort. Although creativity involves problem solving, an equally important aspect to creativity includes seeking out problems to solve. What can we do to democratize creativity so that it is available to everyone? We recommend that individuals must attend to transforming their current thinking position by building bridges within their thinking. These bridges may be built by examining how the brain processes and uses internal factors and external influences.

According to current models of brain research, the human brain processes and then makes use of a number of internal factors and may be inhibited by a number of external influences. The internal factors include patterns and routines but they may be suspended through the application of creative thinking. For CSE and education generally, the growth of creativity may be inhibited by a number of external influences. For a typical school environment, these external influences may include early evaluation, surveillance, reward, competition, and limited choice. Since students' activities in many CS classes are primarily understood as "solving the teacher's problems", the intentional consideration of creativity in these classrooms should include hands-on and discovery learning, assigning open tasks, and assigning product-orientated tasks in formal learning settings. The examination of software artifacts is important to the CS classroom and their usefulness should be examined from the perspective of the student. Although commercial CS products are more advanced than student-produced artifacts, students do not perceive this difference as essential. Importantly, students perceive the process of producing meaningful artifacts as creative and it is this p-creativity that should be fostered in the classroom.

Implementing creativity-supporting activities in the classroom, regardless of their extent or form, may be very educationally beneficial for students. Such creativity-supporting activities provides students with new perspectives and provides them with an openness to the problem solving process. In addition, creativity-supporting activities provide students with exposure to different attitudes, assists students when overcoming barriers, and prepares students for complex and multifaceted employment environments. The positive outcomes of creativity-supporting teaching and learning activities are encouraging. Further investigations into fostering creativity and enhancing learning in computer science education is therefore important.

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# Could Students' Attitudes towards Learning Physics Significantly Predict their Learning Outcomes: Implications for Innovative Methods in Teaching Physics

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## Abstract

A modern educational process should approach students by taking into account all of their characteristics. A purely intellectual approach to teaching and learning should be replaced with a different approach that takes into account all of the other students' characteristics. Therefore, students' attitudes toward learning specific school subjects are very important determinants of their learning outcomes. Through examining student attitudes, very important implications for creating innovative teaching methods could be defined. Traditional classrooms should be replaced with those with standing desks and other innovative teaching methods that enhance learning applied physics. With the aim of postulating implications of specific innovative methods in teaching physics, students' attitudes toward learning physics are analysed as possible predictors of students' learning outcomes. The sample consisted of 557 eighth grade students from eight primary schools in Zagreb and Zagreb County. The collected data were analysed applying descriptive, correlation, and regression analysis. Overall, the study determined that students with more positive attitudes towards physics achieved better scores in knowledge tests. Eight specific students' attitudes toward learning physics were determined as significant predictors of their learning outcomes. The content analysis of the students' attitudes implied that applied physics would be the most understandable to students and that innovative teaching methods would improve their attitudes and learning outcomes in physics. In addition, some students' attitudes reflected gender differences and these differences should also be taken into account. Finally, some specific guidelines for implementing innovative teaching methods in physics education and future research have been postulated.

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**Keywords:** Innovative teaching methods; physics; students' attitudes; learning outcomes.

## Introduction

Unlike traditional teaching methods in which the teacher is mainly a knowledge carrier and students are passive listeners and recipients of that knowledge, modern teaching methods allow active inclusion of students into the learning process. In addition, these modern teaching methods assist students in revealing their creativity, which is one of the aims of modern teaching. Therefore, teaching methods that promote student activity, learning through experience, observing, and experimenting should be facilitated whenever possible.

Learning is promoted when learners are engaged in solving real-world problems and when new knowledge is applied by the learner (Merrill, 2002). Van Rossum and Schenk (1984) have demonstrated the relations between students' views about learning, their learning approaches, and the quality of their learning outcomes. Also, the influence of students' conceptions of learning and their approaches to learning has been established (Dart et al., 2000). The results of this study indicate that students who reported qualitative and experiential conceptions were likely to use deep approaches to learning, whereas students who had quantitative conceptions of learning tended to use surface approaches to learning.

According to students' conceptions, they prefer to learn in an active and constructive way and to participate in discussions. Also, high correlations were found between reported learning strategies among different learning contexts, indicating the existence of individual consistency in the use of a learning style (Könings et al., 2005).

A modern educational process should approach students by taking into account all of their characteristics. A purely intellectual approach to teaching and learning needs to be replaced by a new approach and this new approach should account for the fact that we learn with our mind, heart, and body (Jensen, 2003). The literature indicates that the psychological characteristics of students significantly correlated with their learning outcomes (Vizek Vidović et al., 2014; Tatalović Vorkapić, 2015) and some of these psychological characteristics include emotions associated with learning, motivation associated with learning, and personality characteristics. Further, the correlation of psychological characteristics of students and their learning outcomes may be observed in the context of applying innovative teaching methods. Students should be enabled to make personal choices whenever possible and students should be allowed to exercise their personal preferences. Finally, with respect to fostering student motivation, it would be advantageous if teaching was oriented toward stimulating students to learn and discover for themselves.

### **Students' characteristics and learning outcomes – theoretical background**

Students' characteristics, such as attitudes, values, motivation, personality characteristics or cognitive styles, significantly correlate with the teaching and learning process. In addition, students' attitudes towards learning certain school subjects are significant factors of learning outcomes. Therefore, studying students' attitudes may have a large impact on enhancing students' learning outcomes and may have a large impact when defining and developing efficient and innovative teaching methods.

Student characteristics are not stable personality traits, but are the reflection of the students' learning experiences. Vermetten et al. (1999) has shown that students use different learning strategies in different learning contexts. Therefore, perceptions of a learning environment also influence students' learning-related characteristics.

In 2003, an extensive empirical study was undertaken with a representative sample of 121 Croatian primary schools financed by the Ministry of Science, Education and Sports of the Republic of Croatia, and the Open Society Institute – Croatia (Rister, 2007). The aim of the research was to improve the quality of obligatory education in Croatia and to provide researchers with an insight into the current state of the national curriculum from the perspective of teachers, headmasters, and students.

The 2003 study included the attitudes of eighth grade primary school students towards teaching physics and the research revealed that these students considered physics to be incomprehensible, difficult, and not particularly important for future life. The research also revealed that there were statistically significant differences between the responses of male and female students. The female students reported that physics was considerably more difficult, less understandable, less important, and not useful. However, the greatest difference between the female and male student responses was that the female students considered physics to be less interesting (Rister, 2007).

### **Innovative teaching methods – theoretical and practical background**

Innovative teaching methods are defined as strategies for working with curriculum where teachers and students participate actively in the process and where learning through experience, observation, and experimentation is stimulated (Bonwell & Eison, 1991). In a classroom where active learning is fostered, students are not passive recipients of new information but students create their own knowledge. There are many pedagogical benefits that may result from fostering an active learning environment. An active learning environment is intellectually stimulating for students and it helps to maintain student motivation. Students engaged in active learning develop many learning

capabilities necessary for organising activities and in strengthening social and communication competencies in cooperative activities. Students appear to accept active learning because it provides immediate feedback to students about their learning progress and active learning fosters positive student attitudes toward themselves and the subject.

In the learning process, students should be emotionally and thoughtfully invested in the subject of their learning and they should incorporate all of their senses into the learning process. When students use all of their senses in the learning process, the applicability and permanence of their knowledge increases since this knowledge is acquired through the efforts of their own mind. Active learning is important because it introduces new learning strategies, a new dimension to teaching, and develops a new system of values with students. As students form an interactive relationship with their learning, through a series of mental and work activities, students' learning becomes a challenge for them. Once students are challenged in this way, educators may expect that knowledge will be perceived as wealth by students and students may perceive the possibility of learning as privilege (Kovačević, 2005).

New and innovative approaches to teaching include the use of computers, the Internet, and modern multimedia (PEER Instruction, Just-in-time Teaching (JITT), Flipped classrooms, etc.). Through the use of such innovative teaching strategies, students become more motivated and the learning process is made more dynamic for them. The advantages of using computers in teaching and learning are numerous and may include (1) the ability for students to work at their own pace, (2) the ability for students to choose the degree of difficulty that suits their own needs, and (3) the ability for students to produce work that is not necessarily associated with school resulting in greater student learning independence and learning individualisation. Such innovative strategies have a motivating effect because they allow students to momentarily correct their mistakes and to decrease the frequency of such mistakes. As a result, students tend to answer all of the questions posed to them, they do not have to wait their turn during instruction, and students are engaged in constant activity.

Another innovative approach to teaching is based upon the physical activity of students. A significant amount of research indicates that physical activity is favourable to students in such

a way that their learning improved. Koontz (2010) reports that students felt better and their ability to concentrate was improved when motion was a constituent part of their daily routine. In addition, recent research suggests that physical activity may have a beneficial effect on the cognitive abilities of students and on their academic success (Hillman et al., 2008).

Research suggests that teachers should facilitate increased student activity through promoting different body positions such as walking, leaning against a wall, kneeling, sitting or lying (Jensen, 2000). Jensen (2000) reports that physical activity during learning has a number of advantages as compared to learning while sitting. The research suggests that physical activity learning is more long-lasting, may be age adapted, students memorization skills increase, and students have more fun. Also, students can use their bodies to learn where they can stand up and demonstrate some concepts such as tall-short, small-big, or fast-slow. Finally, physical activity during learning promotes an environment where the class becomes more interesting (Jensen, 2000).

The final innovative approach to teaching is the standing desks method where students lean against their desk rather than sit at their desk. The goal of this innovative teaching method was to facilitate increased student concentration and to increase student intellectual engagement. With a view to improve student activity in class, student desks were modified allowing for higher energy consumption during class activities and during the carrying out of tasks (Benden et al., 2013). In this innovative approach to teaching, student desks were adjusted in height so that students could lean against them. The research reported that the continuous usage of standing desks was associated with significant improvements in executive function, significant improvements in the capacity of working memory were observed, and changes in the corresponding models of brain activation were also observed. Submitted findings of pilot research (Mehta et al., 2015) gave preliminary evidence to neurocognitive advantages of the standing desks method usage.

Research carried out in the USA (Dornhecker et al., 2015) referred to the very usage of standing desks, and as an answer to the ever growing educational and health demands which are put upon schools, with a view to, among other things, prevent the problem of obesity in children. The comparison of the engagement of students in a classroom in which they were sitting compared with standing students indicated a general improvement in their school activity over time with both groups. Standing desks did not result in negative effects on the engagement of students. The results indicate promising outcomes of using standing in primary school, with a view to enhancing energy consumption without influencing the educational engagement of students.

In teaching physics, using one's own body to measure objects which surround us is one of the ways to promote physical activity

during class. The existence of old units of measurement such as foot, span, or ell attests to the fact that in the past people have used parts of the body for measurement. Thus, students can, for example, measure the length of the classroom by using paced distances. Also, the physical activity of students is promoted when they perform experiments.

These experiments may include when students walk to measure time or when students climb stairs to measure their strength. In addition, students in the laboratory may be free to stand up while they prepare equipment for experiments, demonstrate or present their ideas in front of the class. Further, pairs of students may demonstrate the formation of waves on a spring while they stand and hold a vibrating spring. Finally, students may gather around the teacher's desk, observe the teacher while he/she conducts some experiment, and then provide comments and discussions.

## Teaching physics – the contextual research frame

Physics introduces central concepts to students and provides fundamental and universal knowledge to them. As compared to other school subjects, physics is unique in that it promotes the development of student cognitive abilities, their formal scientific opinion, and promotes problem solving. As a result, physics is important because it promotes scientific literacy with students.

By learning physics, students acquire skills and abilities necessary for everyday life and these skills and abilities may include creative problem solving, cooperative work, modern technology usage, and lifelong learning evaluation. The goal of learning physics is acquiring physical literacy. Physics encompasses knowledge, skills, abilities, and attitudes which allow a person to observe occurrences, think about them, understand their explanations, and take action (Jakopović, 2003).

Physical literacy is determined by capability to (Jakopović, 2003):

- understand the natural world;
- use the acquired scientific processes and principles in making decisions; and,
- integrate into public discussion of problems concerning science, technology and ecology.

New approaches to teaching imposes the introduction of a new model, the so-called “discovery learning method” in which the assumption is that students want to learn, that learning can be fun, and that a true preparation of students for life is not in drill learning numerous facts and examination, but in learning how to study and love studying. By their nature, people are curious and thereby have an innate tendency to discover new things and learn about them (Jensen, 2003).

While organising the physics class, the teacher should take into account the following principles (Jakopović, 2003):

- Learning physics is an active process, meaning physical and mental activity by the students.
- Students learn more successfully while cooperating with other students.
- Learning is more successful through tasks that have meaning in everyday life.

It may be concluded that teaching and learning physics is an interactive and problem-oriented process based on experiments and examples from everyday life. By learning physics, students develop a scientific way of thinking, understand natural phenomena around them, and students may

understand nature and its laws. Through teaching physics, students may be motivated to do research, perform experiments, perceive, observe, think, and conclude logically. Students are actively engaged by the use of a learning cycle which includes a written prediction of the results of an actual physical experiment, small group discussion, observation of the physical event, and comparison of observations with predictions (Sokoloff & Thornton, 1996). Students are taught to be critical and self-critical, their self-confidence is developed and they are presented with various problem situations, thus preparing them for their future lives. Therefore, physics instruction is important to stimulate the development of students' competence, to find their ways in situations that are new to them, as well as the development of cognitive abilities and formal and scientific thinking.

## **The aim, research problems and hypothesis**

With the aim of postulating implications of specific innovative methods in teaching physics, students' attitudes toward learning physics were analysed as possible predictors of their learning outcomes. The research expected a significant positive correlation between students' attitudes toward learning physics and their learning outcomes, i.e. that students who have positive attitudes would have better learning outcomes in physics. Also, it was expected that students' attitudes toward learning physics would implicate certain modifications in applied teaching methods. The collected data were analysed applying descriptive, correlation, and regression analysis.

## **Methods**

The research was carried out in eight primary schools in Zagreb and Zagreb County on a representative sample of eighth grade students. The headmasters' permission was requested before the research was carried out. The testing itself lasted for 45 minutes and was carried out by physics teachers during their classes. The students' participation in the survey was voluntary, the return of information was assured, and students were given codes to ensure anonymity. The sample included 557 eighth grade students, of which 295 were boys and 262 were girls. The following schools participated in the research: Tituš Brezovački Primary School with 104 students, Rudeš Primary School with 47 students, Brezovica Primary School with 146 students, Žuti Brijeg Primary School with 24 students, Sesevetska sela Primary School with 45 students, Brestje Primary School with 126 students, Mato Lovrak Primary School with 42 students, and Klinča Sela Primary School with 23 students.

A self-evaluated scale was used for measuring students' attitudes towards teaching and learning physics and the research instrument comprised of 25 items (Table 1) organised into five subscales (domains) that covered the following fields:

- Attitudes toward methods of teaching physics;
- Attitudes toward methods of learning physics;
- The perception of the role of mathematics in teaching physics;
- The perception of the importance of physics in everyday life; and,
- Motivation for learning physics in future.

Students gave their answers on the questionnaires by choosing a value on the Likert's scale from 1 (totally disagree) to 4 (totally agree). In addition to the questionnaire, the students took an energy test that included energy content from both the seventh and eighth grades.

The test consisted of six chapters, each divided into a different number of tasks. In total, there were 20 items with multiple choice questions. In the 1st part of the test, students were asked to recognize a situation that was different from the others from the point of view of physics. The 2nd part, had the goal to check students' knowledge of different forms of energy. In the 3rd part, students were asked about the dependence of different forms of energy on other physical quantities like mass, speed, and light. In the 4th part, students were expected to recognize forms of energy in the context of everyday situations. In the last two chapters of the test, students focused on two different problem situations. Students were asked to observe the same problem situation from different aspects and they had to calculate the gravitational potential energy for a body in different positions in relation to the ground.

## Results and Discussion

**Descriptive results on pupils' attitudes toward learning Physics.** Overall, the research determined that students have mostly partially agreed with the presented items on the Attitude toward Learning Physics Scale. To be more exact, students partially agreed with 19 of 25 items, see Table 1.

Students indicated their highest agreement with the following three items:

- “New teaching material is much more easily understood to me if we make experiments and do measuring in the class.”
- “In physics it’s very important to understand the formulas before using them.”
- “Knowledge of physics helps me understand the nature and the world around us.”

Students indicated the lowest agreement with the following item:

“Physics classes are sometimes held out of school (nature outdoors, museums, different institutions).” The moderately high mean for the total Attitude toward Learning Physics Scale was  $M = 2.68$  ( $SD = .53$ ).

The research results indicated that active engagement and one’s own model building based on making experiments, observing and measuring, are an appropriate approach to developing positive students attitudes, as well as better understanding of the world around us. Students are aware of the importance of mathematical modelling of physical problems, which shows that they have experience in learning physics.

**Table 1:** Means ( $M$ ) and standard deviations ( $SD$ ) of each item from attitudes toward Learning Physics Scale.

Table 1: Items of Attitudes toward Learning Physics Scale		$M$	$SD$
1.	Physics is very interesting to me.	2.81	.95
2.	Teaching methods are interesting and motivating.	2.69	.92
3.	The atmosphere in class is working and relaxed.	2.72	1.06
4.	Physics' classes are generally dynamic and well exploited.	2.81	.98
5.	Students are generally actively involved in the conversation, doing assignments, practical work and student presentations.	2.74	1.00
6.	Through classes the purpose of learning physics and its connection with life is shown.	2.98	.97
7.	New teaching material is much more easily understood to me if we make experiments and do measuring in the class.	<b>3.32</b>	.94
8.	Physics classes are sometimes held out of school (nature outdoors, museums, different institutions).	<b>1.73</b>	.97
9.	Teaching materials such as models, computer, simulations, materials from conducting experiments, transparencies, posters etc. are regularly used in teaching Physics.	2.89	.99
10.	Grades show my actual knowledge of Physics.	2.83	1.08
11.	Detailed and careful reading of the text is a good way of learning physics.	2.73	1.03
12.	To understand physics better, I discuss it with friends.	2.32	1.06
13.	While solving physics problem I always try to predict the value I have to calculate.	2.31	.98
14.	Solving numerous tasks helps me in learning Physics.	2.88	1.00
15.	Usually there is only one correct way of dealing with a physical task.	2.40	.99
16.	After learning certain teaching material I have a feeling I understand it but I still have problems with solving problems.	2.52	1.07
17.	In physics it’s very important to understand the formulas before using them	<b>3.28</b>	.91
18.	Physics can be explained without mathematical expressions (formulas).	2.38	1.08

19.	Learning physics develops my own capacity for scientific thinking.	2.91	.98
20.	Knowledge of Physics helps me understand the nature and world around us.	<b>3.03</b>	.96
21.	Physics can rarely be connected with my everyday situations and experience.	2.31	1.01
22.	I use my knowledge of Physics in other school subjects.	2.63	.97
23.	I learn Physics because it will be useful in everyday life.	2.84	1.03
24.	It's important for me to continue learning physics in a high school.	2.56	1.11
25.	For further learning Physics I am attracted by its application in new technologies.	2.71	1.10

The results of similar research on students' attitudes toward physics also indicate the importance of understanding nature, as well as putting the learning content in a real context, and thus providing guidelines on learning and teaching improvement. The Colorado Learning Attitudes about Science Survey (CLASS) probed students' beliefs about physics and learning physics, and distinguished the beliefs of experts from those of novices. A factor analysis indicated that statements involving the connection of physics with reality are separated into two distinguishable categories. The two categories distinguish between whether students think that physics describes the real world and whether they actually care or think about the physics they experience in their everyday life (Adams & al., 2006). Students who engage in model building, validation, and revision have authentic scientific experiences. These experiences promote certain attitudes about learning physics: that it is not simply about memorizing formulas, and that models in physics are coherent, constructed by students and subject to change (Brewer et al., 2013).

In conclusion, teaching should be based on experiments and measuring, putting physical problems into the real everyday context, and emphasizing understanding over memorizing.

**Descriptive results on Physics test.** The results achieved in the test showed that some items had the lowest score (Table 2).

**Table 2:** Frequency of right answers on the Physics Test (Learning outcomes).

Subtest of Test on Learning Outcomes		Frequency of right answers
I. recognize different physical situations	Task 1	145
	Task 2	285
II. students' knowledge of different formations of energy	Task 3	355
	Task 4	455
	Task 5	379
	Task 6	440
III. the dependence of different forms of energy to other physical quantities	Task 7	447
	Task 8	385
	Task 9	239
IV. form of energy in a context of everyday students' situations	Task 10	222
V. the same problem situation with some different aspects	Task 11	407
	Task 12	321
	Task 13	81
	Task 14	113
	Task 15	413
	Task 16	296
VI. Calculus of gravitational potential energy of the body in different positions in relation to the ground.	Task 17	275
	Task 18	224
	Task 19	303
	Task 20	192
<b>M, SD of total test score</b>		10.74; 3.84

Students generally do not distinguish the concept of force and the concept of energy. Students have problems with tasks in which they are expected to conclude in which position the body has the highest/lowest kinetic energy or to calculate the amount of gravitational potential energy of a certain body position. Items that showed the highest score were those in which students were asked to identify the forms of energy for different bodies in everyday situations and to connect the position of the body (height) with the corresponding gravitational potential energy or where it was required to recognize the dependence of the kinetic energy on the mass and velocity. It can be concluded that students have difficulties with mathematical expressions and calculations and do not always integrate what they have learned into real life situations.

Research conducted in the Republic of Croatia in 2008 on a sample of 114 high school students revealed a very low transfer of knowledge between mathematics and physics, the binding of knowledge, and the context in which the knowledge had been acquired (Katić et al., 2009). Similar results were confirmed by Beichner, R. J. (1994) and McDermott et al. (1987) and this research indicated that students had difficulties with graphs and their interpretation in physical contexts. The last aforementioned survey identified two categories of difficulty and these include difficulty in connecting graphs to physical concepts, and difficulty in connecting graphs to the real world.

***Correlation analysis results.*** Students with more positive attitudes towards physics achieved better scores in knowledge tests. Some of the attitudes that grow according to better scores in a test are:

- "It's important to me to continue studying physics in high school."
- "Physics is interesting to me."
- "In physics it is very important to understand formulas before I use them."

As it could be observed in Table 3. In the same table it could be seen that attitudes which are less noticeable with better results in tests are:

- "Physics classes are sometimes held out of school (nature, museum, different objects and institutions)".
- "After learning certain teaching material I have a feeling I understand it but I still have problems with solving problems."

The determined correlation analysis results indicated that students' attitudes are linked to their knowledge test achievements. The more positive students' attitudes are, the better the results gained.

Research on correlation between students' attitudes and their achievements are relatively few in number and the gained results differ. For example, Wilson (1983) indicated that causal ordering results support achievement causing attitude in lower grades and levels of education. The research indicated that attitude changes may result from science achievement for primary school students, but these results also indicated that for older students (high school and college), there was evidence that their attitude modestly predicted later achievement, but not the reverse.

The results of more recent research (Willson et al., 2000) supported an interactive model of conceptual understanding and achievement, but with attitude largely irrelevant to the process for a population of college freshman students. Attitudes did not predict later physics achievement or concept development. A possible explanation for the complex behaviour of attitude that the authors provide was integration of knowledge and attitude over time.



**Table 3:** Correlation coefficients between attitudes toward learning physics and learning outcomes from physics test.

Scale items and average results	Total results on all 20 tests on learning outcomes
Attitude 1	.222**
Attitude 2	.126**
Attitude 3	.005
Attitude 4	.038
Attitude 5	.062
Attitude 6	.183**
Attitude 7	.168**
Attitude 8	-.151**
Attitude 9	.014
Attitude 10	.064
Attitude 11	.175**
Attitude 12	.072
Attitude 13	.126**
Attitude 14	.121**
Attitude 15	-.028
Attitude 16	-.171**
Attitude 17	.207**
Attitude 18	-.038
Attitude 19	.166**
Attitude 20	.184**
Attitude 21	-.052
Attitude 22	.083
Attitude 23	.190**
Attitude 24	.225**
Attitude 25	.192**
Attitude Mean	.169**

\* $p < 0.05$ , \*\* $p < 0.01$

Attitudes and achievements research are also linked to some other aspects of teaching physics such as teaching methods. For example, according to Kalu (2008), students' development of positive attitudes towards physics and achievement in low academic tasks significantly increased with the teachers' indirect influence through classroom activities. However, the link between attitudes and achievements was not observed.

**Regression analysis results.** All 25 attitudes together significantly predict students' learning outcomes and their contribution is 46% of the explained variance in the criterion variable, i.e. results on all tests. The research determined that gender is not a significant predictor of learning outcomes in physics. Regression analysis results are shown in Table 4.

Even though 15 attitudes indicated a significant correlation with the total results on the tests, only 8 specific students' attitudes toward learning physics were determined as significant predictors of their learning outcomes. These attitudes are:

- "Physics is interesting to me."
- "New teaching material is much more easily understood to me if we make experiments and measuring in the class."
- "Teaching physics sometimes takes place outside the classroom (nature, museums, various structures and institutions in the city)."
- "Detailed and careful reading of the text is a good way of learning physics."

- “After learning certain teaching material I have a feeling I understand it but I still have problems with solving problems.”
- “In physics it’s very important to understand the formulas before using them.”
- “Physics can be explained without mathematical expressions (formulas).”
- “I use my knowledge of physics in other school subjects.”

**Table 4:** Regression analysis results with attitudes toward learning physics as predictors and learning outcomes (results from physics test) as criterion variable.

Items	Learning outcomes			
	B	Beta	R <sup>2</sup>	F(df)
Constant	<b>8.076**</b>		.245	<b>5.446</b> (25.420) **
Attitude 1	.585	<b>.146*</b>		
Attitude 2	-.115	-.028		
Attitude 3	-.271	-.075		
Attitude 4	-.076	-.019		
Attitude 5	-.035	-.009		
Attitude 6	.292	.073		
Attitude 7	.497	<b>.118*</b>		
Attitude 8	-.786	<b>-.196**</b>		
Attitude 9	-.243	-.062		
Attitude 10	-.104	-.029		
Attitude 11	.519	<b>.140**</b>		
Attitude 12	.079	.022		
Attitude 13	.231	.059		
Attitude 14	.021	.005		
Attitude 15	-.038	-.010		
Attitude 16	-.630	<b>-.178**</b>		
Attitude 17	.574	<b>.133**</b>		
Attitude 18	-.362	<b>-.102*</b>		
Attitude 19	-.127	-.032		
Attitude 20	.463	.116		
Attitude 21	-.235	-.062		
Attitude 22	-.544	<b>-.137**</b>		
Attitude 23	.342	.093		
Attitude 24	-.040	-.012		
Attitude 25	.306	.087		

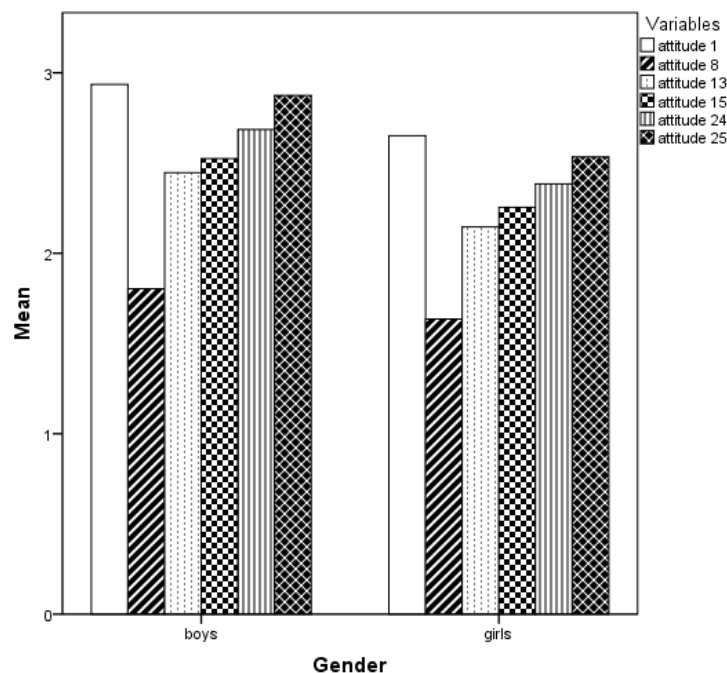
The gained results indicate that students’ attitudes toward learning physics and teaching performance, as well as opinions on physics and its importance in everyday life, are connected with their achievement on a test.

In their study, Perkins et al. (2004) observed positive correlations between student beliefs and conceptual learning gains. Also, students who come into a course with more favourable beliefs are more likely to achieve high learning gains. The survey by Harper et al. (2003) indicated that it is possible to make some prediction about student achievement on conceptual tests purely based on the types of questions they ask in their reports. In particular, encouragement of high-level questions about how the content knowledge of the course is structured is related to better conceptual understanding.

**Additional difference analyses.** Significant gender differences have been determined in some students’ attitudes and should be additionally taken into account. These results are presented in Table 5 and in Figure 1.

**Table 5:** Gender differences in six attitudes toward learning physics.

Attitudes toward learning physics	Boys <i>M</i>	Girls <i>M</i>	ANOVA <i>F(p)</i>
Attitude 1	2.95	2.65	$F(1,554) = 14.286 (p = .000)$
Attitude 8	1.82	1.63	$F(1,554) = 5.366 (p = .021)$
Attitude 13	2.44	2.15	$F(1,550) = 12.352 (p = .000)$
Attitude 15	2.53	2.26	$F(1,539) = 10.280 (p = .001)$
Attitude 24	2.70	2.40	$F(1,551) = 10.650 (p = .001)$
Attitude 25	2.87	2.53	$F(1,549) = 13.903 (p = .000)$



**Figure 1:** Gender differences in six attitudes toward learning physics.

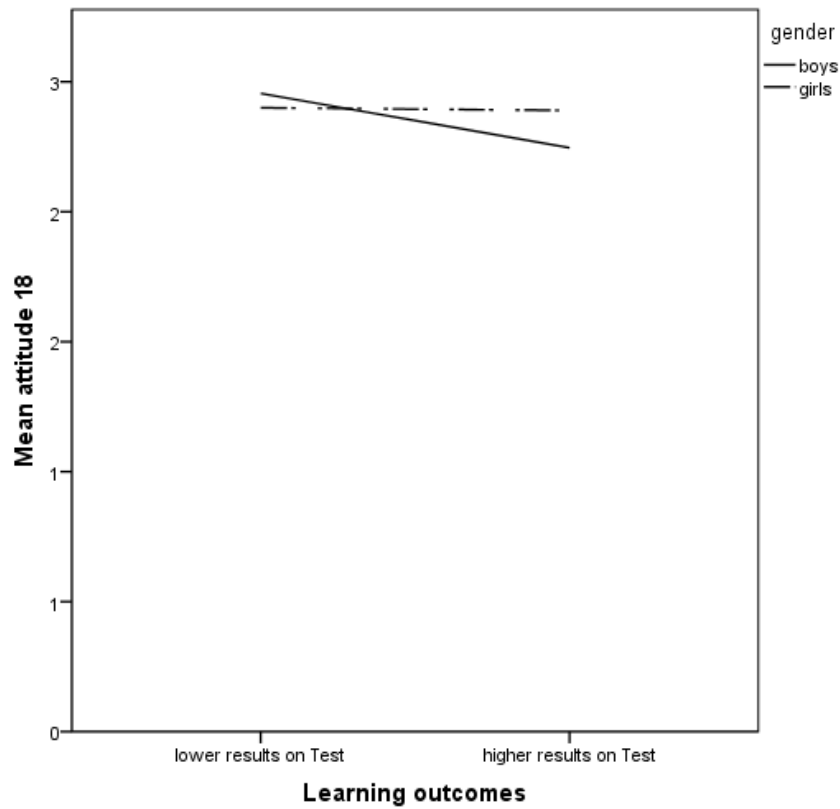
All differences are in favour of boys; i.e., boys demonstrated more positive 6 attitudes toward learning physics than girls:

- “Physics is interesting to me.”
- “Teaching physics sometimes takes place outside the classroom (nature, museums, various structures and institutions in the city).”
- “While solving physics problem I always try to predict the value I have to calculate.”
- “There is usually only one correct way of dealing with a physical task.”
- “It’s important to me to continue studying physics in high school.”
- “For further learning physics attracts me because of its application in new technologies.”

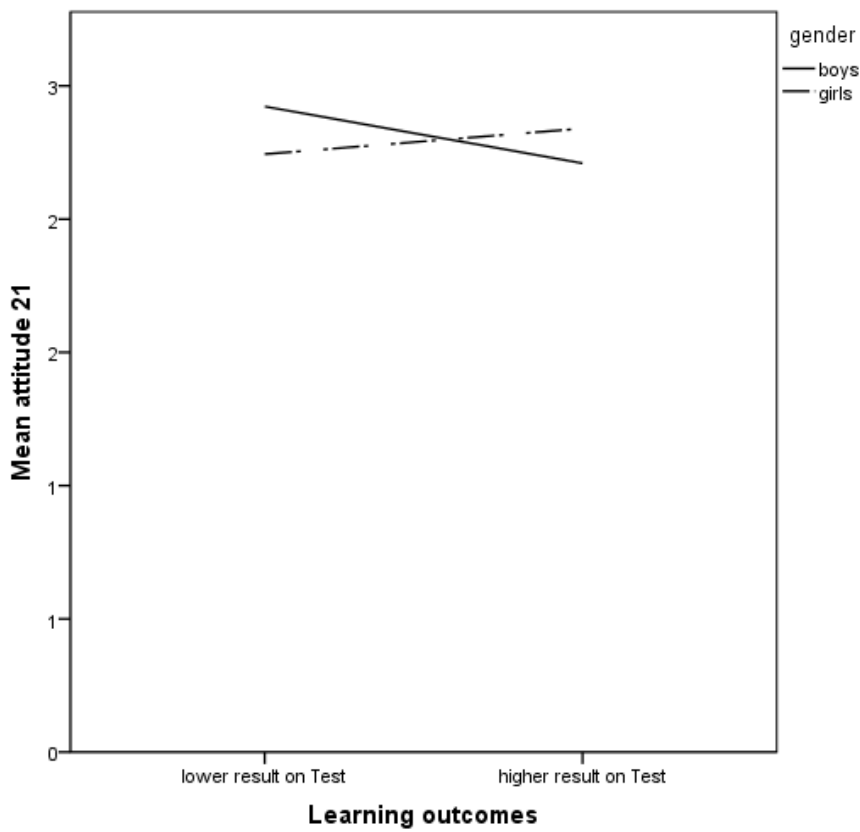
Two interaction effects of learning outcomes and gender were determined, as indicated in Figures 2 and 3. Boys who have a low score on the test significantly show higher agreement with attitudes 18 and 21 than those with higher scores:

- “18. Physics can be explained without mathematical expressions (formulas).”
- “21. Physics can rarely be connected with my everyday situations and experience.”

For girls, the result is completely the opposite. The girls who have a low score on the test, significantly show lower agreement with these two attitudes.



**Figure 2:** Significant interaction effect of gender and learning outcomes regarding the 18<sup>th</sup> attitude toward learning physics.



**Figure 3:** Significant interaction effect of gender and learning outcomes regarding the 21<sup>st</sup> attitude toward learning physics.

The research concluded that boys and girls have different perceptions of physics as a subject. These results may also be explained by the fact that the sample is random. The study by van Rossum and Schenk indicated that student gender is very strongly related to the study strategy. Also, female students have a significantly increased reproductive approach to learning.

The CLASS showed that the responses to nearly half the statements indicate significant gender differences. Comparing male and female students' responses in the same classes, female students are generally less compliant in the “real world connections”, “personal interest”, “problem solving confidence”, and “problem solving sophistication” categories statements. On the other hand, the results are minimally more compliant in some “sense-making/effort” type statements. The calculus-based course results indicate minor gender differences, but there are still significant differences, particularly in the “real world connections” and “personal interest” categories (Adams et al., 2006).

## **Conclusion**

The conducted research indicated that student attitudes toward learning physics may be a possible predictor of their achievements (outcomes). Students with more positive attitudes towards physics achieved improved scores in the knowledge tests. In addition, the research also established that there is a positive correlation between student attitudes and their achievements. Significant gender differences have been determined in some students' attitudes, which may be attributed to a different female or male students' approach to learning and teaching.

According to these research results, innovative teaching methods in physics education should be implemented through problem oriented education based on experiments, by putting the physics content in a real context, by collaborating studying through the students' projects, including more outdoor/indoor classes with physical activities in order to increase intellectual engagement, and by using different methods of teaching.

Finally, some specific guidelines for future research have been postulated. Future research should investigate the influence and possible implementation of innovative teaching methods in physics education and to determine methods of stimulating students by physical and mental activities or by making experiments and demonstrations using modern technology.

The content analysis of students' attitudes implied that applied physics would be the most understandable to students and that innovative teaching methods would improve their attitudes and learning outcomes in physics. Students with more positive attitudes towards physics achieve better scores in knowledge tests. All 25 attitudes taken together significantly predict students' learning outcomes. Finally, the research determined that students' attitudes toward learning physics implied that certain modifications in applied teaching methods are necessary.

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# Exploring the Creativity Potential of ADHD Students in Engineering Programs

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University of Connecticut

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## Abstract

A critical need exists in engineering education to draw on the non-traditional divergent thinking and risk-taking necessary for making radical technological breakthroughs. Literature suggests that individuals with Attention Deficit Hyperactivity Disorder (ADHD) characteristics demonstrate unparalleled creativity and risk-taking potential. While this group of students may offer significant benefits to the advancement of the nation, they are currently significantly underrepresented in engineering programs because of the major academic and emotional challenges that the rigidly structured engineering programs impose on them. Funded by the Division of Engineering Education and Centers of the National Science Foundation, this study is aimed at understanding creative potential and challenges of engineering students with ADHD characteristics. A cohort of 18 female and 36 male undergraduate students were recruited from the School of Engineering at the University of Connecticut (n=54). To quantify the level of ADHD-related characteristics and the creative potential of the participants, the investigators administered Brown ADD Scales for Adults and Torrance Test of Creative Thinking (TTCT) Figural Form A, respectively. A 40-question instrument was designed and administered to understand the learning styles, the perception of current engineering programs in terms of rewarding creativity and risk-taking, and the difficulties of the participants in engineering programs. It was found that there is a statistically significant positive correlation between the Brown total score and the Creativity Index ( $r=.45$ ,  $p=.001$ ). Among Brown subscale scores, *attention* was found to have the largest correlation with the Creativity Index. There were positive significant correlations with the Creativity Index and all of the Brown subscales except for *memory*. The Brown scores were found to have positive significant correlations with three of the TTCT sub-categories: *fluency*, *originality*, and *resistance to premature closure*. A negative correlation exists between the GPA and total Brown score, suggesting weaker academic accomplishments of students with ADHD characteristics. GPA showed no correlation with the Creativity Index, suggesting a lack of creativity appreciation in current engineering programs. The Mann-Whitney test on survey questions revealed that students with a higher Brown t-score are significantly more willing to take a chance in which they may fail in order to pursue innovation. This study found that only three of the eighteen students who are formally diagnosed with ADHD are receiving services from the Center of Students with Disabilities CSD. It is expected that the outcomes of this study lead to a paradigm shift in how these individuals are perceived by both our society and our engineering educational system. The knowledge generated through this study will help to identify the academic struggles of this group of students and facilitate development of specialized education programs that foster largely unrecognized talents and unique potential of this underrepresented population.

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**Keywords:** Creativity; risk taking; divergent thinking; ADHD.

## Introduction

Engineering *breakthroughs* play a crucial role in our nation's ability to face the significant challenges of the coming decades. We cannot afford to rely solely on the incremental advancements currently being made by engineers. A *critical need* exists in engineering education to draw on the *divergent thinking* and *risk-taking* necessary for revolutionizing industries and making radical technological discoveries. Engineering education today reinforces students for using shallow and tired methods to solve problems. Students may understand how to solve certain kinds of problems, but not necessarily why it works or where it came from.<sup>1</sup> In recent years, engineering programs have emphasized the significance of creativity but have not necessarily reinforced risk-taking personality traits. It is not often until there is a desperate need for new ideas that the push for creativity and

divergent thinking is desired. A clear example of this is the “Sputnik Shock” of 1957. The Soviet Union’s immense success in the space race pushed the Western world to challenge what they knew and come up with new innovations. This need for new technology was in such a high demand, that the US National Defense Education Act of 1958 was created with the purpose of stimulating and supporting STEM education. The act states that “*The defense of this Nation depends upon the mastery of modern techniques developed from complex scientific principles. It depends as well upon the discovery and development of new principles, new techniques, and new knowledge*”.<sup>2</sup>

Published literature supports the idea that individuals with ADHD may have the potential to be more creative than their peers.<sup>3-7</sup> Their ability to be spontaneous and divergent thinkers allows them to take more risks. As they naturally tend to think outside of the box, individuals with ADHD have the potential to offer unexpected solutions to complex problems.<sup>8</sup> But despite the significant contribution ADHD students can make, they often struggle in traditional educational environments. Mainly, how the traditional educational setting functions does not cater to how students with ADHD achieve success, nor do teachers have sufficient training and understanding of how ADHD affects learning and academic performance.<sup>9</sup>

Funded by the Division of Engineering Education and Centers of the National Science Foundation, this study is aimed at understanding creative potential and challenges of engineering students with ADHD characteristics. A quantitative study was suggested to achieve the goals of this research. A cohort of undergraduate students was recruited from the School of Engineering at the University of Connecticut, and several characteristics of the sample population were measured. The potential for ADHD was quantified using the Adult form of Brown ADD Scales. Creative thinking potential was measured using the Torrance Tests of Creative Thinking® (TTCT). The investigators designed a survey instrument to understand the learning styles, the perception of current engineering programs in terms of rewarding creativity, and the difficulties of the participants. This 40-question survey was administered using online tools. To evaluate the academic performance, academic records for each participant were acquired from the Office of the Registrar. The independent-groups T-test and correlation analyses were conducted to examine the difference in Creativity Index and its sub-constructs between the lower ADHD potential group and the higher ADHD potential group.

## Background and Motivations

### *Creative Potential of Individuals with ADHD Characteristics*

The literature supports the idea that individuals with ADHD have the potential to be more creative than their peers. It has been proposed that ADHD characteristics including sensation seeking, stimulation seeking, and a greater use of imagery, are highly similar to creative behaviors.<sup>10,11</sup> Additionally, it has been found that creativity and risk-taking behaviors are related.<sup>12</sup> Research has shown that gifted students with ADHD characteristics have higher levels of creativity than gifted students without ADHD characteristics.<sup>13,14</sup> Building on these findings, additional research has indicated that non-gifted individuals with ADHD perform higher on specific areas of creativity than non-gifted individuals.<sup>6,15,16</sup> Not only does research support the idea that those with ADHD score higher on creativity assessments, but also a study examining the real world creative achievement among adults with ADHD found that “*adults with ADHD showed higher levels of original*

*creative thinking and higher levels of real-world creative achievement when compared to adults without ADHD*”.<sup>15</sup> Roberts suggests that those with ADHD tend to be creative, spontaneous, and divergent thinkers and these qualities allow them to take more risks, as they naturally tend to think outside of the box.<sup>8</sup> Verheul, Block, Bumeister-Lamp, Thuril, Tiemeier, and Turturea found that students with a higher level of ADHD-like behavior are more likely to have entrepreneurial intentions. They were also able to identify risk taking as a mediator that partly explains this positive effect. They suggest that an underlying factor may be the tendency to search for, and engage in, stimulating activities to compensate for their experienced under-arousal.<sup>17</sup> A study by Issa utilized several different tests in order to identify a correlation between ADHD and higher levels of creativity. The Kirton Adaption-Innovation Inventory (KAI) indicated preferences for originality,

nonconformity, paradigmbreaking, and low efficiency in those diagnosed with ADHD. Puccio's FourSight showed preferences for generating novel ideas and overlooking details and the Adjective Check List (ACL) scores determined a tendency to seek novelty and avoid routine.<sup>18</sup> The results from these tests suggest a positive correlation between ADHD and higher levels of creativity.

It has been suggested that inhibitory effects and lower working memory of those with ADHD allow creativity to flourish. Fugate, Zentall, and Gentry found that lower working memory scores shared a relationship with higher creativity scores in a population of gifted individuals with ADHD characteristics.<sup>13</sup> These findings are supported by a study done by Kalbfleisch, which used electroencephalograms (EEG) in populations of gifted boys with ADHD, and found that they have cognitive strengths that potentially make them more adept in creativity and problem solving situations.<sup>19</sup> There is strong evidence that the ADHD brain is functionally different, and these differences may help facilitate positive cognitive functioning.<sup>20-23</sup> The research regarding the brain structures and functioning of those with ADHD has been

furthered by the suggestion that those with ADHD actually help advance societies and are not simply a genetic coincidence. Williams and Taylor suggest that the prevalence of ADHD and the fact that the seven-repeat allele of DRD4 (dopamine receptor type D4) are positively selected in evolution, indicate that individuals with ADHD aid the evolution of society; the authors also emphasize that those with ADHD often engage in risk-taking and cognitive idiosyncrasy, thus benefiting society. Specially, Williams and Taylor state that "*we have suggested two advantages of ADHD-HI to society: first, increased exploration of behavioral possibilities and second, the confining of concomitant social and physical risk to a minority*" (p. 408).<sup>24</sup>

Although some studies have indicated that there is no significant difference in creativity between those with ADHD and those without ADHD,<sup>25</sup> it is our suggestion that more research must be done to investigate this phenomenon specifically among the engineering students with ADHD. The present study attempts to discover a similar trend by using the Brown ADD Scales for Adults and Torrance Test of Creative Thinking (TTCT) Figural Form A.

### ***Specific Goals and Objectives***

It is relevant to learn more about students with ADHD in engineering fields. It is likely that there are students with ADHD in engineering who are not having their learning needs met and are not having their creativity nurtured, and thus may not be reaching their full potential. Additionally, studies have shown that there are very few students receiving services for ADHD in the college of engineering; thus these findings raise the question of why students with ADHD are not pursuing engineering education. The proposed project will specifically investigate this phenomenon and will gather information about the perceptions on engineering education from students with ADHD in the engineering college. We suggest that recruiting and retaining students with ADHD in engineering programs is a significant problem in engineering education, and may result in the loss of creative and innovative individuals. As such, this project attempts to gather information to help address this problem and will present a significant and important potential addition to the existing body of work. The specific research questions are:

- Is there statistically significant association between creative potential and ADHD characteristics for engineering students?
- Is there a difference between academic performance in students with strong and weak ADHD characteristics?

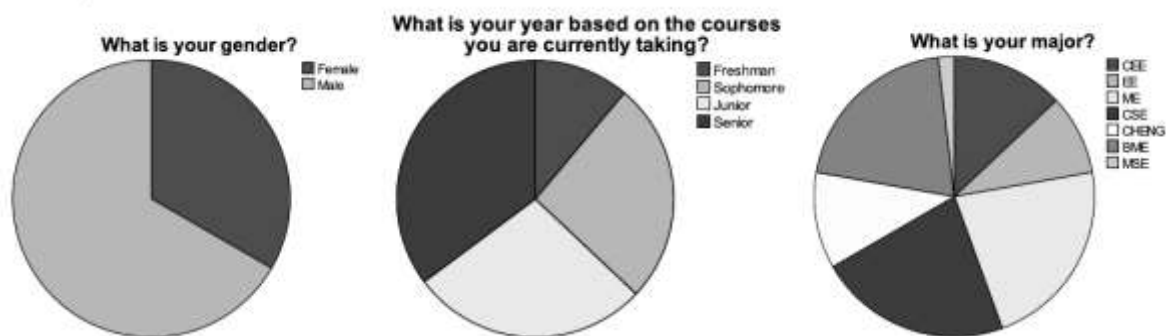
## **Methods**

### ***Participants***

This study is part of our ongoing project to explore the association of ADHD characteristics with creative potential and academic challenges of engineering students. The first major activity was the submission of the research protocol to the university Institutional Review Board (IRB) and response to the reviewers' comments. After receiving the IRB approval to begin the study, an advertisement to recruit participants was posted in the Daily Digest of the University of Connecticut

so that emails were sent to all of the university's engineering students. In the first recruitment effort, 33 engineering students volunteered to participate in the study. The investigators met with participants individually to provide more information about the study and obtain the consent of each participant. Given the level of interest received from students and after consideration of the effect of the sample size, the investigators submitted an amendment to the approved IRB in order to increase the allowed number of participants. Following the same process as was previously used for recruitment, 27 additional students joined the study and consented to participate.

Five participants had ages more than 25 years, which were not included in the current data analysis. One participant was excluded because of concerns about the accuracy of the scores of Brown ADD Scales. Ages of the participants range from 18-24 with mean=20, SD=1.5. Of the 55 participants, 35% are female and 65% are male engineering students. Participants consist of 13% freshmen, 25% sophomores, 27% juniors, and 35% seniors. There are 8 participants from Civil and Environmental Engineering, 5 from Electrical Engineering, 12 from Mechanical Engineering, 12 from Computer Science and Engineering, 6 from Chemical Engineering, 11 from Biomedical Engineering, and 1 from Material Science Engineering. Participants' overall GPA out of a 4.0 scale consists of mean=3.26, SD=.51 while their engineering GPA has mean=3.26, SD=.50.



**Figure 1:** Demography of the participants.

## Materials

The Torrance Test of Creativity (TTCT)<sup>26</sup> was used to quantify creative potential of the participants. This instrument is the most widely utilized measure of creativity and has strong psychometric properties, which ensures reliable scoring.<sup>25,27,28</sup> Data collected from Figural Form A of the TTCT, known as the Creative Index, was used to evaluate the creative aptitude of study participants.<sup>25</sup> The Creativity Index refers to a portion of the TTCT, which is determined through three subtests. The subtests ask participants to come up with unusual drawings. These drawings are scored by trained professional on five subscales: *originality*, *fluency*, *elaboration*, *abstractness of titles*, and *resistance to premature closure*; additionally aspects such as humor, emotional expressiveness, and richness of imagery are also included in the total score. Fluency scores show how many ideas the test subjects generated; originality scores show how unusual those ideas are; elaboration scores show how detailed the ideas are and how persistent the test subjects are in creative endeavors; abstractness of titles scores show how abstract and symbolic the ideas are and whether the test subjects exhibit the ability to synthesize information; resistance to premature closure scores show how open-minded the subjects are in deferring judgment.<sup>28,29</sup> According to Torrance, these scores were not intended to provide individual assessments but rather to be combined into one final Creativity Index to serve as the overall assessment of creative potential. The Figural Form A of the TTCT was selected for this research because individuals with learning differences, including ADHD, may struggle with typical testing environments partially due to the challenges associated with their learning difference.<sup>30</sup> The TTCT attempts to subvert the typical threatening testing environment and instead emphasizes a game-like, thinking, and/or problem-solving atmosphere; Torrance emphasizes that participants should enjoy the activities and have fun, and the environment should be as comfortable and psychologically stimulating as possible.<sup>26</sup> Thus although multiple creativity

assessment tools exist, the TTCT is ideal for assessing creativity in learners with ADHD because it allows for divergent thinking, flexibility, and attempts to continuously engage the learner in a fun and stimulating manner. After all assessments were completed by the participants, the TTCT was sent to Scholastic Testing Services for professional scoring.

The ADHD characteristics were measured using the Adults form of the Brown ADD Scales that is suitable for individuals with 18 years and older. This screening test consists of 40 questions asking the recipient how frequently a particular symptom occurs. Examples include how often the person forgets things over a 24-hour period or how often they're overly frustrated. Brown ADD Scales are composed of five subscales of ADHD-related executive function impairments including *Activation*, *Attention*, *Effort*, *Affect*, and *Memory*. This test is based on self-report rather than the observations of others but is still a valid screening test for ADHD in adults. The scale has been proven with good internal consistency and good test-retest reliability. Because of the time limitations of the participants, only Brown Scales was used to measure the strength of ADHD traits. The Brown ADD Scale was scored using software developed by Pearson. Both total scores and subscale scores are used in this paper. The typical syndromes associated with the five executive function impairments measured by the Brown test are: <sup>31</sup>

**Activation:** Have difficulty organizing tasks and materials; difficulty estimating time and prioritizing tasks; and trouble getting started on work.

**Attention:** loses focus when trying to listen or plan; easily distracted—internal/external; and forgets what was read and needs to re-read.

**Effort:** difficulty regulating sleep and alertness; quickly loses interest in task, especially longer projects; and difficulty to complete task on time, especially in writing.

**Affect:** emotions impact thoughts, actions too much; frustration, irritations, hurts, desires, worries; “Can’t put it to the back of my mind”.

**Memory:** difficulty holding one or several things while attending to other tasks; difficulty “remembering to remember”; inadequate “search engine” for activating stored memories, integrating these with current info to guide current thoughts and actions.

## Results

Participants’ Brown scores and creativity scores were compared to their GPAs and SAT scores. Since the GPA may vary from participant to participant due to types of courses taken and their academic year, GPAs were divided into three subsets: engineering GPA, non-engineering GPA, and Total GPA. SAT scores were chosen for their reliability to be a normalized test as well as their availability among the participants. SAT scores were divided into three subsets: Math SAT, Verbal SAT, and Total SAT score.

An independent t-test was performed on the Brown scores of the group of 18 students who were formally diagnosed with ADHD and the group of 42 students without formal diagnosis (the total number of participants was 60) (Table 1). This table presents the results under two assumptions: 1) the variances within the two groups are equal and 2) the variances within the two groups are not equal, hence are estimated separately (also known as Welch's t-test.) It is evident that students with diagnoses had statistically significant higher Brown scores in all five subscores, backing the reliability of the Brown score test to properly indicate whether the participant has ADHD related symptoms or not.

**Table 1:** Independent T-test on the Brown Scores of participants with and without formal diagnosis.

		Levene's Test for Equality of Variance		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Activation TScore	Equal var. assumed	1.15	.288	-3.75	58	.000	-14.984	3.999	-22.989	-6.979
	Equal var. not assumed			-4.52	50.879	.000	-14.984	3.311	-21.633	-8.336
Attention TScore	Equal var. assumed	19.2	.000	-2.51	58	.015	-8.921	3.552	-16.031	-1.811
	Equal var. not assumed			-3.36	57.999	.001	-8.921	2.658	-14.242	-3.600
Effort TScore	Equal var. assumed	.399	.530	-3.37	58	.001	-13.460	3.989	-21.445	-5.476
	Equal var. not assumed			-3.45	34.012	.001	-13.460	3.897	-21.380	-5.541
Affect TScore	Equal var. assumed	1.43	.237	-3.09	58	.003	-13.262	4.285	-21.839	-4.685
	Equal var. not assumed			-3.66	48.558	.001	-13.262	3.622	-20.542	-5.981
Memoru TScore	Equal var. assumed	3.71	.059	-2.19	58	.033	-10.889	4.981	-20.589	-9.19
	Equal var. not assumed			-2.75	54.868	.008	-10.889	3.965	-18.836	-2.942
Brown Total TScore	Equal var. assumed	7.55	.008	-3.71	58	.000	-13.913	3.748	-21.415	-6.410
	Equal var. not assumed			-4.52	51.710	.000	-13.913	3.080	-20.094	-7.731

Figure 2 shows the scatter plot of Brown total T-Scores and Creativity Indexes for the male and female participants. After testing a linear, quadratic, and cubic fit on the plotted data, the cubic model was found to be the best fit ( $R^2 = 0.25$ ). This figure shows the ascending trend of Creativity Index with the strength of ADHD traits for Brown total T-Scores higher than 70. The cubic fit indicated by the solid line was bounded by  $\pm$  standard deviation dashed lines. The standard deviation increases with lower Brown T-Scores. There is higher confidence with increasing Brown total T-Scores. In terms of Creativity Index and Brown total T-Scores, there is no observable difference between male and female scores, indicating gender neutrality. Gender neutrality of Creativity Index is also observed in Fig. 3 which shows a histogram of Creativity Index for male and female participants. Both genders have comparable normal distribution.

Table 2 shows the Pearson correlation matrix for Brown total T-score and its subscores, SAT Math, SAT Verbal and SAT Total scores, Creativity Index and the sub constructs of TTCT test, and GPA in engineering courses, non-engineering courses, and total. Engineering courses were those offered by the School of Engineering, and non-engineering courses were those offered by other schools and departments at the University of Connecticut. There was a statistically significant positive correlation between the Brown total T-score and Creativity Index ( $r = .45, p < .01$ ) of the participants. Among Brown subscale scores, *attention* was found to have the largest correlation with the Creativity Index ( $r = .38, p < .01$ ). There were positive significant correlations between the Creativity Index and all of the Brown subscales except for memory. The Brown scores were found to have positive significant correlations with three of the TTCT sub-categories, including: *fluency* ( $r = .33, p < .05$ ), *originality* ( $r = .32, p < .05$ ), and *resistance to premature closure* ( $r = .40, p < .01$ ).

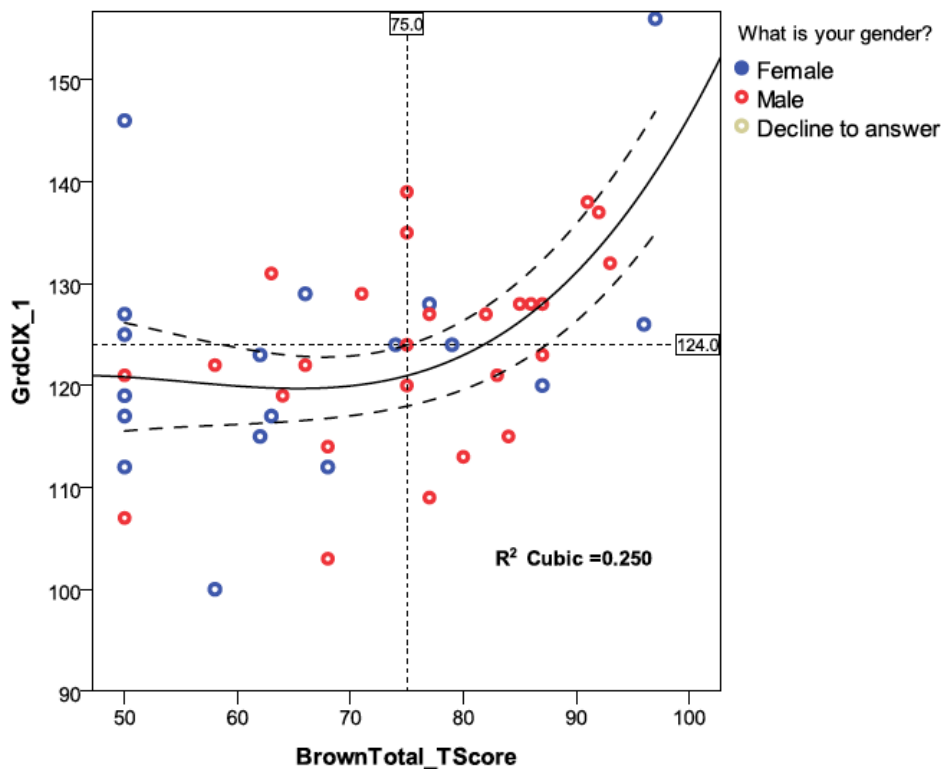


Figure 2: Scatter Plot for Brown total T-Score and Creativity Index.

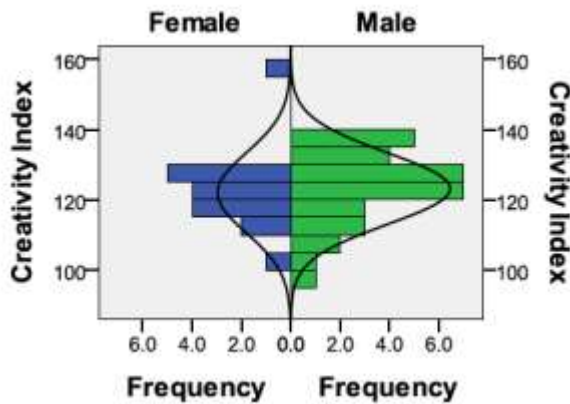


Figure 3: Histogram of Creativity Index for Male and Female Students.

Initial analyses indicated that a significant negative correlation existed between GPA and total Brown score ( $r=-.30$ ,  $p<.05$ ); however, only the negative correlations of *attention* ( $r=-.36$ ,  $p<.01$ ) and *memory* ( $r=-.28$ ,  $p<.05$ ) to GPA were significant. The five questions from the Brown ADD Scale instrument were identified as the best predictors of Creativity Index.

There was a significant correlation between SAT total score and engineering and non-engineering GPAs ( $r=.328$ ,  $p<.05$  and  $r=.398$ ,  $p<.05$ , respectively), indicating that the SAT Total scores are a good predictor of GPA in both engineering and non-engineering courses. However, this correlation is only significant when comparing engineering and non-engineering GPAs to the SAT Verbal scores ( $r=.383$ ,  $p<.05$  and  $r=.489$ ,  $p<.05$ ). The lack of correlation of SAT Math score with GPA may be due to the limited range effect, as students who are admitted to engineering programs tend to have higher SAT Math scores.

**Table 2: Pearson Correlation Values and Significance Levels.**

		Brown Total TScore	Activ. TScore	Atten. TScore	Effort TScore	Affect TScore	Mem. TScore	SAT Score Math	SAT Score Verbal	SAT Score Total	Cr. Index	Non-Engr GPA	Engr GPA	Total GPA
Brown Total TScore	Pearson Corr.	1	.864**	.879**	.899*	.757**	.779**	-.099	-1.44	-.081	.449**	-.209	-.311*	-.296*
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.508	.336	.573	.001	.140	.031	.033
	N	54	54	54	54	54	54	47	47	51	50	51	48	52
Activation TScore	Pearson Corr.	.864**	1	.770**	.743**	.805**	.596**	-.126	-.169	-.048	.335*	-.073	-.200	-.175
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.400	.256	.737	.017	.609	.173	.215
	N	54	54	54	54	54	54	47	47	51	50	51	48	52
Attention TScore	Pearson Corr.	.879**	.770	1	.692**	.648**	.731**	-.180	-.311*	-.213	.380**	-.226	-.354*	-.357**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.226	.033	.133	.007	.111	.014	.009
	N	54	54	54	54	54	54	47	47	51	50	51	48	52
Effort TScore	Pearson Corr.	.899**	.743	.692	1	.632**	.661**	.031	.036	.077	.355*	-.162	-.221	-.184
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.834	.811	.593	.012	.257	.132	.190
	N	54	54	54	54	54	54	47	47	51	50	51	48	52
Affect TScore	Pearson Corr.	.757**	.805	.648	.632	1	.673**	-.027	-.218	-.012	.362**	-.044	-.113	-.104
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.856	.141	.933	.010	.761	.444	.465
	N	54	54	54	54	54	54	47	47	51	50	51	48	52
Memory TScore	Pearson Corr.	.779**	.596	.731	.661	.673**	1	-.005	-.156	-.017	.275	-.233	-.274	-.284*
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.976	.295	.620	.053	.115	.060	.041
	N	54	54	54	54	54	54	47	47	51	50	51	48	52



SAT Score, Math	Pearson Corr.	-.099	-.126	-.180	.031	-.027	-.055	1	.637**	.864**	.028	.154	.145	.160
	Sig. (2-tailed)	.508	.400	.226	.834	.856	.976		.000	.000	.861	.306	.352	.283
	N	47	47	47	47	47	47	47	47	47	43	46	43	47
SAT Score, Verbal	Pearson Corr.	-.144	-.169	-.311	.036	-.218	-.156	.637**	1	.938**	.076	.489**	.383*	.474**
	Sig. (2-tailed)	.336	.256	.033	.811	.141	.295	.000		.000	.628	.001	.011	.001
	N	47	47	47	47	47	47	47	47	47	43	46	43	47
SAT Score Total	Pearson Corr.	-.081	-.048	-.213	.077	-.012	-.071	.864**	.938**	1	.010	.398**	.328*	.389**
	Sig. (2-tailed)	.573	.737	.133	.593	.933	.620	.000	.000		.945	.005	.026	.005
	N	51	51	51	51	51	51	47	47	51	47	49	46	50
Creativity Index	Pearson Corr.	.449**	.335	.380	.355	.362**	.275	.028	.076	.010	1	-.017	-.089	-.064
	Sig. (2-tailed)	.001	.017	.007	.012	.010	.053	.861	.628	.945		.911	.558	.664
	N	50	50	50	50	50	50	43	43	47	50	47	46	48
Non-Engineering GPA	Pearson Corr.	-.209	-.073	-.226	-.162	-.044	-.223	.154	.489**	.398**	-.017	1	.661**	.890**
	Sig. (2-tailed)	.140	.609	.111	.257	.761	.115	.306	.001	.005	.911		.000	.000
	N	51	51	51	51	51	51	46	46	49	47	51	47	51
Engineering GPA	Pearson Corr.	-.311*	-.200	-.354	-.221	-.113	-.274	.145	.383*	.328*	-.089	.661**	1	.887**
	Sig. (2-tailed)	.031	.173	.014	.132	.444	.060	.352	.011	.026	.558	.000		.000
	N	48	48	48	48	48	48	43	43	46	46	47	48	48
Total GPA	Pearson Corr.	-.296*	-.175	-.357	-.184	-.104	-.284*	.160	.474**	.389**	-.064	.890**	.887**	1
	Sig. (2-tailed)	.033	.215	.009	.190	.465	.041	.283	.001	.005	.664	.000	.000	
	N	52	52	52	52	52	52	47	47	50	48	51	48	52

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

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

## Discussion

The gender neutrality of Creativity Index and Brown is satisfactorily observed in Fig. 2 and 3, which suggests that female engineering students are as creative as male engineering students. The Brown test scores reliably represent ADHD and non-ADHD populations. This provides reliable data and results for a thoughtful discussion to take place.

Data suggests that there is a significant positive correlation between the level of ADHD-related impairments and creative potential of engineering students. This supports the first hypothesis of the project. For the studied group of engineering students, there are no significant correlations between Creativity Index and GPA or the Creativity Index and SAT scores, indicating that SAT scores and GPA are poor predictors of creativity. Because creative potential is not reflected in the current evaluation methodology, the most creative engineering students may not be at the top of their class, so their unique potential may be underappreciated in engineering programs. This observation indicates the urgent need to revisit the student evaluation that is performed in the current engineering education. Potentially low GPA of highly creative engineering students may become an impediment for their recruitment for jobs that are high demand for creative ideas.

The negative correlation between the GPA and the level of ADHD-related impairments suggests weaker academic accomplishment of students with ADHD characteristics. This supports the second hypothesis of the project. GPA is significantly negatively correlated with the Brown Attention ( $r = -.36, p < .01$ ) and Memory ( $r = -.28, p < .05$ ) subscale scores. Thus, the attention and memory are the main ADHD-related impairments that affect GPA, which can speak for the current typical course structure of engineering classes relying highly on memorization and lecture-based teaching. We suggest that the lack of attention of students in classes is associated with the way engineering material is presented in lecture-based passive classes. Individuals with ADHD are well-known for their ability to deeply focus on tasks and activities that are interest provoking. This talent of these individuals is known as hyperfocus which is the experience of deep and intense concentration. Thus, difficulties of students in engineering programs are more associated with uninteresting design of current engineering education. Unfortunately, this aged and faulty engineering education system puts all the blame on students with ADHD for not being attentive in classes; it even goes further to extremes and labels them “disables” that may be qualified for “special accommodations.” The same argument may be valid for the observed adverse impact of the impairment of memory on academic performance in engineering programs. This is an indication that the current engineering education heavily relies on memorization of subjects. On the other hand, it is agreed upon that innovative engineering products are more the result of implementation of concepts, than utilization of memorized information. Therefore, emphasis of the current engineering education on memorization of the information does not cater to innovation and technological advancement of our nation.

## Conclusion

Both hypotheses prior to the experiment were supported by the results. There is a statistically significant association between creative potential and ADHD characteristics for engineering students. There was also an observable difference between academic performance in students with strong and weak ADHD characteristics. Memory and attention were the ADHD characteristics that have a significant negative effect on GPA. These results suggest that creativity is underappreciated in engineering programs and the current structure of engineering programs does not allow the unique potential of ADHD students to thrive.

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# School Climate, Classroom Climate, and Teaching Quality: Can Excellent Students Unravel this Connection?

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## Abstract

The present study examined the degree to which a teacher's practice in the classroom is influenced by external conditions at the school, and whether this influence is different in teachers from different teacher education programs. The study focused on the relationship among school climate, classroom climate, and teaching quality as they are perceived by teachers. These relationships were examined by means of an online questionnaire completed by two groups of teachers: graduates from the REGEV Outstanding Student Teacher Education Program (the Excellence Program), and graduates from traditional teacher education programs. The findings show a significant correlation between school climate and classroom climate and between school climate and teaching quality among graduates from traditional programs. This is not the case among Excellence Program graduates, where a weak correlation was found between school climate and classroom climate in the various measures (in some measures no correlation at all was found), and no correlation was found between school climate and teaching quality. The findings therefore indicate a weak influence from external factors, e.g., on school climate, on classroom climate, and even weaker influence on the teaching quality of Excellence Program graduates compared to graduates from traditional teacher education programs. The present article presents a number of possible reasons that might explain these differences, as well as the Excellence Program graduates' resilience to various external pressures.

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**Keywords:** School climate; classroom climate; teaching quality; excellence in education; REGEV; program for excellent students.

## School climate

School climate has been found to be one of the factors most influencing students' mental wellbeing, achievements, and improvement (or conversely, decline) in their cognitive, academic, social, and emotional functioning (Brand et al., 2003; Cohen, Pickeral, & McCloskey, 2008-9; Freiberg, 1998). Additionally, the professional literature indicates that a school with a healthy climate is a school with an effective leader, where the teachers are satisfied with their work and colleagues, and consequently they are also more involved in school life and more willing to invest in developing quality education and teaching methods (Freiberg, 1998; Goddard et al., 2000; Heck, 2000; Hoyle, English, & Steffy, 1985; Thapa, Cohen, Guffey, & Higgins, 2013).

There is not one universally agreed-upon definition of school climate. Practitioners and researchers use a range of terms, such as atmosphere, feelings, tone, setting, culture or milieu of the school (Freiberg, 1999; Homana, Barber, & Torney-Purta, 2006; Lindahl, 2009; Tagiuri, 1968; Zhu, 2013). Cohen et al., (2009) suggest that school climate refers to the quality and character of school life. "School climate is based on patterns of people's experiences of school life and reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures [...] However, school climate is more than individual experience: It is a group phenomenon that is larger than any one person's experience [...] of the character of the school" (p. 182). While adopting this reference, Collie, Shapka & Perry, (2012) add that: "school climate is determined by the quality of relationships between individuals at a school, the teaching and learning that takes place, collaboration between teachers and administrative staff, and the support present in a particular school" (p. 1189) and therefore the school climate influences all members of the school.

Along the years, different researchers adopted different dimensions in order to analyze the influence of schools' culture on various educational aspects (e.g. : Dunn & Harris, 1998; Goldkind & Farmer, 2013; Hofstede, 1994, 2001; Phillips, 1997; Leadbeater et al., 2015; Thapa et al., 2013; Zhu, 2013).

In the present study we referred to Hoy, Tartar, and Kottkamp (1991) who defined school climate in terms of the staff members' "organizational health". Their definition is based on the perception whereby the teacher belongs to an organization and influences and is influenced by the organization's climate. The definition includes a detailed construct that enables identification of school climate in observable behavioural terms in accordance with three aspects: technical, administrative, and institutional.

As we shall see, school climate influences both classroom climate and teaching quality. In general, it seems that when the climate is positive students are less violent, they have a high sense of safety, and their achievements are high both academically and behaviourally. With regard to teachers it has been found that in addition to their success in leading their students to high achievements, they also demonstrate high commitment to the system, high collegiality and teaming, work survivability, and a high degree of satisfaction with the system and teaching (O'Brennan & Bradshaw, 2013).

## **Classroom climate**

The concept of classroom climate was first coined by Walberg (Walberg & Anderson, 1968), and then made popular in Moos's (1973) work, initiating more than forty years of research on the nature of classroom environments.

Classroom climate is a broad term that includes multiple aspects, and researchers also refer to it as "classroom atmosphere" or "classroom environment", with reference to the room where teaching and learning processes take place, and to the factors participating in and influencing these processes and their outcomes (Dorman, Aldridge, & Fraser, 2006).

The construct itself is nebulous and hard to delineate. One reason is that there have been many different dimensions identified with classroom climate. Evans et al.,(2010) summarize the literature in this field and suggest that there are three differentiable components: (1) academic, referring to pedagogical and curricular elements of the learning environment; (2) management, referring to discipline styles for maintaining order; and (3) emotional, referring to the affective interactions within the classroom.

As cited in their research summary, Evans et al., (2010) illustrate how classroom climates have been found to be related to positive educational outcomes such as enhanced academic achievements, constructive learning processes, and reduced emotional problems, as well as to undesirable outcomes such as increased bullying and aggression, and social and emotional maladjustment.

Evans et al., (2010) summarize their overview of classroom climate research with the claim that "classroom-level analyses attribute classroom climate almost exclusively to the skills of the individual teacher" (p. 135).

Despite the considerable similarities between the components of school climate and those of classroom climate, each of them is distinctive (Cheng, 2001), especially in light of the fact that teachers usually teach in different classrooms and are required to adapt both the teaching materials and themselves (on a personal level) to each classroom.

Classroom climate is influenced to a high degree by school climate, and to a certain degree even reflects it and the culture prevailing in it. This is because both climates, school and classroom, are influenced by the environment and subject to external influences: political, social, cultural, and economic. However, whereas school climate is fixed, classroom climate changes from one class to the

next: classroom climate is connected to school climate and is influenced by it, yet within the same school each classroom has a unique climate. According to Anderson (1982), the teacher contributes to the nature of classroom climate and is also influenced by it. This is because the way a teacher manages the classroom influences his/her relationships with the students, their behaviours, and their attitudes to each other. Aspects of classroom climate have been researched with a variety of tools, including direct observations of the classroom environment, questionnaires, and interviews with students and teachers to obtain a description of how they perceive the climate in their classrooms (e.g., Mucherah, 2003).

## **Teaching quality**

In his article, Berliner (2005) asks how do we know that America's three million teachers are competent, skilled, and qualified to teach, since, in his view, teaching should be examined, *inter alia*, by testing the ability of teachers to advance their students' learning. There are various methods, such as examining the students' standard of learning, or student feedback questionnaires on their teachers' teaching quality (e.g., Byrne & Flood, 2003; Felder & Brent, 1999; Gravestock & Gregor-Greenleaf, 2008). However, one of the most common methods for evaluating teaching quality is by questioning the teachers themselves. Teachers' self-evaluation is effective since it is readily available; in other words, it can be obtained in any educational setting. Moreover, since the teachers are evaluating themselves, i.e., in their own words, the findings can have considerable influence: they can engender listening, and reinforce identification (Marsh & Roche, 1997).

However, although there are diverse methods for testing teaching quality, the difficulty in examining it stems first and foremost from the difficulty in defining it: on the one hand, it is clearly evident that teacher and teaching quality considerably influence students' ability to learn and attain high achievements (Croninge et al., 2007; Rivkin, Hanushek, & Kain, 2005), and on the other, as Berliner (2005) contends, this is a nebulous construct that always involves value judgment and is influenced by cultural, social, and other factors.

Berliner (2005) summarizes and states that teaching quality includes both good teaching, i.e., the teacher teaches the required content using the appropriate methods, and effective teaching, i.e., the students indeed learn what the teacher is teaching. This approach mandates focusing simultaneously on three aspects: the characteristics of the teacher's teaching, the students' learning, and the nature of the environment, i.e., physical conditions, the means it provides, and the degree of social and emotional support. Thus Berliner (2005) in effect links teaching quality with school climate. This linkage is described extensively by other researchers (e.g., Cohen et al., 2009; Thapa et al., 2013).

## **High personal abilities and resilience to external influences**

Thus far we have presented the connection between school climate and the two variables: classroom climate and teaching quality. The implication is that when school climate is positive or healthy, there is a good chance that teaching quality will be high, and vice versa: when a negative school climate prevails it will influence classroom climate and the teachers' teaching quality.

The question is whether the connection between school climate and classroom climate or teaching quality is similar in different teachers. In other words, can this connection be positive in some teachers and be either nonexistent or negative in others? This question is especially significant in cases where school climate is not good, since it can also influence the classroom and teaching quality. This leads to the question: Is it possible that some teachers will not be influenced by this negative climate, and the climate in their classroom and the quality of their teaching will be positive even when a negative climate prevails in the school?

If we had to find a population of teachers who are resilient to external influences in contrast with another group of teachers, we would need to find a group that can function well even when external conditions pose difficulties for them. However, what kind of teacher population can we

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choose for this kind of study? What should characterize its members so that we can hypothesize that they will be less influenced by external pressures and conditions?

There are a number of characteristics that reduce the influence of external pressures, and one of the main ones pertains to personal abilities. The research literature indicates that learners with high cognitive abilities (e.g., gifted students) are characterized, more so than other learners, by belief in their abilities to do and to influence despite difficulties in the external environment and failures. It seems that this is associated with their perceptions of their abilities, belief in their abilities to succeed, their internal locus of control, which leads them, more so than others, to trust themselves, to demand from themselves, and to act with integrity in accordance with their abilities and views (Ablard, 1997; Assouline et al., 2006; Colangelo, Kelly, & Schrepfer, 1987; Litster & Roberts, 2011; Yong, 1994). It is particularly interesting to note that these characteristics, which are associated with the learners' high abilities, enable resilience to external pressures in gifted students, including in higher education institutions (Anazonwu, 1995; Mathiasen, 1985; Rinn & Cunningham, 2008). Contending with external influences is manifested in various ways: refraining from copying in exams; displaying more ethical behaviours; having behaviours guided by personal principles rather than being swept up after others; or using previously learned strategies to achieve success (Coleman & Mahaffey, 2000; Kirkpatrick et al., 2008).

The findings described by Rinn (2007; Rinn et al., 2014) are especially interesting and indicate characteristics particularly prominent in high-ability students studying in excellence programs. These students' perceptions of their abilities, and their beliefs in their abilities to succeed in their own right (i.e., due to their abilities, efforts, and endeavours), are higher not only than those of lower-ability students, but also than those of high-ability students who do not study in excellence programs.

Our hypothesis posits that teachers who have been defined as possessing high abilities, e.g., Excellence Program graduates, are likely to be less affected by external influences such as the school climate. This is likely to be expressed in a weaker correlation between school climate, classroom climate, and teaching quality among Excellence Program graduates than among graduates from traditional teacher education programs.

## **Excellence programs in teacher education colleges in Israel**

Within teacher education in Israel there are a number of groups studying in unique training programs, including the REGEV<sup>15</sup> Outstanding Student Teacher Education Program. Key criteria for acceptance into the program include high cognitive (psychometric exam) and academic (matriculation exam) abilities, and high motivation for engaging in education and teaching. The students' high abilities must also gain expression during their studies: progression from one year to the next in the program is also conditional upon particularly high passing grades (average grade 90) in an accelerated program, and very successfully fulfilling additional challenging tasks and activities, such as expanded practical teaching experiences, preparing conferences and seminars in the colleges, and involvement in the community, such as helping underprivileged children. These are undoubtedly students from whom proof of excellence is demanded both when entering the program (meeting criteria of cognitive, academic, social, and personal excellence) and in the course of their teacher training (very successfully meeting academic and practical challenges as a condition for completing the program). It is therefore possible that if our hypothesis concerning the influence of these teachers' high personal abilities on their resilience to external pressures and circumstances, e.g., school climate, is correct, this will be manifested in teachers who are Excellence Program graduates (for more on the REGEV

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<sup>15</sup> REGEV is the name of "The Excellence/ Outstanding Student Teacher Education Program" [Hebrew acronym describing a highly motivated student with high abilities and a desire to influence others].



Program, see: Ariav, Maskit, & Klavir, 2014; Klavir & Goldenberg, 2014; Shayshon & Popper-Giveon, 2016). Accordingly, we defined two research hypotheses:

**First hypothesis:** A positive correlation will be found between school climate and classroom climate among teachers who are graduates from traditional programs; however, this correlation will be weaker among Excellence Program graduates.

**Second hypothesis:** A positive correlation will be found between school climate and teaching quality among teachers who are graduates from traditional programs; however, this correlation will be weaker among Excellence Program graduates.

## Methodology

### Sampling and participants

The present study was conducted as an online study in which questionnaires were emailed to a sample of 3062 graduates from teacher education colleges who graduated between 2008 and 2011 and belong to two groups: 1691 Excellence Program graduates, and 1371 graduates from traditional teacher education programs. A reminder was sent about two weeks later. The completed questionnaires were automatically added to an Excel file without the respondent's identifying details. 470 completed questionnaires were received: 272 (16%) Excellence Program graduates, and 198 (14%) graduates from traditional programs.

The respondents from both groups were predominantly women, constituting over 80% of each group. No significant differences in responses were evident between men and women.

The teachers in the sample graduated in 2008 (19%), 2009 (23%), 2010 (28%), and 2011 (30%). Their average seniority in teaching at the time of completing the questionnaire was 2.94 years, with a standard deviation of 1.61.

### Research tool

The research tool was an anonymous self-reporting online questionnaire. Based on the background from the literature on the terms examined in the present study, a series of statements were defined that meet the theoretical description of the terms: school climate, classroom climate, and teaching quality. These items were structured in consultation with content experts and educators, including senior lecturers in several teacher education colleges.

Based on these items, the statements were incorporated into the research questionnaire, which included background variables. The questionnaire comprised 102 questions, most of them on a Likert scale in which answers ranged from 1=not at all, to 5=to a very high degree. Based on the responses obtained in its empirical examination, factor analysis of the questions was carried out. From all the questions (some of which are not relevant to the present study and are being used for other studies) a number of measures were defined for examining the three variables: school climate; classroom climate; and teaching quality in the present study. An overall factor score was calculated for each variable, as well as individual sub-scores for the components comprising each variable. The internal reliability and construct validity of these scores were computed.

- School climate: The teacher's subjective evaluation of five measures: school staff cohesion; encouraging initiatives and professional collaborations; eradicating violence; condition and accessibility of school supplies and teaching aids; and the degree to which the school strives to academic excellence. Cronbach's alpha reliability for this factor was 0.79, with a mean of 3.85, and a standard deviation of 0.629.
- Classroom climate: The teacher's subjective evaluation of six measures: the students' support for each other; the teacher leads by personal example; the teacher treats all students equally; the teacher encourages volunteering; the students' ability to express an independent opinion; and there is a supportive and meaningful teacher for the students. Cronbach's alpha reliability for this factor was 0.70, with a mean of 4.12, and a standard deviation of 0.423.

**Teaching quality:** The teacher's subjective evaluation of seven measures: advancing initiatives and change processes in the classroom and school; planning short- and long-term teaching and evaluation processes; promoting academic achievements; keeping abreast with and implementing innovative and diverse teaching methods; investing in homework; participating in relevant courses and advanced studies on teaching methods and the relevant discipline; and promoting additional (non-academic) student achievements. Cronbach's alpha reliability for this factor was 0.77, with a mean of 3.60, and a standard deviation of 0.572.

It is important to bear in mind that each of these variables constitutes a perceived value (e.g., perceived teaching quality) rather than a subjective value since it is based on the respondents' (teachers) self-reporting.

## Findings

As explained in the Tool section, the questionnaire administered to the teachers comprised questions that were divided into three distinct factors: school climate, classroom climate, and teaching quality.

### 1. Correlation between school climate and classroom climate

The first research hypothesis posited that a positive correlation would be found between school climate and classroom climate among teachers who graduated from traditional programs, and this correlation would be weaker among Excellence Program graduates.

To examine this hypothesis, correlations between the overall factor scores of *school climate* and *classroom climate* in the two groups of graduates were calculated. In a Z-test for differences between correlations, a significant difference was found ( $p < 0.05$ ) in this correlation among graduates from traditional programs ( $r = 0.38$ ), which was higher than the correlation among Excellence Program graduates ( $r = 0.21$ ). This difference between the correlations indicates that among graduates from traditional programs classroom climate is related to school climate to a greater degree than among Excellence Program graduates, where this relationship is weaker.

### 2. Connection between school climate and teaching quality

The second research hypothesis posited that a positive correlation would be found between school climate and teaching quality among teachers who graduated from traditional programs, and this correlation would be weaker among Excellence Program graduates.

This hypothesis was examined by calculating the correlations between the overall factor scores of *school climate* and *teaching quality* among graduates from traditional training programs and Excellence Program graduates. In a Z-test for differences between correlations a statistically significant difference was found ( $p < 0.001$ ) in this correlation between graduates from traditional programs ( $r = 0.37$ ) and Excellence Program graduates ( $r = 0.07$ ). This difference between the correlations indicates that among graduates from traditional programs school climate is significantly related to teaching quality, in contrast with Excellence Program graduates where no correlation was found between the two variables.

To clarify these findings and attempt to find the source of the differences, Table 1 shows the correlations between the overall factor scores of *school climate* and *teaching quality* and the individual sub-scores for the components comprising each of these variables in both groups.

**Table 1:** Pearson correlation coefficients between the overall factor scores of *school climate* and *teaching quality* and the individual sub-scores for the components comprising each of these variables in both groups of graduates

		School Climate overall factor score		Teaching Quality overall factor score		Significance of difference
		Graduates From traditional programs	Excellence Program graduates	Graduates from traditional programs	Excellence Program graduates	
A. Sub-scores Of School climate	1. School staff cohesion			.20**	-.05	**
	2. Encouraging initiatives and professional collaborations			.34**	.12*	**
	3. Eradicating violence			.21**	.07	
	• Condition and accessibility of school supplies and teaching aids			.33**	.04	**
	• Degree to which the school strives to academic excellence			.38**	.24**	*
B. Sub-scores Of Teaching quality	1. Advancing initiatives and change processes in the classroom and school	.32**	.10			**
	2. Planning short- and long-term teaching and evaluation processes	.29**	-.05			**
	3. Promoting academic achievements	.22**	.11			
	4. Keeping abreast with and implementing innovative and diverse teaching methods	.22**	.05			*
	5. Investment in homework	.25**	.09			*
	• Participation in relevant courses and advanced studies on teaching methods and the relevant discipline	.14	-.08			**
	• Students' achievements	.11	.01			

\* $p < 0.05$

\*\* $p < 0.01$

Table 1 shows the correlations between the statements comprising the overall *teaching quality* factor score and the *school climate* sub-scores, as well as the statements comprising the overall *school climate* factor score and the *teaching quality* sub-scores in both groups. The

correlations indicate that among graduates from traditional programs all the *school climate* sub-scores have medium strength significant positive correlations with the overall *teaching quality* factor score (the correlations range from 0.20 to 0.38). In contrast, among Excellence Program graduates no correlations or weak correlations with the overall *teaching quality* factor score were found in most of the *school climate* sub-scores (the correlations range from -0.05 to 0.24). The difference between the correlations was statistically significant with regard to four of the five statements (for statements A1, A2, and A4  $p < 0.01$ , and for statement A5  $p < 0.05$ ).

With regard to the correlations between the statements comprising the *teaching quality* sub-scores and the overall *school climate* factor score it emerges that most of the statements are positively connected to school climate among graduates from traditional training programs. In contrast, and across the board, it was found that among Excellence Program graduates none of the *teaching quality* sub-score statements are connected to the overall *school climate* factor score. Examination of the differences between the correlations shows statistically significant differences between the groups with regard to five of the seven statements (for statements B1, B2, and B6  $p < 0.01$ , and for statements B4 and B5  $p < 0.05$ ).

These findings corroborate the present study's second hypothesis whereby a correlation will be found between school climate and teaching quality among graduates from traditional training programs, but this correlation will become more moderate and even disappear among Excellence Program graduates. In the discussion and conclusions section we shall attempt to explain this absence of correlations on the basis of the components of the Excellence Program and the characteristics of its graduates.

## Discussion and Conclusions

The present study focused on the connection between school climate and two variables: classroom climate and the teacher's teaching quality. Although in the literature this kind of connection has been found between school climate and the two other variables, this study focused on the question of whether there is a teacher population for whom these connections function differently or at a different strength.

We hypothesized that unlike a traditional teacher population, among Excellence Program graduates the influence of school climate will be weaker and will not influence either classroom climate or teaching quality. The findings corroborated both hypotheses.

As presented in the Introduction to this article and based on broad empirical findings, the researchers hypothesized that due to their high abilities and their constant belief in these abilities, teachers who are Excellence Program graduates are likely to be resilient to external influences such as those manifested in school climate. The findings do corroborate this hypothesis; however, in light of these findings, the question is whether this is solely due to their high abilities. Perhaps, as Rinn (2007; Rinn et al., 2014) found, there is also "something" in the very association with a prestigious program such as the Excellence Program that augments the students' sense of efficacy and recognition of their self-worth, which can reinforce their resilience to various external pressures, such as manifested in the school climate. As previous studies on graduates have found (e.g., Klavir & Goldenberg, 2014), there is no doubt that the very fact of this association carries prestige and importance in the graduates' eyes. This reinforces their sense of efficacy and their commitment to excellent educational endeavour as well as their ability to achieve it. It is therefore possible that these factors (which derive from the very fact of belonging to the Excellence Program) combine with the Excellence Program graduates' high sense of resilience to external influences in the school, although this was not examined in the present study. Finally, an additional possible factor that joins the previous two and contributes to the teachers' ability to withstand external conditions, such as those manifested in the present study on school climate, is resilience. Resilience is a concept that in the past was used in developmental psychology and psychiatry to describe the individual's ability to recover from a difficult or traumatic situation (Block & Block, 1980). In recent decades studies on resilience have shifted from investigating the individual's coping skills and difficulties to positive characteristics, namely the strengths that aid the

individual's good adaptability and successful transitions in the individual's life (Henderson & Milstein, 2003).

It is therefore possible that there is something that typifies the character of the training the students received in the Excellence Program that coupled with their high abilities and sense of efficacy contribute to the picture emerging in the present study. On the one hand, as described above, this is an accelerated, demanding, and challenging program, and meeting its conditions mandates high abilities and resilience to time pressures and academic, professional, and personal demands. On the other hand, it is possible that the program, which openly conveys to the students in every possible way that they are expected to become high-quality teachers and should strive for excellence in teaching, strengthens them and contributes to their resilience to external pressures. This hypothesis stems from the fact that the program encourages the students participating in it to become teachers who change the environment by means of initiatives and innovation with the aim of achieving the goal of quality and excellence in teaching. It may be that the program's ethos, which is conveyed to the students, reinforces the resilience of its graduates as teachers to external pressures. A possible intimation of the veracity of this explanation can be drawn from previous studies on graduates such as that conducted by Klavir, Cohen, and Grienfeld (2009a), which engaged in the feelings expressed by Excellence Program graduates in their descriptions of it. In their summary of the graduates' words in that study, the researchers write:

The very fact of being accepted to the program, belonging to an elite group, the high expectations from the students as learners in the present and excellent teachers in the future, as well as successfully meeting the program's numerous demands and difficult challenges – all these have made excellence [in the eyes of the graduates] not only a brand name that is mentioned as an empowering component in itself, but also a component possessing a Pygmalion effect: high expectations, the system's belief in their ability to meet these expectations, and the efforts they invested in meeting them, all came together and led the graduates to high achievements on personal and professional levels alike (p. 483).

Emerging from this study is that there is indeed a connection between school climate and classroom climate and between school climate and teaching quality. The veracity of this finding has been confirmed with regards to teachers in the education system in general. However, among Excellence Program graduates these connections are weaker, and they have been found to be less influenced by the external climate around them. This resilience joins not only their high abilities, but also the expectations from them, their own expectations, and the character of the programs in which they received their teacher training, which possibly reinforces and contributes to their resilience and firm insistence on their vision, and gives them the strength to continue striving to fulfill their aspirations to be excellent teachers.

As one graduate (KV) who participated in a previous study (Klavir, Cohen, & Grienfeld, 2009b, pp. 441-442) related after a year of working as a teacher in a school:

I feel that the program contributed to me. I have the ability to come to a coordinating role [...] to be a teacher that is more active than the usual [...] to form connections with other teachers [...] to build a unique and personal program for each one. I got that from the program. we received a systemic perspective. I think that's what helped me, enabled me to feel the system [...] to advance my outlook. We learned how to lead changes and that enabled me to feel competent [...] that I can. Altogether, the program worked on what we are capable of [...] And there were expectations from us and you feel that there are expectations from you so you do difficult things and succeed [...] And this confidence that you're successful gives you the confidence to continue, and enables me at least! All these things gave me strength [...] to feel that it's possible [...] that I am capable of leading forward.

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# Express Yourself: An Auto-Ethnographic Poetic Account

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## Abstract

To counter the narratives about African American males in special education, my poetic account represents the voice of a gifted AA male with dyslexia. I applied critical disability theory to learn, and become mindful, about my academic journey and how my identity was shaped. As an auto-ethnographer, I examined my schooling to understand my cultural experiences. Furthermore, after immersing myself in the literature of auto-ethnography poetry, I quickly recognized that this method would allow me to compose my stories and inspire students who are placed into special education that they too can reach their full academic capabilities. The organization of this account begins with a description of my method followed by a short description of who I am. Next, in the section entitled *Express Yourself: An Auto-Ethnographic Poetic Account*, I provide four poems followed by classroom pedagogy. Moreover, it is important to realize that scholarship rarely captures the voices of this population.

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**Keywords:** African American; dyslexia; giftedness; poetry; auto-ethnographic; Critical Disability Theory.

## Introduction

I begin by contextualizing my poetic account by using the lyrics of the song *Express Yourself* written by O'Shea Jackson aka Ice Cube (1989).

“...I'm expressin' with my full capabilities,  
And now I'm livin' in correctional facilities...”

I frame my correctional experiences from the perspective of a former African American (AA) male in special education who faced more punishments for my aggressive conduct than teachers trying to acknowledge the root causes of my behavior. I was unable to read, unconscious of my full academic capabilities, felt shackled, misguided, and mis-educated, which all impacted my identity (Connor & Ferri, 2005; Woodson, 1933). Moreover, as a bi-racial individual, society did not stop and say, “since you have a White mother, we are going to provide you certain privileges and social/capital access.” Instead, society treated me as a nigga, and at a young age, some teachers started tagging me with certain identifiers and placing me in self-contained classes with all AA males (Robinson, 2016a).

Regrettably, this is how the pipeline to prison begins, and how individuals get tagged with more serious identifiers (i.e., criminals) (Alexander, 2010). In fact, some teachers do not

develop an awareness of the specific academic and social needs of AA males living at the intersection of giftedness and dyslexia who are placed in special education (Robinson, 2017a). For instance, because I was a student who stood 6'3”, some teachers just saw color and had a prepackaged notion about my identity and ability. Thus, when I was placed in special education, my capabilities were overshadowed not only because of the color of my skin, but also from institution policies and microaggressions (Blanchett, 2010).

Consequently, my capabilities were disregarded because I was shuffled through a system that has been designed to exclude AA males, especially in special education. Having those experiences resulted in me feeling voiceless and hopeless through most of my academic journey, and being tagged with identifiers that socially constructed my identity - who I was and later became (Robinson, 2017b). Connor (2006) states that the “...voices of [AA]

males in special education and how they understand their position [capabilities] in the academic system are noticeably absent from traditional scholarship” (p. 154). A major factor behind the voices of AA students being absent in the literature is that there are some teachers who frame those students’ learning abilities from a ‘deficit’ rather a strength-based perspective (Robinson, 2016b).

Therefore, my poetic account serves as a platform that not only allowed me to express

myself, but to also rewrite the description given to AA males in special education who have not reached their full academic capabilities (Ferri, 2006; Grantham, Ford, & Henfield, 2011). Furthermore, the word “I” is used because the methodological approach is based on a form of qualitative research in which the author engages in self-reflection and writings to reveal personal experiences (Chang, 2013). Applying auto-ethnography permitted me a voice for a population that had essentially been silenced in academic and sociopolitical realms.

## Auto-Ethnographic and Critical Disability Theory

My poems are intended to provide a deeper understanding about my position in the academic system as a gifted AA male with dyslexia. Writing these poems allowed me to make reflections and analyses of the situations in my constructed reality as a former special education student who graduated reading at an elementary level as well as provide a transformational experience (Robinson, 2013). I write about my experiences by contextualizing my *lebenswelt* through the lens of both James Weldon Johnson, a civil rights activist and poet, and contemporary scholar Ta-Nehisi Coates. First, Johnson was dissatisfied with the cultural stereotypes that were circulated in the 1900s, and in 2017 certain stereotypes remain towards AA, especially males in special education.

Second, Coates’s book *Between the World and Me* (2015) is a framework for understanding America’s rich culture and history, our current educational calamity, and the social inequality that AA students experience within the systems (Davis, 2016). Like Coates, as I became conscious, I had no reason to constrict myself to make others feel comfortable, especially when advocating for AA males who are in an oppressive state within the special education system. Furthermore, Coates explained that the destroyer’s (i.e., oppressors) are rarely help accountable, and in this context, they are not help responsible for the failure to teach AA males in special education. Yet, the oppressor still receives their pension (Coates, 2015).

Overall, the propaganda concerning the status of AA males in special education with

learning disabilities (LD) that are widespread by teachers who have lower academic standards or frame their students’ learning from a deficit perspective are detrimental to their psyche. To counter the false narratives written about AA males, many 20th and 21st Century social scientists have had a desire to examine appropriate methodologies to portray the reality and identity of AAs, especially those who are gifted and have a LD (Connor, 2008; 2006; Ford, 2013).

For instance, Coates asserts that his writings have been a result of his lived experiences, which is what I hope to accomplish. Further, we both share some commonalities regarding our educational experiences as AA males. Like Coates, at a young age, school seemed useless to me as the special education system had failed me. However, things changed when I meet Dr. Robert T. Nash who taught me how to read and accepted me into a college remedial program. During this time, I then pursued my studies at the University of Wisconsin Oshkosh where I underwent an intellectual awakening by learning to read, and understanding the sound structure of the American English language (i.e., linguistics) (Wolf, 2007). In the end, like Coates, once I found the value in education and the freedom it provided, I became more conscious about how society treated me prior to learning to read as an AA male. Thus, my degrees (i.e., Bachelors, M.Ed., & Ph.D.) then had opened doors into rooms where educational decisions were made about policies, which not only allowed me access, but also challenge the status que, and the oppressor (Freire, 1970).

## **My Narrative: Encountering Chauvinism against Individuals with Disabilities**

Writing my narrative through auto-ethnographic poetry and critical disability theory tapped into my creativity, and general intellectual and specific academic abilities, which all went unnoticed as a former AA male in the Pk-12 special education system. My experiences are the foundation of my quest for academic egalitarianism and social justice, and utilizing auto-ethnography allowed me to be innovative with not only conveying my lived experiences, but also confronting ableism and educational biases. Thus, like Johnson and Coates' literature on identity and culture, I too found myself learning about how giftedness, race, and dyslexia constructed my identity.

As Johnson and Coates share throughout their literature and poetry, I too became conscious about how my lived experiences were connected, and shaped who I am, which also allowed me to find a voice and break my silence (Jones, Adams & Ellis, 2013). Moreover, the use of poetry is a source of knowledge that captures situations through telling that not only describes raw emotion and provides thick and rich descriptions, but can also help readers determine if my story speaks to them about their own experiences through the situations described, or about the lives of others.

Furthermore, my auto-ethnographic poetry employs critical disability theory as a lens to examine my lived experiences (Blinne, 2010). This theory examines how individuals with different disabilities are subjugated and excluded from society (Reid & Knight, 2006). My race was a major factor in how I was treated by society, and teachers lacking knowledge on dyslexia, which resulted in my anger overshadowing my capabilities.

Thus, if teachers do not acknowledge dyslexia and giftedness as a social construct, students will continue to receive identifiers from a deficit perspective. Next, I offer a short description, called *Who I Am* before moving into my auto-ethnography poetry entitled *Express Yourself: An Auto-Ethnographic Poetic Account* that includes four critical aspects: (1) policy and standardized assessments, (2) teacher takes risk, (3) the aftermath, and (4) inspired, which were all part of my identity development.

### **Who I am**

I was gifted, but my frustrations shifted my abilities;  
It seemed I was lonely because I was the only "other," who lacked identity, and treated like a special act;  
I was trying to cope with the discrepancies between my abilities, and disabilities, but received more penalties;  
Not receiving adequate reading curriculum, kept me locked up like an inmate;  
I felt a sense of isolation and, disengagement, which resulted in altercations, and disciplinary arrangements;  
I constantly faced the race that set me a-part from the start;  
I was always identifying for behavior status, occupying the space that was more of a hiding place, for those they see as "terrifying";  
I eventually viewed my cultural identities, which included the intersections of race, dyslexia and gifted as my sources of power;  
Having this knowledge, allowed me to navigate college;  
I persisted, and dismissed all stories that place AA males in special education into deficit perspectives.

### **Express Yourself: An Auto-Ethnographic Poetic Account**

Scholars continue to recognize an array of causes that affect the identification rates of AA males who are underserved across both gifted education and special education. For instance, some causes that contribute are: (1) school policies and standardized assessments, and (2) deficit thinking

(Mayes & Moore, 2016). Another aspect that is limited in the literature is the voices of this population (Fries-Britt, 2002).

### **Policy and standardized assessments**

The impact of the academic policies kept me tracked  
 My learning was viewed from a deficit, which left me not having an identity element  
 Majority of my PK-12 schooling, was spent being punished by the rulings  
 Being moved to more restrictive environments, constricted me from learning  
 The misdiagnosis and mistreatment remained elusive, which was abusive  
 Standardized tests characterized me as a charity case, and kept me oppressed  
*Teachers lived in fear, showed their doubt, and kept me out!*

### ***Teacher takes risk vs judging my ability***

As many teachers ignored me  
 I had one teacher who took a risk, and helped me escape  
 He had perceptions and no misconceptions about my full capabilities  
 His decision and vision were not based on race, but noticed my anger, and that I was in danger  
 He was all about nurturing, and encouraging  
 Said, he was taking a chance, to see me advance.

### **The aftermath**

Graduating high school reading at an elementary grade level, left many thinking if I would be succeeding  
 Sent into the unforgiving world, livid from not reading  
 Started college irritated, but had faculty who never underestimated  
 They elevated me so I didn't think I was a mistake, and become a-part of the academic attrition and unemployment rates  
 Helped me navigate systems that discouraged, instead of nourished me

### ***Inspired***

After a total of 18 years in the academy I flipped the script on educators who had doubt, and tried to keep me out.  
 My journey has led me to proceed with my creativity to inspire other AA males in special education to reject all negativities and reach their full capabilities  
 My voice allows Brothers in the trenches to know they have a choice to rejoice!

### **Classroom Strategies**

Based on my lived experiences and reflecting on my poetic account, I offer a few recommendations for teachers who are looking to tap into students' capabilities. First, there are a variety of assessments types, but I believe performance assessments that directly measure the domain-specific construct that a student shows interest in is crucial as it will tap into their creativity, general intellectual, and specific academic abilities (Leslie & Caldwell, 2009).

Second, teachers may want to incorporate scaffolding techniques that include, but are not limited to: direct instruction, making connections to students' prior knowledge, and use visual aids (i.e., graphic organizer) (Palincsar & Schutz, 2011). Third, classroom instruction may also contain culturally responsive pedagogy that enhances students' learning by using cultural referents, which aid in students expressing their full capabilities through hands-on activities (Paris & Ball, 2009). Fourth, through trial and error, teachers are continuously discovering their students' strengths by not only incorporating strength-based learning strategies, but also maximizing their students' social networks

(Yosso, 2005). Overall, if AA males in special education are not provided opportunities that tap into their strengths, and their learning is framed from a deficit perspective they will continue to be disengaged and feel isolated (Ferri & Connor, 2014).

## Conclusion

I hope my story resonates and inspires other AA males in special education to keep their head high, eyes to the sky, and stand strong through the storm of life. Moreover, I share my story to serve as a platform to voice my lived experiences, express myself, and rewrite the narrative given to hundreds of AA males in special education that they can reach their full academic capabilities. Overall, with the limited research that gives gifted AA males with dyslexia in special education a venue to voice their academic concerns and limitations, teachers could offer them a pen to scribe reflective knowledge, which provides them the opportunity to showcase their full capabilities, and tell the world their truth about how they see their positions in the academic system. Providing them these opportunities, could open the doors of creativity for AA males in special education whose general intellectual and specific academic abilities are continuously overlooked.

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# Seemingly Benign and Not So Benign Every Day Occurrences and Words

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You never know when words, phrases, photographs, images, strategies, and ideas for stories or practical classroom exercises will pop up, but if you keep your mind open to snag them when they come, you can retain a fluid inventory of notes and potential. Seemingly benign everyday occurrences can remain benign, but also have the possibility of becoming poems, discussion starters, pedagogical strategies, games, stories, reminders, or even books. Words and images can evoke reflection, give birth to a classroom discussion or inspire disturbing contemplation. Sometimes I find the ideas on my walks around the neighbourhood. Sometimes they find me, like recently at the Minnesota State Capitol.

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## Evoked Reflection

We often miss the art of life because we are going too fast or we fail to open our souls to capture the fragile and fleeting beauty in our surroundings and people we meet as we go about our day. On my bike ride to the university recently, I came up behind a man riding a bicycle pulling a child bike carrier heaped high with stuff. Most of the stuff was tucked under a plastic tarp of sorts, but a pillow and what looked like a metal bed frame bobbed on the side. When the man biked through an intersection in front of me, a wooden jewelry box fell from his bike carrier right into the middle of the street. I stooped to pick up the empty box and handed it to him when I crossed to the other side where he was. He took the box with soiled work-worn hands. His clothes seemed to have only a very faint memory of soap and water.

“Looks like you’re moving,” I said.

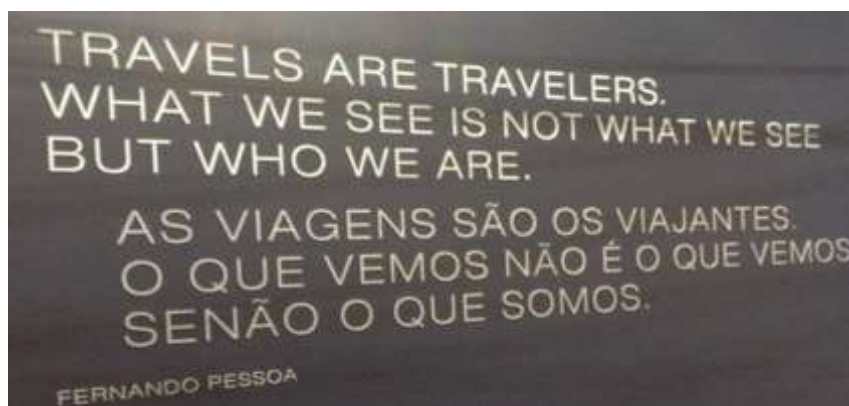
“Into my own place,” he beamed. “Moving my stuff in shifts.”

“Nice,” I said.

“It’s more than nice. I am 59 years old and I spent six months on the street. That was the hardest thing I ever did. My new home is more than nice.”

“Enjoy your new home,” I said as we parted ways.

I later thought about the few words exchanged and the image of the man pulling all his belongings in a bike carrier to his new home, next to high-heeled women and shiny-shoed men in tailored business suits walking briskly down the sidewalk to gleaming office buildings. As the business world clocked in another day of mundane work, this man celebrated having a new home. We should all have stopped and celebrated with coffee and cinnamon rolls at Tim Hortons. Then I would have asked the man who the jewelry box had belonged to, what treasures it used to hold, and what other stories he had to share with us. The image of the man proudly biking down the street moving his belongings in shifts to his new home remained with me for a long time. He captured the art of life, which many of us miss in our rush to get to where we are going and back again. It reminded me of a quotation in an airport by Fernando Pessoa:



Had the man’s jewelry box not dropped in the middle of the street right in front of me, I may not have seen past his outward appearance. What I saw after that very brief interchange with him was much more than a man biking down the sidewalk with a carrier heaped high with belongings. He represented a story in motion, into which he gave me a brief glimpse.

### Classroom discussion

Transformative wavelengths are latent even in a bothersome speeding ticket. Recently, I opened the mailbox to find an envelope with the return address from the police service. Even though I did not have any recollection of recent infractions with the law, I still opened the envelope with unease, only to be stunned with a \$221 speeding ticket. It was an image capturing ticket with indeed a photograph of my vehicle’s license plate. Apparently, my vehicle had been going 63 kilometre per hour in a 50 kilometre per hour zone, this in a family where most of us bike wherever we need to go. I put the ticket away for later payment, thinking you can’t argue with a camera. When my young son, who was learning to drive, came home we studied the ticket to see where the infraction occurred and which family member possibly could have been driving our vehicle. By retracing our steps and looking at the calendar to see what and where our family’s schedule was taking us that day, we deduced the location and driver. That person would be responsible for the ticket.

With just a little detective work we realized that from where we turned and the location of the camera that took the image of our license plate, there was no speed limit sign and it was not a construction zone to warrant such a heavy ticket. Since my name is on the vehicle’s title, I was armed to do battle with the law. This was simply not fair, so locking my bike outside the ominous parking authority with helmet in hand, I went in to confront and challenge the law. An hour later after standing in various lines, I appeared before the judge. I explained my side of the story, was told that not knowing speed limits was not a sufficient excuse for speeding, but he would reduce the ticket to \$100.

TIME TO PAY / DÉLAI DE PAIEMENT			
NAME / NOM AU COMPLET: FRIESEN, HELEN L			
DISPOSITION DATE / DATE DE LA DÉCISION: 25-Sep-2017/25 sep. 2017			
OFFENCE / INFRACTION: Speeding - SPEED-SCHOOL AT WB GRANT AVE WEST OF THURSO ST S.			
Ticket Number Numéro de contravention	Offence Date Date de l'infraction	Original Amount of Ticket le montant initial de la contravention	Amount Due Montant dû
71179920	8-Sep-2017/8 sep. 2017	\$221.00	\$100.00
			DUE DATE / DATE D'EXIGIBILITÉ 30-Nov-2017/30 nov. 2017
<b>HOW TO PAY THIS TICKET</b> a) ONLINE:* <a href="http://www.manitoba.ca/finepayment">www.manitoba.ca/finepayment</a> - Pay your ticket by Visa or MasterCard - There is no fee for this service - Only full payments can be made online.		<b>COMMENT PAYER LA PRÉSENTE CONTRAVENTION</b> a) EN LIGNE:* <a href="http://www.manitoba.ca/finepayment">www.manitoba.ca/finepayment</a> - Payer votre avis par Visa ou MasterCard - Il n'y a aucun frais pour ce service.	

What seemed like a huge inconvenience turned into a great classroom assignment that week. My students had completed a diction field trip analysis where they were tasked with analyzing the writing they observed around the university campus and were now working on a critique. The assignment that I invented as a result of my speeding ticket experience turned into a critique activity which I called: “That is totally and completely unfair.” After I told the students about my speeding ticket scenario, I invited students to get into groups of three or four. In their groups, they were to tell their tale of an unfair event. After each student had told about an unfair event, the group voted on who would go to the Judicial Justice of the Peace (JPP) with their story to request clemency. Students volunteered to play the role of JPP. The class then became the courtroom. Students drew their scenarios on the board or explained in detail, incidents that had happened recently or many years ago.



Students asked thoughtful questions as they cross-examined the case and eventually, the volunteer JPPs announced their decision, which in all cases was much more compassionate than what actually happened in real life. As I walked out of the classroom that day, I was not only completely surprised by the students' engagement in the practical and oral critique, but in their compassion for each other.

## Contemplation

As I write this, a cool breeze is welcoming the change of seasons. The forest behind my yard is slowly shedding its summer garment in exchange for winter austerity. In solitude, contemplation, and reflection I strive to embrace life to its fullest. Sometimes reflection does not lead to a place of serenity or peace at all, but to a place of extreme disturbance and unrest. Such was the case on a serendipitous field trip that I happened upon in the State Capitol of Minnesota. I had been in St. Paul presenting at a conference. My topic was on the Indigenous course requirement that The University of Winnipeg implemented a year ago. A student and I had conducted research on how the first year of the requirement went, and I was presenting on our findings and on the pedagogical innovations the course requires.

After the conference, I had a few hours before my return flight to Winnipeg. Since I had not had any time to explore the neighbourhood during the packed conference, I went for a run after the conference ended. The conference hotel was just a few blocks from the State Capitol, so I wandered in to look around. I had done a little research on the Indigenous history in Minnesota, just enough to know the traditional territory on which we were located. I wish I would have gone on the field trip before my presentation. I would have invited the group to a tour of the State Capitol and specifically the Governor's Reception Room, which told the ever so tragically familiar history of most North American communities, the story of displacement and of treaties signed without proper understanding of long-term implications.

A tour was in process at the Capitol, so I tagged along behind. The last location for the tour was an Art Gallery in the Governor's Reception Room, that among other art and informational plaques, also featured the history of the signing of treaties with Indigenous peoples in the Minnesota area. Large paintings hung on the wall. One of the paintings was of The Treaty of Traverse des Sioux, c. 1905.



*Courtesy Minnesota Historical Society*

The Treaty of Traverse des Sioux, c. 1905; Francis D. Millet; Oil on canvas; 7'4" x 10'5"; Governor's Reception Room Installed 1905.

As the tour guide pointed to this large painting, she explained that although the painting depicted a peaceful negotiation between settlers and Indigenous peoples, what actually happened was far from that. According to Minnesota Treaties in 1805, the Dakota surrendered or were forced to surrender 100,000 acres of land to the United States government to build a military fort and later land was sold to settlers who moved west. Of the seven Indigenous leaders of the area, only two were present for the signing of the treaty that day. The land was valued at \$200,000, but the Indigenous leaders were only given gifts valued at \$200. Usually, the Indigenous leaders signing treaties did not speak English fluently and therefore did not know exactly what the treaties said or meant (Minnesota Treaties, 2008). The treaties that forced the Dakotas onto reservations severely restricted their subsistence traditions (Wakefield, 2002). Native American scholar and professor Treuer (2016) states: “So, with the treaty, you can look, for example at somebody like Sibley, who married a Dakota woman in order to cement trade relationships with an entire group of people, and then cast her off and had no use for her once he had ascended, financially and politically.”

Many treaties served to benefit the government and settlers such as the following 1837 treaties:

**The treaties of 1837**  
**Date: 7/29/1837**

"At Ft. Snelling In 1837, the Ojibwe ceded their land between the St. Croix and Mississippi Rivers north of the Dakota/Ojibwe "boundary" established in 1825 and south of the Crow Wing River. This cession totaled more than 12 million acres, and it included Lake Mille Lacs. In exchange, the government paid the Indians' debts to traders and gave tribal members cash and goods in annual payments called "annuities." Under the treaty, the Ojibwe retained hunting, fishing, and rice- harvesting rights on this land and its waters—rights that were upheld by the U.S. Supreme Court in March 1999.

In both 1837 treaties, Americans primarily were after the rich timber resources in the "triangle" of land between the two rivers. But the widely reported treaty signings also attracted the attention of land speculators and settlers."

**Tribes: Ojibwe (Chippewa)**

**Concluded at: Fort Snelling, St. Peter's (now the Minnesota River) (at the confluence of St Peter's and Mississippi rivers), in Wisconsin territory.**

**9/29/1837**

In 1837, the U.S. government persuaded a delegation of Mdewakanton Dakota to travel to Washington, D.C., under the pretext of settling their southern boundary. Instead, the Dakota were pressured into ceding all their lands east of the Mississippi. The land was valued at \$1,600,000, but the government agreed to pay far less.

**Tribes: Dakota (Sioux)**

**Concluded at: Washington, D. C.**

(Minnesota Treaties, 2008)

As the tour guide continued in her tour guide voice relating the horror of these events, I pushed back the tears that threatened to spill. The Governor's Reception Room was the last spot on the tour, and the tour guide left us to linger or to explore further other stops on the tour. With a few other visitors still left in the Governor's Reception Room, we went back to read the placards on the wall. An elderly gentleman beside me blurted out, "That is just horrible what we did! How could we have thought that was appropriate?"

The encounter in the Art Gallery in the Governor's Reception Hall in the Minnesota State Capitol was far from benign. The paintings and accompanying stories left an indelible mark on my soul. One of the classes I teach at the University of Winnipeg has an experiential learning opportunity (ELO) component to it, and that field trip was my ELO that I took back to my classroom. My previous classroom exercise of "That is completely and totally unfair" paled in gravity and was suddenly rendered inconsequential. What is a speeding ticket, a piece of paper, that binds me to a \$100 fine, compared to having your way of life and land taken away by words signed on a paper called a treaty?

Teaching and pedagogy are a fluid art form that have the possibility of taking on many different shapes. The gravity and long-lasting impact of words spoken or written on a page lead me to a humble recognition and a desire that my words and interactions may be gentle and kind. Words and occurrences that students remembered years later after an incident that they recalled as unfair, still lingered. Occurrences and words signed on a treaty over one hundred years ago still impact lives and livelihoods today.

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## About the Author

**Helen Lepp Friesen** teaches in the Rhetoric, Writing, and Communications department at The University of Winnipeg. Outstanding points in her career are meeting and having the privilege of working with hundreds of enthusiastic, talented students and working with colleagues that are supportive and encouraging. Her research and writing interests are multimodal writing in culturally-diverse classes. She enjoys outdoor activities such as skating, snow sculpting, biking, tennis, and running.



# Promoting Creativity: Reading and Writing Through Storyboarding

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## Abstract

The article focuses on creative uses of storyboarding in teaching and learning. The first step invites participants to individually brainstorm and identify a memorable short story which could either be real or fictional. It then provides them with a template of a six-scene project and invites them to simply sketch their short stories. The second major step involves the coloring of the story scenes by another workshop participant. Once they finish, the workshop conductor collects all projects and redistributes them so that each member has a new sketched and colored six-scene short story to write out and read. The discussion of the different perspectives brought by the three participants in the design and interpretation of each single story boosts higher thinking skills such as multiplicity of meaning and critical thinking.

**Keywords:** Creativity; sketching; writing; reading; critical thinking.

## Introduction

The storyboarding activity employs various scenes of a story or an event sketched for the sake of analysis and interpretation. It is a common practice in a number of academic and professional settings. Filmmakers, for instance, make active use of storyboarding in initial stages of film preparation. The various scenes are sketched so that most elements of each scene are visibly seen, read, and discussed (see Tumminello, 2005; Giuseppe, 2011, among others).

## Workshop Procedures

In a workshop, the following six-scene story handout is distributed to the participants:

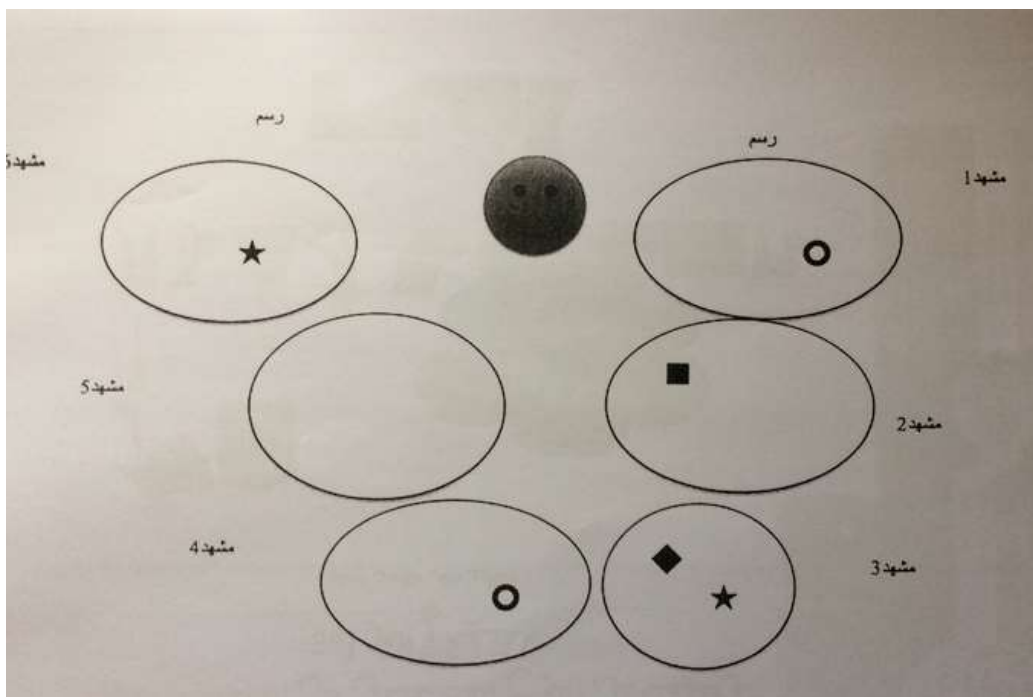



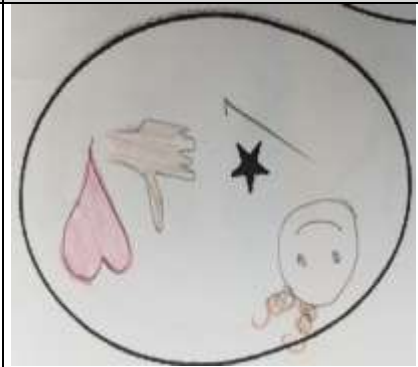
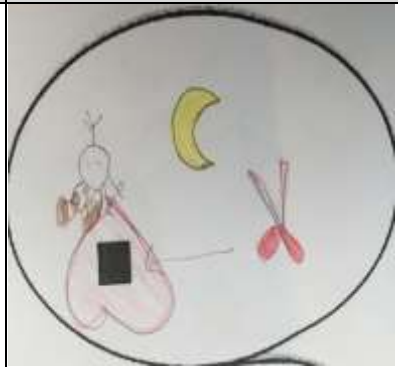
Figure 1: Storyboard Handout.

As can be seen from the handout above, the expected outcome of the activity includes the sketching of six scenes, with scene one introducing the beginning of the story and scene six signaling its end. Workshop participants are asked to brainstorm and ponder a particular memorable event which then is sketched inside the given template. They are also advised to avoid the use of verbal language; as such, the sketch will only include simple or complex drawings.

In order to make the activity visually richer and more challenging, a number of geometrical shapes such as circles, squares, diamonds, and asterisks are included inside each scene space. Such visuals assist with generating ideas on the one hand, then provide discussion opportunities related to ways each participant can make use of the visuals in their respective stories. These shapes can be seen in Figure one inside each oval. Scene One, for instance, includes a circle; this geometrical shape has various possible uses and interpretations.

Workshop participants are advised to make use of the visual shape as per their scene needs and features. The last scene of the short story appears with a star shape inside it. Workshop participants will therefore attempt to make use of this visual shape while signaling the end of their short stories. Such visual shapes are seen in Table 1 below:

**Table 1:** Visual shapes within storyboards.

Sample Circle	Sample Star	Sample Square
		

The sketching activity of the story is usually timed. While some participants finish the sketching of their stories quite early, the majority tend to take the time as set by the workshop conductor.

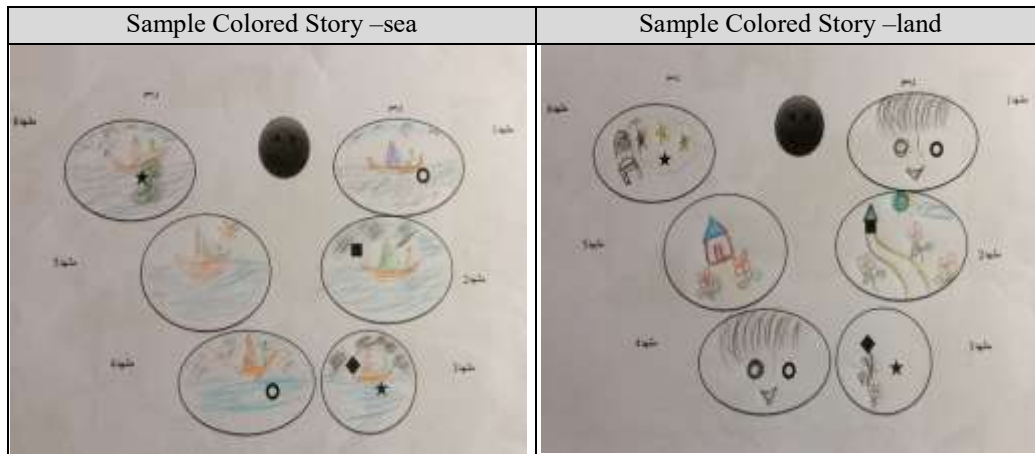
Despite its complex nature, most participants are usually done within fifteen minutes. At this stage, each participant has already visualized a series of events, connected one to another, from scene one to scene six, forming a coherent short story. However, no verbal language is being used to explicate the events, their details, and the overall intrigue of the story as can be seen in the sample sketches of Table 1 above and discussed in the rest of the paper.

The following activity involves coloring. Participants are provided with sets of color pencils and asked to carefully examine all the scenes of each story and add colors as per their own understanding. In order to make the activity more challenging, the workshop conductor collects all sheets and redistributes them so that each one gets a different short story to color.

In doing so, each sheet is assigned a different number for the sake of identification, but remains anonymous to avoid any type of personalization and the maximization of suspense and surprise. Sample colored short stories are shown in Table 2 below.



**Table 2:** Colored short stories.



The coloring activity does not take a long time. A ten-minute limit is usually enough to cover the coloring of the short story six events. However, as can be noted in the samples above, some participants may choose to limit coloring to a few scenes. The short story on the right side above, for instance, has only three scenes colored; the one on the left, however, is fully colored. Such variation should be tolerated since the objective is to get into the trainees’ interpretations of scenes using the power of colors, black and white included.

Apart from the above formal aspects of coloring, this activity not only does it add a variety of color adjectives to numerous scene’s noun phrases, it may also contribute to partial or full alteration of the short story’s original meaning. If a desert is colored blue, for instance, it turns into a sea and the entire story shifts gears. As such, the coloring activity is assessed as an interpretation of the short story which may or may not preserve the initial intended meaning.

It is worth adding that colors tend to enrich details within each scene and participate in events’ foregrounding. A closer look at the storyboards in Table 2 above shows the one to the right with selective parts coloring and a total dismissal of the background. This is what the colors did not miss in the left storyboard in Table 2. The background as well as the details within each scene have been colored.

It is probably true that the fact that the scenes of the storyboard on the left take place in the sea invites its blue coloring; however, it is also noticeable that the sky was similarly colored. This shows a clear intention to add colors to the scene’s background. A blue sky and a blue sea are features of clear skies and good weather. This type of weather is not strange to residents in the Middle East where such good weather is observed almost year around. Had it been in other places where such weather is rare, coloring the sky and the sea could have been quite different, especially during the month of March. As such, the coloring activity tells quite a lot about the context, the environment, and the culture. In her book, Tumminello (2005) states that

“color often creates a sense of time and space, establishes mood and atmosphere, and provides emotional impact” (p. 132).







The third step of a workshop involves the writing of the short story. Similar to the second step, the writing is done by a third party. Thus, the workshop conductor collects all storyboards, then redistributes them amongst the workshop participants making sure no one gets a storyboard which they have either sketched or colored. Timing wise, this step could take longer than the first two stages

combined. However, putting a time restriction does assist in encouraging participants to speed up and finish within the set timing. A fifteen-minute time limit can be set for this activity, and most participants finish writing the story within this time frame. A handout is distributed to each participant which guides them towards a smooth writing of each scene. This is shown in Table 3 below:

**Workshop outcome**

As the handout in Table 3 below shows, the six-scene story are numbered one to six and contain the visual prompts as they appear on the storyboard for ease of reference. It is divided into two columns, one for the visuals in each scene and a second space for writing.

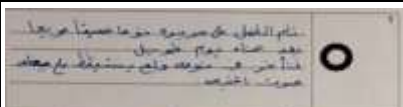
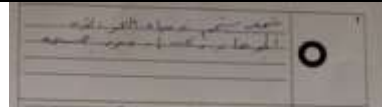
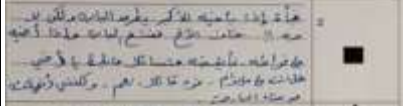
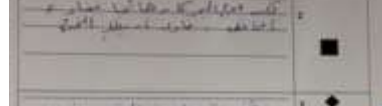
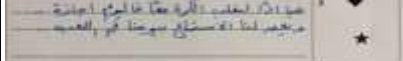
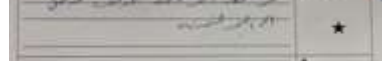
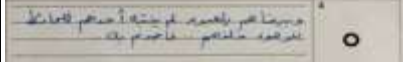
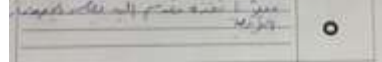
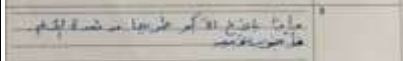
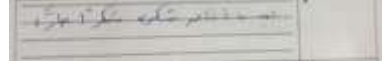
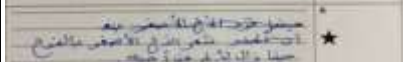
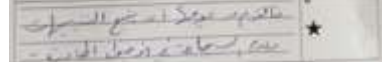
**Table 3:** Sample writing with visuals handout.

Writing Area	Visual Shapes
<hr/> <hr/> <hr/> <hr/>	<p>1</p> 
<hr/> <hr/> <hr/> <hr/>	<p>2</p> 
<hr/> <hr/> <hr/> <hr/>	<p>3</p>  
<hr/> <hr/> <hr/> <hr/>	<p>4</p> 
<hr/> <hr/> <hr/> <hr/>	<p>5</p>
<hr/> <hr/> <hr/> <hr/>	<p>6</p> 

The participants are now invited to carefully examine the entire storyboard, sketched and colored, and extract the story along with its six events. Since each participant has already gone through the initial steps, each one has an idea about this writing task. Knowing that such productive skill is usually challenging, the workshop conductor assures them that the amount of writing is minimal as it captures the development of the story and stresses that the story is now theirs since they are the ones who will narrate it. In addition, the amount of writing, as suggested by the relevant four-line spaces in the handout, is indeed reasonable. When the participants finished writing the short stories in a workshop, it was obvious that while some had written generously, others experienced limitations. This can be seen through the samples in Table 4 below:





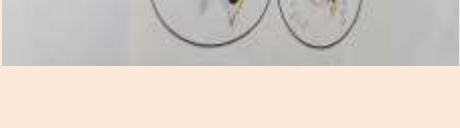



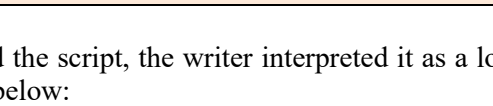


**Table 4:** Sample written short stories.

Sample of Generous Writers	Sample of Limited Writers
	
	
	
	
	
	







As Table 4 illustrates, the amount of written words in this sample workshop varied across story scenes and across participants. It is clear that the participant who wrote the story to the right produced much less words than the one to the left. In general, the amount of written words varied between 60 and 150 words. Those who wrote minimally, almost one sentence per scene, assessed the scenes as one simple event. Others tended to show some degree of involvement by providing some background information, adding names of locations, and connecting each event to the next one in ways they viewed as coherent. It is obvious after reading what participants wrote that some are much more creative than others. This is seen through the various ways simple and complex sketches have been interpreted. What seemed simple sketched scenes denoting simple events and activities became highly revealing sketches with complex intrigues. Writers made use of the power of the word combined with other rhetorical devices to provide a lively and creative interpretation of the various sketched scenes. The following example illustrates the creative aspect of the activity. Let us first take a look at the storyboard in Table 5 below:

**Table 5:** Story of a heart.

Sketched Story	Written Story
	
	
	
	
	
	

As can be seen through the storyboard and the script, the writer interpreted it as a love story. The details of the six scenes are shown in Table 6 below:

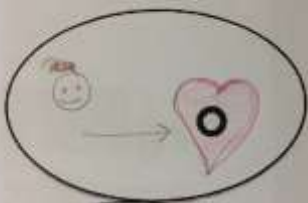



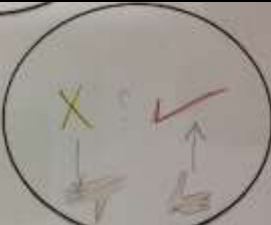

Table 6: The writing &amp; reading of the story.

Sketched Scenes	Interpretation
 <p>مشهد 1</p>	<p><b>Scene 1:</b> A young lady fell in love with a boy who then left her. وقعت بنت في حبّ شابّ فتركها.</p>
 <p>مشهد 2</p>	<p><b>Scene 2:</b> The young lady felt miserably sad and she got depressed. شعرت الفتات بالحزن والأسى وانهارت.</p>
 <p>مشهد 3</p>	<p><b>Scene 3:</b> She decided to never love again and she became lonely. وقرّرت ألاّ تحبّ أبداً وبقيت وحيدة.</p>
 <p>مشهد 4</p>	<p><b>Scene 4:</b> Her life turned into a river of tears. وتحوّلت حياتها إلى نهر من الدّموع.</p>
 <p>مشهد 5</p>	<p><b>Scene 5:</b> Suddenly, after her mother's advice, she managed to distinguish between two paths: وفجأة وبعد نصح أمّها لها، ميّزت بين طريقين.</p>
 <p>مشهد 6</p>	<p><b>Scene 6:</b> One that leads to an innocent and honest love and marriage and a second which leads to sadness and misery. She then lived happily ever after. طريق يودّي إلى الحبّ العفيف الصّادق والزّواج في النّهاية، وطريق يودّي إلى الحزن والأسى. وعاشت حياتها في سعادة وهناء.</p>

It is easy to see how the writer introduced new characters to the story, for instance. While the sketches show a single character, the story included three, namely the young lady, the boy, and the mother. While the boy was introduced as the heart breaker, the mother appeared to be the wise character who interferes to put an end to her daughter's suffering through her advice. Despite the introduction of new characters, the short story turned out to be quite coherent. The happy ending, as shown through the happy face symbol and the thumbs-up symbol could easily indicate the happy ending of a story which began with a broken heart. The hole inside the heart in Scene 1 and its absence in Scene 6 also strengthens the writer's interpretation. Accommodating the sketches to the overall interpretation of the story scenes is a creative process which tends to oscillate between simple reading of scenes' symbols and overloading others to get the desired meaning. Such overloading is obvious in Scene 5 above, for instance, where there is no indication of a mother character. It could therefore be argued that the writer resorted to introducing new characters to increase the story's coherence and maximize its dramatic effect.

However, despite its coherent structure and fair interpretation, the short story sketcher was very amazed and eager to comment on this reading. When her turn came and she started commenting on the way her short sketched story was read, she stated that the interpretation had absolutely no connection whatsoever with her sketched story. She then explained that the story is about some child born with a hole in his heart and had to go through hospitalization and surgery followed by some critical phases, but ended successfully. The details of the scenes as per the initial sketcher are explained in Table 7 below:



**Table 7:** Sketching & reading the story.

Sketched Scenes	Interpretation
<p>رسم</p> <p>مشهد 1</p> 	<p><b>Scene 1:</b> All the sudden, a hole inside the heart of this child was discovered!</p> <p>تم اكتشاف ثقب مفاجئ في قلب هذا الفتى.</p>
<p>مشهد 2</p> 	<p><b>Scene 2:</b> The boy had to go through a czarina process to close the hole.</p> <p>فوقع تحديد أنّ هذا الثقب لا بدّ أن يُسدّ عن طريق عمليّة قيصره.</p>
<p>مشهد 3</p> 	<p><b>Scene 3:</b> Unfortunately, the czarina intervention failed and turned into an open-heart surgery.</p> <p>فشلت للأسف عمليّة القيصرة وتحوّلت إلى عمليّة قلب مفتوح.</p>
<p>مشهد 4</p> 	<p><b>Scene 4:</b> The child was shedding tears when heard about the bad news.</p> <p>انهارت الدّموع من وقع هذا الخبر.</p>
<p>مشهد 5</p> 	<p><b>Scene 5:</b> In fact, it was a life-threatening situation with the possibility of success or failure.</p> <p>وكانت عمليّة القلب المفتوح تتأرجح بين النّجاح والفشل.</p>
<p>مشهد 6</p> 	<p><b>Scene 6:</b> Thank God, the open-heart surgery was successful; everyone was happy and the child went back to his life as happy as ever.</p> <p>عمليّة القلب المفتوح نجحت والحمد لله، فرح الجميع وعاد الطّفل إلى حياته سليماً مرّة أخرى.</p>

After hearing the story from the original sketcher, all participants including the final interpreter were startled. The amazing love story was indeed a life-threatening medical condition. The contrast shows the extent to which working with storyboards in this way leads to suspense and deep thinking. Apart from the laughter that filled the room, everyone was nodding in clear surprise and appreciation. The story was read twice: one reading by the one who wrote the script, and a second reading by the original short story sketcher. It was now time to hear from the participant who colored the short story.

As for the second task, namely the coloring of the sketches, the participant chose a number of colors which affected its interpretation. She, for instance, colored what looks like scissors 'pink' so that it resembled the cancer ribbon logo. The similarities are shown in Table 8 below:

**Table 8:** Coloring and interpretation.

Cancer Logo	Scissors Sketch
	

The pink coloring led her to interpret the short story based on a cancer case. Thus, the hole inside the heart is read as a cancer case after which the young girl underwent a surgery, went through a difficult and life-threatening period, and was finally saved. Even though her overall interpretation resembled the one who sketched the story, it includes a number of distinct elements, and the fact that she had a powerful tool, that is coloring every single item within each scene, she managed to advance a different and coherent version of the sketch.

## Conclusion

It is quite clear that a storyboarding activity involves most of our senses as every participant gets hold of the paper, visualizes, imagines, sketches, colors, then writes, reads, and listens. It involves the activation of two distinct but interrelated intelligences: the verbal-linguistic intelligence and the visual-spatial intelligence. While the former involves the skills of writing, reading, and speaking, the latter includes visualization, pictorial representation, and the visual arts where language and visuals are blended (see Campbell, Campbell & Dickinson, 2004 for more details). In addition to the above features of a storyboard activity, originality or novelty "...the skill of fashioning an unfamiliar and yet worthy product within a particular realm, be it an innovative story or dance..." (Gardner, 1993: 288) should be stressed. Each participant ends up creating their own short story, a creative event which may be viewed, used, and reused in other educational settings.

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## About the Author

**Dr. Maher Bahloul** holds a Ph.D. in Linguistics from Cornell University, New York, and an MA from the Sorbonne University, Paris. He taught courses in language, linguistics, translation, and TESOL in the United States and the Middle East. He participated in more than 60 international conferences and conducted workshops in various applied linguistics fields. His latest book with Carolyn Graham deals with the growing field of Learning through The Arts (LTTA), and focuses specifically on the use of film in education. Dr. Bahloul is Associate Professor at the American University of Sharjah.

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# The Moccasin Project

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## Introduction

In Winnipeg, several school divisions (Winnipeg, River East Transcona, St James-Assiniboia, and Louis Riel School Division, to name a few) have opened alternative site “Off-Campus” programs and opportunities in an effort to better engage reluctant school attendees. Approximately 20 students, aged 12 to 15 years old, attended the “Off-Campus Program” showcased in this case study. Many of these students were Indigenous, often from remote communities in northern Manitoba such as Moose Lake, St. Theresa Point, Bloodvein, and Cross Lake. This case study explores the cultural, social and economic benefits for these students, of what has come to be called “The Moccasin Project”.

## Overview and analysis

Jaymi Witzke is a teacher in one of the “Off-Campus Programs”. Like others, Jaymi’s program is located away from the larger high school campus in a more accessible and less intimidating community space. Many students who attend her program come from Indigenous backgrounds. As stated earlier, many have moved to Winnipeg from First Nations communities in Northern Manitoba, and are no longer living near close family members.

Although she is not an Indigenous Canadian, Jaymi grew up attending a school outside of Winnipeg with primarily Indigenous students. As a result, she was exposed to Ojibwa culture very early on. Jaymi recalled, “We had sharing circles, and we had elders come in... and I have always been tied to the outdoors.” Jaymi is grateful for those experiences.

Curtis Howson is an Educational Assistant working with Jaymi. Curtis is an Aboriginal male who grew up in a single parent home. After high school graduation, Curtis worked in several agencies, such as Winnipeg Native Alliance, Ma Mawi, Ndinawe, Anishinaabe Child & Family Services, and most recently the Winnipeg School Division. He has devoted his time helping Aboriginal youth find jobs, return to school and become involved in organized sports. One of his biggest accomplishments was helping create the Ndinawe Hockey League. The program assisted children and families with hockey equipment, registration fees, transportation to and from games and practices. In 2010, Curtis was selected to represent the Metis Nation at the 2010 Winter Olympics, where he performed in the Opening Ceremonies alongside 150 youth leaders across Canada.

For Jaymi and Curtis, making deep personal connections with and between the students in their program is tremendously important. They both believe that culture, heritage and family are key connecting points for many young Aboriginal students. They had noticed that their students came alive when they were engaged in culturally-relevant handiworks such as making dream catchers and medicine bags. In 2015, Jaymi invited an “Off-Campus” support teacher to conduct workshops on moccasin making with the students. Most of the students were very interested in the workshop, especially with the beading component. The students began to share the unique beading patterns of each of their home communities. Through the beading patterns, the students were able to express who they were, where they were from, and how the larger patterns of their lives were related.

A few students, who initially had not become engaged in the project, became interested in the idea of selling the moccasins. Jaymi noted, “I had one kid in particular who perked up and said, ‘We can sell these?’ And that was his motivation.” The business component was very attractive to him. Soon he had created his first pair of moccasins. For the purposes of this article, the student’s name has been withheld.



Jaymi and the student discussed the marketing and selling of moccasins. Although his sewing skills were basic, Jaymi discussed the aspect of marketing “The Story of the Moccasins” as well as the moccasins themselves. As Jaymi explained, “We encouraged him to share that little piece of himself, so that people weren’t necessarily getting just moccasins, but were getting something from a student who had really put his heart and soul into it. He set a very high price, and shared his story.” (Is it possible to relate it here?)

Jaymi relied on Curtis to inspire the student to share his story. From Jaymi’s perspective, the story was more valuable than the moccasins themselves, noting, “The value was really in who (the student) was, and not the moccasins.” Curtis explained, “When meeting new people, I immediately try to establish a personal connection. In my culture, one way we generally do this is by asking this question ‘Where are you from?’ Jaymi noted that Curtis, “knew that [the student] had a really good story, and that needed to be celebrated.” Over time, and with trust and creativity, Curtis found ways for the student to share his story, and wrote down what the student had told him. The story later became part of an assignment for the student’s English Language Arts course. Within one day of posting a photograph of his moccasins and his personal story on social media, the student received \$100.00 for his moccasins.

For Jaymi, The Moccasin Project had two distinct benefits for the students who participated. First, it was the opportunity for them to share their personal stories and culture. Second, the project gave them opportunities to earn “legit” money.” Jaymi noted that poverty had driven some of her students to sell cigarettes and drugs, and to steal cell phones. Her students were very excited to earn money that, as Jaymi explained, “They can be proud of.”



Bourdieu (1986) examined “capital” and its ability to be converted into various forms. While the majority of students in the program seemed to lack socio-economic capital, they were rich in cultural capital. More importantly, their teacher and her educational assistant held their cultural capital in high personal and academic regard. Through The Moccasin Project, the students were able to take pride in and share the highly valued cultural capital they possessed, and to transform it into the socio-economic capital they needed.

## **Status report**

During the 2015-2016 school year, Jaymi and Curtis found The Moccasin Project to be very effective, and used this model with other students. For example, two students were having difficulties finding funds for a camping opportunity. The students made three pairs of moccasins over the course of three days and they were able to attend camp.

In September 2016, Jaymi began teaching in a different “Off-Campus Program”. She continues to teach children how to make moccasins, to share their stories, and to market their products. At times, students give their creations away. On other occasions, students sell their moccasins. Jaymi has indicated that there is no shortage of demand for the moccasins.

Last year, due to his age, the student at the centre of this case study left the “Off-Campus Program” and transferred to one of the largest high schools in Winnipeg to continue his secondary education.

Curtis continues to work as an educational assistant in the same “Off-Campus Program”. He is studying to become a teacher. His long-term career goal is to become a full-time teacher within the inner city of Winnipeg, the community he grew up in. He hopes to inspire others who have come from similar social backgrounds. He continues to make connections with every student he encounters by first asking students to share their stories.

## **Recommendations for future research**

The Moccasin Project raises interesting issues about the education of Indigenous youth from remote First Nations who struggle to engage with school in the city. The following four questions should be considered with regards to future research.

First, it is clear that the variables of personal identity, cultural traditions and escape from poverty made The Moccasin Project relevant to the students. How can these variables be more successfully integrated into curricula in schools with Indigenous and other marginalized minority populations?

Second, Jaymi’s role as a teacher with a deep respect for Aboriginal culture and Curtis’s role as a cultural mentor were essential to the success of the project. How do we develop deep, as opposed to superficial, respect for and engagement with Aboriginal cultures and traditions in Canadian schools and their teachers?

Third, for some of Jaymi’s and Curtis’s students, the entrepreneurial aspect of The Moccasin Project was paramount. How far should schools go in encouraging entrepreneurship and in promoting anti-poverty projects on behalf of their students?

In addition, Curtis noted that sharing stories from The Moccasin Project with friends and family often led to the question, "That is great, but did you ever consider that you're exploiting your culture by selling a form of traditional art?" He felt this question was usually asked by those who believed that Aboriginal peoples traditionally led a communal lifestyle, divorced from entrepreneurial pursuits. Curtis’s response was to remind them of the fur trade in the past, and the need for sustainable businesses in Aboriginal communities in the present. Is entrepreneurship consistent with Aboriginal values?

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Fourth, The Moccasin Project is a good example of project-based learning. It combined elements of English Language Arts (e.g., oral storytelling, autobiography and writing), Social Studies (e.g., northern First Nations, beading traditions and moccasin making), Mathematics (e.g., budgeting, marketing strategy, pricing and sales), as well as addressing other important areas such group cohesion and personal identity development. However, curricula are often separated into disciplinary silos in terms of the outcomes to be achieved and to be assessed at school. What supports and tools do teachers need to plan, to implement and to assess projects that integrate curricula and lead to practical outcomes in the real world?

Finally, The Moccasin Project took place in a small, Off-Campus community program. At best, such programs represent welcoming, right sized and culturally- respectful educational spaces for First Nation's youth seeking secondary education in the south, but lacking roots and family supports in the city. At worst, they may become places in which marginalized youth are further devalued and segregated from their roots, dreams and opportunities. How do educators ensure it is the former, rather than the latter, description that is accomplished.

## Conclusion

Persistent low graduation rates for Indigenous Canadians (Auditor General of Canada, 2004; Paquette & Fallon, 2010) indicate that new and innovative approaches need to be adopted. The Moccasin Project suggests some of the directions innovative educators might consider and some of the challenges reform efforts might face.

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## One word of caution

While we highlight an example of some students being motivated by this approach, others may not be. Although this paper illustrates an example of one way to engage students in one particular dimension of human endeavour, it is essential that schools find ways to provide opportunities for all of our students in all areas and disciplines, including the identification and development of talents of Indigenous young people in the STEM (science, technology, engineering, and math) domain.

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# Services Available from American Mensa for Students Who are Gifted and Talented: An Overview for Teachers and Administrators

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## Abstract

Mensa is an organization of people scoring in the upper two percent on an approved intelligence test. Once considered a group for “geeks”, it has expanded its role to offer considerable resources to parents and teachers of the gifted. However, a review of the literature indicated that this information is not routinely available to non-members. Through an extensive review of the Mensa website, this article provided information on the organization, as well as its educational resources that are available to teachers who enhance the education of gifted students. Additionally, suggestions for their use in acceleration, enrichment, diversifying instruction, curriculum and planning and preparation were included.

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## Introduction

Mensa was founded in England in 1946 as a society for “bright people”. Designed to be free of political, racial or religious distinctions, the organization’s initial purposes were for fellowship and participation in social/cultural activities. Perhaps because of this, the general public has developed somewhat of a distorted understanding of Mensa, often viewing it as a club for “geeks” or “nerds” (Whitby, 1999; Lyall, 1996).

Since its inception, however, Mensa has changed its purpose and expanded its services. In the United States, for example, it has become a provider of considerable resources to parents and teachers of the gifted and talented (MGT). Regrettably, there is limited information published in professional journals to inform American educators of these resources. To illustrate this point, an ERIC search was conducted in the fall of 2014 using the descriptors “Mensa”, “Mensa Services”, “Mensa Resources”, and “Mensa and Teachers of the Gifted”, and located a total of 27 articles published between 1971 through 2014. The majority of these articles were published in the *MENSA Research Journal*, a magazine available to Mensa members, about topics such as Intelligence Quotient (IQ), measuring creativity, cultural diversity, gifted teens and talent development. Only one article, “What On Earth is Mensa?”, (1971), outlined specifics about Mensa itself. In a “Q & A” format, officers answered questions about issues such as the number of members, IQ scores required for admission, and the idea that Mensa portrays an “artificial elitist quality” (p. 481).

A second search conducted in public media websites during the same time frame, determined that much of the information consisted of announcements of local Mensa events. Seemingly, then, there is little information about the resources provided by an organization with an avowed interest in giftedness available to anyone other than its own members.

## Purpose

This article was written to inform teachers and administrators, who may not be members of the organization, about American Mensa, the resources it provides, and how they may be used by teachers in the public schools to benefit gifted students. In addition, it is hoped that any teacher who is interested in expanding the content of their lessons, and/or diversifying the manner of their instruction, might find the article to be beneficial.

## Mensa: The Organization

According to the Mensa International website ([www.mensa.org](http://www.mensa.org)), 2013, the organization has three goals: 1) to identify and foster human intelligence for the benefit of humanity; 2) to encourage research in the nature, characteristics and uses of intelligence; and 3) to promote stimulating intellectual and social opportunities for its members. There are approximately 100,000 Mensans in 100 countries, with "...active Mensa organizations in over 40 countries on every continent except Antarctica" (About Mensa International, 2013, [www.mensa.org](http://www.mensa.org)).

American Mensa Ltd. is the name for the Mensa branch in the United States ([www.us.mensa.org](http://www.us.mensa.org)). Headquartered in Arlington, Texas, it claims to have more than 57,000 members nationwide. Though the organization is adamant that it takes no stand on politics, religion or social issues, American Mensa has an interest in gifted students that goes back many years.

Membership in the organization is open to persons who have scored within the upper two percent on an approved intelligence test that has been properly administered and supervised. American Mensa accepts the results of approximately 200 standardized intelligence tests that include the Stanford-Binet, Wechsler Adult Intelligence Scale (WAIS), Wechsler Intelligence Scale for Children (WISC), Wechsler Preschool and Primary Scale of Intelligence (WPPSI), GRE General Test (GRE), Miller Analogies Test (MAT), Armed Forces Qualification Test (AFQT), and Army or Navy General Competency Test (GCT). A partial list of commonly administered and acceptable tests can be found at ([www.us.mensa.org/join/testscores/qualifying](http://www.us.mensa.org/join/testscores/qualifying)). Previous test scores are evaluated individually at a one-time cost of \$40.

In lieu of submitting previous test scores (and also for \$40), individuals can take the Mensa Admission Test. Once accepted for membership, dues for American Mensa are \$70 per year.

## American Mensa Resources for Teachers of the Gifted

Mensa has been described as a society primarily for adults. However, there are a number of resources that are specifically designed for gifted students, or teachers of these students. It should be emphasized that all are funded by the American Mensa Education and Research Foundation and are available "...as a complimentary service to the public" ([www.mensafoundation.org](http://www.mensafoundation.org)). In other words, one does not have to be a Mensa member to use them. Moreover, the Foundation indicated that reproduction and distribution of these materials without modification is allowed. These resources include *Excellence in Reading*, *Pinterest Boards*, the *Year of Living Poetically Program*, *TED Connections*, and *Lesson Plans*. All can be accessed in the Teacher/Parents Resources section on the Mensa For Kids website ([www.mensaforkids.com](http://www.mensaforkids.com)), and are discussed in greater detail in the following paragraphs.

### *Excellence in Reading Program*

Viewed by Mensa as its flagship resource for teachers, the *Excellence in Reading Program* was designed to instill an appreciation of classic literature and is based on the National Endowment for the Humanities (NEH) Summertime Reading list. The books that are included are "segmented" according to grade levels (K-12). Students who complete a segment are eligible to receive a certificate and a Mensa for Kids T-shirt. Involving fiction, drama, poetry, non-fiction, autobiography, government, mythology, religion, and philosophy, a list of NEH books is also available at: ([www.slideshare.net/MensaFoundation/excellence-in-reading](http://www.slideshare.net/MensaFoundation/excellence-in-reading)).

### *Pinterest Boards*

*Pinterest* is a social media site and an on-line tool for collecting items of interest and sharing them with others ([www.pinterest.com](http://www.pinterest.com)). *Pinterest* is comprised of boards that are organized by topic and supplemented with materials and references. On its Mensa for Kids website, Mensa has collected

and made available 31 different pin boards that address educationally-relevant topics such as Shakespeare for Kids and Music Class Magic.

### ***The Year of Living Poetically Program***

The *Year of Living Poetically Program* presents the world's greatest poems to students, as well as techniques to help students memorize many of these immortal lines.

### ***TED Connections***

*TED Connections* are short, easy-to-use guides for teachers, parents and students and are extensions of the basic TED Talks. For those who may be unfamiliar, TED is a non-profit organization unaffiliated with Mensa that stands for ***Technology, Entertainment, Design***. TED offers “free knowledge and inspiration from the world's most inspired thinkers” ([www.TED.org](http://www.TED.org)). Its major events include two annual summer conferences, the award-winning TED Talks video site, the Open Translation Project, and TED Conversations.

### ***Lesson Plans***

Finally, *Lesson Plans* for gifted children are available from American Mensa for use in a traditional classroom or homeschool environment. According to Mensa, the lessons are correlated with the common curriculum at each grade level, can be used with very few supplies and can be implemented without prior knowledge or training. Routinely, new *Lesson Plans* are added each month, and teachers can write in and request that Mensa develop a Lesson Plan based on a given idea or topic. A complete listing of these *Lesson Plans*, as well as examples of their content, can be found on the Web, ([www.mensafoundation.org](http://www.mensafoundation.org)).

## **Suggestions for the Use of Mensa Resources in the Classroom**

Acceleration and enrichment are the program options for gifted instruction that are most frequently mentioned in the literature. Additionally, there are other components or considerations necessary for the effective education of gifted students, such as differentiation of instruction, curriculum development, teacher planning, and preparation. Suggestions for using Mensa resources in these areas are listed in the following paragraphs. Two advisory notes are in order, however. First, these suggestions are neither all-inclusive nor exclusive. In other words, the multiple ways in which they can be used are limited solely by the creativity of the teacher. Secondly, teachers should check with their Principal before implementing any of them to ensure that there is no conflict with school district policies.

### ***Acceleration***

Generally speaking, acceleration involves moving a student through a school district's curriculum at a more rapid pace. Though up to 18 different types of acceleration have been identified (Southern and Jones, 2004, pp. 5-6), those that seem to be the most enhanced through the use of Mensa's resources for grades K-12 are Curriculum Compacting, Independent Study, Self-Paced Instruction, Credit by Examination, and On-Line / Correspondence Courses.

### ***Curriculum Compacting***

For openers, teachers can use Mensa's *Lesson Plans* to reduce the amount of non-essential instruction and repetitive drill in their classes and open up other possibilities for their students. For example, some students might attend a specific class only for new material or for concepts that have not yet been mastered. The rest of the time could be used to acquire more in-depth instruction in the respective subject from TED Talks, Pinterest Boards, or other supplemental materials.

### ***Independent Study***

Mensa's *Pinterest Boards* offer excellent opportunities for independent study. The 679 “pins” available through this resource can assist students in identifying a topic for, or completing, such a project.

### ***Self-Paced Instruction***

As Mensa's *Lesson Plans* have been designed so that anyone can implement the instruction, students can use them to complete individual self-guided work at their own speed. This may be of particular benefit for students who are twice-exceptional (learning disabled and gifted).

### ***Credit by Examination***

The many resources available through Mensa can provide students with an advanced understanding of content in a variety of academic subjects. At the high school level, a district might allow a student to receive equivalent credit through successfully passing a comprehensive examination without being required to take the actual course.

### ***On-Line / Correspondence Courses***

This program is really more of an option for student members of Mensa rather than for teachers of the gifted. Based on proof of membership, the Johns Hopkins University Center for Talented Youth offers Young Mensans a 10 percent discount on their online courses. Similarly, (GiftedandTalented.com) offers innovative computer-based, multimedia courses in Mathematics, English Language Arts, Science, and Computer Programming. Should school policies allow for this option, gifted students who are Mensa members, might be allowed to complete an on-line course during school hours under teacher supervision. Or, the District might view this opportunity as an extension of its *Dual Enrolment* program should it have one.

### ***Enrichment***

*Enrichment* involves providing programs, activities, and/or experiences that are outside the regular, traditional school curriculum. Renzulli and Reis (1997, p.15) outlined three different types of enrichment activities: Type I – the use of a wide variety of disciplines, topics, occupations, and hobbies, not ordinarily covered in regular education; Type II – the development of higher-level thinking skills to include creativity, problem solving, as well as the use of advanced level reference materials; and Type III - the pursuit of a self-selected area for advanced content acquisition, such as the application of interests and / or the development of authentic products.

#### ***Type I Enrichment***

The sheer multitude on Mensa resources for teachers that have been described previously should make it obvious that Mensa is a treasure-trove for *Type I enrichment*. Simply put, there are activities to interest every student.

#### ***Type II Enrichment***

Regarding *Type II Enrichment*, teachers have used great works in literature to supplement readings in basal texts, as well as to form discussion groups to address higher levels of thinking (Halstead, 1990). *Excellence in Reading* as well as the *Year of Living Poetically Program* are two of Mensa's resources that could accomplish both of these tasks. Moreover, TED Talks are also excellent sources for *Type II Enrichment*. As an illustration, a session entitled *Shape Shifting Dinosaurs* provides students with the opportunity to: 1) view a discussion with a paleontologist (“*watch it*”); 2) read a book on dinosaurs (“*read about it*”); 3) visit a virtual museum on-line (“*surf it*”) and; 4) answer higher-level questions (“*think about it*”) all based on their level of understanding.

#### ***Type III Enrichment***

With their utility for independent study, *Pinterest Boards* are excellent resources for *Type III Enrichment*. For example, the *Pin Board “Mad Scientists”* includes a high-interest, hands-on classroom activity involving Styrofoam and its impact on the environment. Such an activity can be a great way to introduce students to scientific field work, have them assume the role of an independent researcher, and complete a project designed to address a real-world problem.

### ***Diversifying Instruction***

*Diversifying Instruction* adjusts both teacher presentation and curriculum content to allow for maximum benefit for all students. Mensa's many resources offer numerous alternatives and choices for teachers. Additionally, these resources have been designed to allow teachers to vary the complexity, depth, and presentation of activities and assignments, and to address higher levels of thinking.

### **Curriculum**

Mensa resources can enhance *Curriculum* in a number of different ways. Several of them are a "curriculum" in and of themselves, such as *Excellence in Reading* and the *Year of Living Poetically Program*. So are a number of *Pinterest Boards*. For example, complete courses in a number of Foreign Languages (Chinese, French, German, Spanish), as well as World Literature (South American Literature and Culture), are available through the Massachusetts Institute of Technology (MIT) Pin. *Pinterest Boards* can also supplement and add breadth to curriculum, and/or provide a means to integrate curriculum across a number of different subjects. Using the pin entitled "Science and Verse" as an illustration, teachers are shown how to combine science with English, the Arts, and physical education.

### **Preparation and Planning**

Finally, teachers have access to a number of pre-prepared lesson plans through Mensa. This can be a big boon to teachers from both a time-saving standpoint and content standpoint. A comment from a teacher who has used them in the past may serve as the best indicator of their utility (<http://www.mensafoundation.org/who-we-impact>):

"...Each lesson is carefully crafted, putting into account the needs of a gifted learner, involving all the senses (visual links, hands-on activities and higher-level thinking for the curious and engaged mind)... The assessment at the end of each lesson helps clarify learning accomplished as well as provide documentation"...

### **Summary**

Mensa is an organization of people scoring in the upper two percent on an approved intelligence test. Since 1946, it has expanded its goals to include: 1) identifying and fostering human intelligence for the benefit of humanity; 2) encouraging research in the nature, characteristics, and uses of intelligence; and 3) promoting stimulating intellectual and social opportunities for its members. Its U.S.A. Chapter, American Mensa, offers considerable resources to parents and teachers of the gifted and talented. This article provided information on resources that are available to teachers who enhance the education of gifted students, such as *Excellence in Reading*, the *Year of Living Poetically* and *Lesson Plans*. Additionally, suggestions for their use in *Acceleration*, *Enrichment*, *Diversifying Instruction*, *Curriculum*, *Preparation and Planning* were included.

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# Tracing the Roots of a Career in Creativity

James C. Kaufman

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For as long as I can remember, I have had two passions: creativity and writing. At first, my dream was to be a creative writer. Although the idea of studying creativity as a topic by itself may have been the farthest thing from my mind, I, nonetheless, learned the importance and vale of creativity even as a young child from family, teachers, friends, and mentors.

My mother, Nadeen, read all of my stories; she made detailed comments and suggestions in red ink. My father, Alan, taught me about statistical analysis through baseball. Factor analysis and multiple regression made a lot more sense when the numbers stood for home runs and RBIs (Runs batted in). Both my parents believed in honest feedback. They were never unnecessarily harsh, but it wasn't their nature to nod, smile, and tell me how wonderful I was. If at the time I sometimes yearned for the bland platitudes given by most people, I was able to recognize their critiques helped me improve.

As a child, however, statistics were the last thing on my mind; creative writing was my life. When I was seven years old, I wrote a rambling play over 100 pages long called *San Delanos*; I moved to short stories and abandoned novels by nine. By twelve, I was able to finish short stories. I would also soon understand the potential danger of being too autobiographical with creative work. When my late eighth grade teacher, Glen Pritzker, read one of my stories out loud to the class (with my enthusiastic and oblivious permission), I only belatedly realized that my first-person story of

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generic unrequited love would make every girl think I had a crush on them and every boy think I had inside knowledge of his personal love life.

Given I often study creativity in the classroom, I hear many horror stories of teachers who stifled or crushed their students' creativity. I was lucky. I never had a terrible teacher and I had many wonderful ones who encouraged me. I also fell in love with journalism, starting the *Middle School Times* at one of my schools and working on my high school paper. I became a stringer sportswriter (comparable to an adjunct instructor in academia, but with less pay) at the *La Jolla Light* and *Escondido Times-Advocate*. I again saw the power of words. Top local football players were suddenly eager to talk to me. On the other hand, a story on a local high school water polo coach, in which I let him vent a little too much, ended up accidentally making his wife cry.

During this time, I got to know many journalists, poets, and fiction writers. I worked side by side with professional sports writers. I began writing to my favourite creators, from David Mamet to Matt Groening to Joyce Carol Oates (and, pre-eBay, most wrote back). In addition to the newspaper, I also got involved in the high school's literary magazine. I began to submit my work for publication. I got many rejections (an astounding number, really), but the occasional poem, horror story, parody, or non-fiction piece would find its way to print. I collaborated with my father on many baseball research articles, including a book on *The Worst Baseball Pitchers of All Time* (Kaufman & Kaufman, 1993). As I went off to college at the University of Southern California, I continued to stay active in my college newspaper and literary magazine. I noticed just how different the journalists, poets, and fiction writers were, despite having so much in common.

If I think about the different directions that my career has taken, I can see the roots of my interest in creativity across domains developing with these experiences. My dissertation (Narrative and Paradigmatic thinking styles in creative writing and journalism students) would explore differences in thinking styles, personality, and motivation in journalists and creative writers, such as the creative writers being more open to experience and intrinsically motivated but less emotionally stable and conscientious (Kaufman, 2002). It helped me confirm my intuitive hunch that despite superficial similarities, the groups were quite different.

I would delve further into how creativity varied across domains. With John Baer, I developed the Amusement Park Theory (APT) that provided a hierarchical model of domain-generality and domain-specificity, moving from general requirements to general thematic areas to domains to micro-domains (Baer & Kaufman, 2005, 2017; Kaufman & Baer, 2004b, 2005, 2006). My belief that comparing micro-domains (such as novelists and journalists or clinical and social psychologists) particularly stems from this time. In college, as I pursued a double major in creative writing and psychology, my experiences with these two quite different fields gave me further fodder for more eventual work exploring creativity across domains from visual art to science to writing (e. g., Kaufman, 2012; Kaufman & Baer, 2002; Kaufman, Beghetto, Baer, & Ivcevic, 2010; Kaufman, Cole, & Baer, 2009).

In college, I experienced an insight due to my creative writing major that years later would surface in much of my research. During a one particular course, the class was unimpressed with one of my short stories and praised another student's story. What is interesting as I reflect back is that I don't remember which story was being critiqued (it wasn't one of my favourites) and I don't remember the feedback being particularly cruel. Rather, what struck me was that I began to doubt my own ability to judge the quality of my own writing as it was compared to my peers. It was not only that I liked the story I submitted whereas the class did not; it was that I thought my story was infinitely better than my classmate's. Years later, I would ponder the idea of creative metacognition and its importance for creativity (Kaufman & Beghetto, 2013b; Kaufman, Beghetto, & Watson, 2016). Recognizing your own creative strengths and weaknesses are essential but are an undervalued component; without it, revising and incorporating feedback into your work is much harder. I had been used to understanding the feedback to my writing, from my mother's early comments to the overpraise of my K-12 teachers. This sensation was different. It was a feeling of disconnection with a field and made me wonder both about my own abilities and my accuracy in my judgment.

As I thought about this question, I realized that there were two possible scenarios. In the first one, I was a terrific creative writer and my classmates and professor were clueless. In the second one, I was competent but mediocre, and the feedback was reasonable. Clearly, the answer was the first one. This moment had a large impact on me because without realizing it, I had internalized the Big-C/little-c split of creativity. In other words, I thought that being creative either meant being a genius or being an everyday contributor. Left unsaid was that if I was going to pursue something with all of my heart, I wanted to be Big-C. Such a motivation is more extrinsic than intrinsic, not the recommended approach (Amabile, 1996). I have in recent years, incidentally, begun playing with ideas about what needs underlie intrinsic creative motivation (e.g., Luria & Kaufman, 2017), although it is still percolating. My own intrinsic motivation for creative writing at that time was not enough to sustain me if I thought I would only be little-c and writing for my own enjoyment.



People with high-creative aspirations face a lot of hurdles as they develop. Some setbacks come from outside. For example, Beghetto (2014) discusses creative mortification as when your creativity is dismissed and you lose your desire to create. I can certainly imagine that this situation would be painful. Yet consider when the stumbling blocks come from within. Sometimes it is not a teacher who ignores, misunderstands, or over-enthusiastically criticizes your work. Instead, it may be *you* who fully recognizes the value of your ideas and finds them to be not good enough. What happens when *you* are the one to dismiss your creativity?

When I think back to that moment, I think one reason for my dismissal of my creative writing abilities is that I truly saw a pure dichotomy between “making it” and “not making it.” There was no in between. This conception of creativity, as the basic little-c/Big-C split, limited me. If you know you want a creative pursuit to become a lifelong passion, then you likely want more than little-c. But “Big-C or bust!” is akin to wanting to be an astronaut and fly to the moon. It’s possible, but the odds are better for winning the lottery.

Up until that writing class, I wanted to fly to the moon and was convinced I would be able to do so. At my moment of doubt, I had no other conception of what creative success might look like. Likely my best-known creativity work is my Four C Model (mini-c, little-c, Big-C, and Pro-c) that I developed with my dear friend and frequent collaborator Ron Beghetto (2006). He was the driving force behind mini-c, those moments of creativity that are small insights which hold personal meaning (Beghetto & Kaufman, 2007, 2009, 2013, 2014). It was the first step of breaking down the dichotomy of little-c/Big-C to see what gets left behind. I adore the concept and love how it has meant so much to so many people. It was when we took mini-c, little-c, and Big-C and continued to expand that we proposed a fourth C. It is this addition, Pro-c, that is the centre of much of my passion.

In between little-c and Big-C, between the person who reads poetry at a coffee shop and Robert Frost, is Pro-c. This level represents professional or expert creativity. It is the poet who has published in several literary magazines, has written a chapter book or two, and teaches classes or runs writing workshops (Kaufman & Beghetto, 2009, 2013a).

Pro-c recognizes that true Big-C, the creative genius that Dean Keith Simonton (2009) emphasizes, is rare and hard and dependent on variables that are out of our control. The novel, song, scientific theory, or product that lasts generations does not need only to be a brilliant creation; other factors are needed, such as luck, timing, supporters, staying relevant, and the current status and values of the field. The child who grows up wanting only to be Big-C is being primed for disappointment. There is that moment when you realize that you will never paint your masterpiece, never invent the greatest thing since sliced bread, never play a number one hit song to adoring fans in a sold-out stadium, never have the “aha” moment that cures cancer, or never see your name up in lights, let alone have your descendants read about you in history books. If your beliefs about creativity are limited solely to little-c/Big-C, then this moment of insight is akin to having the rug pulled out from under you; mine certainly was. Yet, if you can appreciate the nuances of creative accomplishment and recognize that you may not be *great* but you can still be *good enough*, then you can still pursue a modified dream instead of abandoning ship.

The happy ending to this story is the idea of Pro-c is not only a concept I have helped develop but one that has helped me write again. After years of not writing creatively, I revisited a musical I’d written with my composer, Michael Bitterman. *Discovering Magenta* made its New York City debut in 2015. I am currently finishing a new full-length play, *Aftertaste*. Whether my work is little-c or reaches Pro-c, my discussions of these issues with so many people have helped me regain my own passion for writing.

My current main focus is, broadly, on looking at the positive potential effects of being creative. My first realization that this idea was important came when I worked at Educational Testing Service as an Assistant Research Scientist. I had an idea for measuring creativity and pitched it to one of my bosses. I was excited; the idea of being able to possibly include creativity on a large standardized test struck me then (and, to a degree, now) as an ideal outcome. But my boss blinked, looked lost for a moment, and then asked, “Why?” That one word made many of my most dear assumptions crumble. In school, a topic is important because it matters. New knowledge is good. Studying something because it interests you is a perfectly good reason to do so. In the world of creativity research, no one asked “Why?” *Of course* it was important to study or measure creativity. No one would ask why you bothered eating or breathing. My initial response, unimpressively, was along the lines of, “Well, it would give us a measure of creativity!”

My boss argued that creativity was nothing but error in measuring *g* (*general intelligence factor*). Even if it was its own construct, who would care? The two things that most predicted success in school or work were *g* and conscientiousness (Schmidt & Hunter, 1998). Why would anyone want a measure of creativity? Who would ever want to pay for it?

I had no response. Eventually, I would strive to not only have my own answer but to get our field to come up with many answers. I teamed up with rising superstar Marie Forgeard (Forgeard & Kaufman, 2016) to address this question. So much research has been done on how to improve creativity (example?), from the ideal environment to the best array of personal attributes to training. Indeed, we found that 70% of a random stratified sample of articles from journals across multiple fields (creativity-specific, psychology, business, and education) used creativity as a dependent variable. Yet less than 25% used creativity as an independent variable (e.g., what outcomes are predicted by creativity) and, even worse, less than ten percent of papers went into any notable detail of why creativity is important to study (even something as simple as talking about potential positive outcomes). In general, business journals were better at discussing the importance of studying creativity, but the pattern is similar.



As a field, we need to do better at communicating why creativity matters. Most studies that do link creativity with a positive outcome do not include other potential predictors. Some exceptions include studies that compared creativity's relationship with GPA with cognitive style (Niaz, Saud de Nunez, & Ruiz de Pineda, 2000), mental speed and short-term memory (Vock, Preckel, & Holling, 2011), or reasoning ability (Freund & Holling, 2008). In all cases, creativity did predict GPA, but the second variable had a stronger relationship. Even with the existing studies, although we can provide evidence that creative people can get good grades, better succeed in business, have less stress, and be more resilient (see Kaufman, 2016, for a review) – however, what we are usually unable to do is to compare creativity with many different desired traits that businesses and schools are seeking (resiliency, leadership, drive, etc.) to show that creativity, will add specific incremental variance in predicting work performance, work engagement, school performance, and other important outcomes.

As a result, we're stuck with a fundamental problem. A school or workplace might truly believe that creativity is a valuable thing, but they have limited time, money, and resources. If we want to convince them to invest in creativity, I want to have more supporting evidence to convince them how and why creativity is such an important and world-changing trait or ability. Thus, one central focus is studying and writing about positive results of creativity. Although there are many amazing outcomes, I will focus on the one that is most important to me: social justice and equity. My interest was crystallized with a fortuitous invitation from Cecil Reynolds to write a chapter on non-biased assessment (Kaufman, 2005). In this chapter, I proposed using creativity as a supplement to other criteria or assessments, such as IQ tests, the SATs, or GREs. I was certainly not the first to use this approach; see, for example, my amazing graduate mentor's work (Sternberg, 2008).

A next step was to look at individual differences in creativity, from gender (Baer & Kaufman, 2008) to ethnicity (Kaufman, Baer, & Gentile, 2004; Kaufman, Niu, Sexton, & Cole, 2010; see also Baer & Kaufman, 2008); we found no differences in creative ability. When we examined self-beliefs about creativity, African-Americans often saw themselves as being more creative than did Caucasians (Kaufman, 2006; Ivcevic & Kaufman, 2013). A further study showed that bisexuals gave significantly higher self-ratings of their creativity than both heterosexuals and homosexuals (Ben-Zeev, Dennehy, & Kaufman, 2012).



Combining the supplemental concept with the studies on gender and ethnicity, I began advocating for colleges (Kaufman, 2010; Sternberg & Kaufman, in press) and gifted programs (Kaufman, 2015; Luria, O'Brien, & Kaufman, 2016) to include creativity as part of their admissions package (again, I am not the first; Sternberg, 2010). A related angle is that creativity can lead to higher levels of equity by challenging stereotypes and encouraging people to be more open-minded (Luria & Kaufman, 2017; Luria, Sriraman, & Kaufman, in press). Even if people are convinced of

creativity's importance, there still remains the issue of the practicality of including creativity as an admissions tool. Only a small handful of college or universities incorporate creativity, and they tend to be either arts-focused or private schools with very high tuition.

Creativity measurement has progressed surprisingly slow over the last many decades. Most new assessments that are not self-reports are firmly rooted in the Guilford/Torrance tradition. One exception are those assessments that utilize Amabile's (1996) Consensual Assessment Technique (CAT) to have qualified raters use their own expertise to evaluate actual creative products. Some of my work is built off of the CAT, from examining the types of prompts that can be used to the number or expertise level needed for raters to be considering which domains should be used (Kaufman & Baer, 2012; Kaufman, Baer, & Cole, 2009; Kaufman, Baer, Cole, & Sexton, 2008; Kaufman, Baer, Cromptley, Reiter-Palmon, & Sinnett, 2013; Kaufman, Lee, Baer, & Lee, 2007). Measuring creativity can feel like an uphill challenge, but it is essential. The field of creativity cannot advance further than its best assessment.

It is easy to think about the negative events happening in the world and perhaps feel discouraged or wonder if our society is heading in the right or wrong direction. The older I get, the more I want my work to have meaning and a purpose. If creativity is viewed as a predictor, if we consider all of the potential wonderful things that may emerge from human creativity, then I believe we are taking a step forward. One of the most exciting directions, to me, is to see how nurturing and noticing creativity can help all people succeed to reach their full potential in life.

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## Joyce Van Tassel-Baska

Interviewed by: Taisir Subhi Yamin  
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**TSY:** What led you to the field of gifted education?

**JVB:**

I started my career as a high school teacher, working with honors and advanced placement students in both English and Latin. Within these classes I worked with critical masses of gifted learners who provided me endless hours of challenge, joy, and fun. Starting in the classroom and working with these students was what first turned me on to gifted education. Secondly, I also wanted to know more about what worked with high-end learners and how those approaches might be used with other learners as well. What worked with my honors students, I tried with my basic students and found that they were more motivated to learn when I was using more challenging strategies and materials with them. That was what heightened my interest in designing curriculum and instruction that teachers could use with gifted and talented learners. Thus my teaching career with advanced learners sparked my interest in later work with curriculum design and development at an administrative level within the gifted field. I was also thrilled to be a part of an enterprise so undervalued and under-resourced. I threw myself into learning as much as I could and into designing interventions for students at all levels of the K-12 enterprise. Thus my role as teacher, curriculum designer, and administrator at local and state levels in gifted education was a natural transition for me.

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**TSY: What were the most important lessons you learned from a mentor?****JVB:**

I was fortunate enough to have a number of different people mentor me throughout my career. I like to think that what I learned from my mentors were the intangibles, the things that spelled the difference between success and failure in a lot of situations. The most important lesson learned was that people do not want to fail; in any given situation at any given time, they do the best they can do. That understanding has carried me in ways that I've only recently begun to appreciate. An example of that would be every time I want to blame somebody because they don't understand something, I stop and say, Is it their fault? Is it that I am not communicating clearly? Is it that the task is vague? Or are the means for them to succeed not readily available? It is a fundamental belief in people's integrity to see them as trying. It is a positive view of human nature and a great lesson for me because it mediates my impatience, which is one of my worst qualities.

A second thing I learned from my mentors is how to work smart, meaning, that if you are going to give a presentation someplace, take the time to prepare well, execute well, and travel, then that presentation should allow you to accomplish three things. It should be able to be converted into an article for publication. It should be exploring a new idea in greater depth that will lead you to design a research study, and it should provide a context for networking among colleagues.

A third area that I have learned from my mentors is how to think about my work, meaning that what matters is the pressing forward and persisting with questions of interest despite personal setbacks, despite professional distractions, and despite the call for multi-tasking in every sphere of life. Mentors have strongly supported my work ethic and the reality of spending large amounts of time on professional writing seven days a week and fifty-two weeks a year.



**TSY: If you had to name individuals in gifted education who have had the greatest effect on your thinking, who would they be?**

**JVB:**

Julian Stanley provided a model for excellence in research and program development. His talent-search model was so well developed, researched, and articulated, that it was inspirational to me in the late 1970s as a catalyst to spur more program development activities for highly-gifted students in the state of Illinois and eventually in an eight-state region of the Midwest. Based on his work, I developed a statewide talent search in Illinois in 1978 and the Midwest Talent Search in 1981, and later Northwestern University's Center for Talent Development, begun in 1984 and still operating today, 33 years later. Julian Stanley also served as a model of deep kindness, providing support and encouragement in all my professional endeavours.



James Gallagher was also a central model for shaping my thinking about gifted education throughout my career. Since meeting him at the Leadership Training Institute State Plan Conference in Aspen, CO in 1974, I have enjoyed a continued professional association for the past 30 years. His firm grasp of the issues, his Irish wit and humor, and his unswerving commitment and clear-eyed vision of what needs to be accomplished has been an inspiration to my work in program development at the local, state, university, and national levels.

Harry Passow provided a model for my thinking about curricula. He provided important insights on the curriculum development process, its pitfalls, and the need to persist in the face of obstacles. He also “mentored” me by his mensch-like approach to life and its human inhabitants. He taught me through his life example that kindness and integrity are the highest virtues.

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John Feldhusen was a direct mentor to me and opened doors for me in many ways. He encouraged me to finish my dissertation, and was a wonderful supporter as a dissertation committee member. John was a gentle, yet powerful model of how to be both a teacher and a scholar. He exemplified both excellence and altruism as an educator.

**TSY: What other areas of learning have held your interest and how have they influenced your life?**

**JVB:**

Professionally, I have always been interested in Latin and the importance of a classical education as a foundation for understanding our cultural heritage. I have also had a strong interest in poetry and other forms of fiction in literature as both a professional connection to quality curriculum but also a personal connection to understanding life better. Great authors and poets are a better source of inspiration for me than politicians or scientists. At a personal level, I deeply enjoy the arts as appreciator through regular museum trips and theater excursions and as a creator of both poetry and photography.

Most of my interests have deepened over the years and my insights into their importance in my life and work have also deepened. In recent publications, for example, I explore the role of the arts as a key tool for channeling emotional and social issues that gifted individuals encounter. I continue to see Latin as a *sine quo none* for gifted learners, at least one year, no later than eighth grade. With respect to the role of literature in understanding life, my curriculum work continues to focus on major themes and works of literature that lay bare the human condition and the human dilemma.

**TSY: Can you describe some of the research you are continuing to work on?**

**JVB:**

My research continues to investigate interventions that work with gifted learners in different subject areas at different stages of development. I continue also to be interested in pedagogy that works as exemplified by studies on teaching behaviors and interest in low-income minority students as currently being addressed through the development of learner prototypes that display important individual differences that we need to attend to in schools. Moreover, I continue to be fascinated by the talent development process and therefore continue to do archival studies of eminent people, especially Sir Francis Galton and women writers.

**TSY: What do you see as the most important questions we should be asking in the field?**

**JVB:**

The following constitute the broad set of questions of interest in intervention research:

- What works with gifted learners at different stages of development?
- What combination of teacher attributes and skills are indicative of exemplary classroom practice with gifted students?
- What are similarities and differences among low-income students that impact on working with them effectively?
- What new insights can the study of individual lives continue to provide for educators to apply talent-development principles?

**TSY: If you had to give someone advice on the things not to do in their research, what might some of that advice be?**

**JVB:**

My first piece of advice is not to stop thinking about what interests you and finding new ways to frame your ideas around those interests. In the final analysis, research is “me-search”, the study of what frames your thinking and feeling as a human being. Life themes are an excellent source for researchable questions.

Secondly, don’t ever stop learning more about your subject of interest and the methodological approaches to studying it. Most researchers only use a few methodological approaches during their entire careers. Try to learn new applications, new techniques to study your questions of interest.

Next, don’t ever give up on a research interest because you encounter skepticism, negativity, or rejection. Always regroup, re-conceptualize, and rewrite. Thinking more deeply about how to articulate your ideas is always time well-spent. Value a trusted friend who is willing to offer criticism of those ideas in a written context.

**TSY: What accomplishments are you most proud of?**

**JVB:**

Looking back across my 50 years in gifted education, I am struck by all the areas of the field that I have been involved with in all of the types of professional roles that I have held. Right at the top of my accomplishments would be the 50 or so doctoral students I have graduated, many of whom have gone on to become university professors and fine educators in local and state settings. The preparation of gifted educators to be leaders was a foremost consideration because the program I designed was in educational leadership. It is very fulfilling to see these individuals who came to me as inexperienced teachers or local administrators to be able to elevate their work to levels they could not have imagined. Many are now eminent individuals in the field, well-published and providing professional development on relevant topics to teachers and others. Others have risen to high levels of influence as master teachers or administrators in state and local contexts. I am also proud of the 125 master’s students who have received an advanced degree in Curriculum and Instruction with an emphasis in Gifted Education at the College of William and Mary. Knowing these people are inhabiting classrooms across this country and abroad with an important expertise that can make a difference in the top 12% of the student populations they encounter, makes me especially happy as well.



A second area of accomplishment that I value has been my ability, with help from many others, to create two national centers in gifted education, one a talent development center and the second, an all-purpose center that engages in multiple tasks in gifted education, including teacher development, curriculum design and development, outreach to multiple stakeholders, and research on talent development. These centers, the first at Northwestern University and the second at The College of William and Mary, both speak to my abiding belief that the field of gifted education can move forward best by collaboration with others, by attacking multiple problems on several fronts as well as simultaneously, and by seeing the value in creating a synergy among people and institutions that can have an impact on gifted student learning.

Thirdly, I value my contributions to the field in the area of curriculum design, development, implementation, and assessing effectiveness. The 20+ years of research and development at College of William and Mary allowed me to advance understanding of how to design differentiated units of study, how to improve them, and how to test for effectiveness with the populations of interest. The opportunity to do this took funding, and I was fortunate enough to procure over \$15 million to do so. Our products and findings in language arts, science, and social studies produced important units for the field to use as models as well as teachable products.



I also have valued my archival research work on Charlotte Bronte and Virginia Woolfe and finally on Sir Francis Galton. Doing qualitative studies has allowed me to understand the value of ‘climbing inside the heads’ of people who lived before and trying to understand the conative as well as cognitive impulses that made them so successful in their fields.

Finally, in recent years, I have also enjoyed the opportunity to evaluate gifted programs, to see what is working, what is not, and the cultural forces that are driving decisions in schools that may be counterproductive to the development of the next generation of talented learners. This work is especially gratifying in that it has been carried out collaboratively with good colleagues who have worked with me before, some whose specialties are different from mine, but all who cherish the importance of providing effectively for the needs of gifted learners.

**TSY: Who is she?**

### **Joyce VanTassel-Baska**

**She** is Smith Professor Emerita and Founding Director, The Center for Gifted Education, The College of William and Mary. Dr. VanTassel-Baska is the Jody and Layton Smith Professor Emerita of Education and founding director of the Center for Gifted Education at The College of William and Mary in Virginia where she developed a graduate program and a research and development center in gifted education. She also initiated and directed the Center for Talent Development at Northwestern University. Prior to her work in higher education, Dr. VanTassel-Baska served as the state director of gifted programs for

Illinois, as a regional director of a gifted service center in the Chicago area, as coordinator of gifted programs for the Toledo, Ohio public school system, and as a teacher of gifted high school students in English and Latin. She has worked as a consultant on gifted education in all 50 states and for key national groups, including the U.S. Department of Education, National Association of Secondary School Principals, and American Association of School Administrators. She has consulted internationally in Australia, New Zealand, Hungary, Jordan, Singapore, Korea, Hong Kong, China, England, Germany, The Netherlands, Spain, Kazakhstan, Oman, and the United Arab Emirates. She is past president of The Association for the Gifted of the Council for Exceptional Children, the Northwestern University Chapter of Phi Delta Kappa, and the National Association for Gifted Children (NAGC). During her tenure as NAGC president she oversaw the adoption of the new teacher standards for gifted education, and organized and chaired the National Leadership Conference on Promising and Low-Income Learners.

Dr. VanTassel-Baska has published widely including 30 books and over 550 refereed journal articles, book chapters, and scholarly reports. Recent books include: *Content-based Curriculum for Gifted Learners* (3rd edition) (2016) (with Catherine Little), *Patterns and Profiles of Low Income Learners* (2010), *Social and Emotional Curriculum for Gifted and Talented Students* (with Tracy Cross and Rick Olenchak) (2009), *Alternative Assessment With Gifted Students* (2008), *Serving Gifted Learners Beyond the Traditional Classroom* (2007), and *Comprehensive Curriculum for Gifted Education* (3rd Edition) (2006) (with Tamra Stambaugh). Recent curriculum work includes units of study on leadership (with Linda Avery) and on Rome, focusing on its language, history, and art and architecture (with Ariel Baska). She also served as the editor of *Gifted and Talented International*, a research journal of the World Council on Gifted and Talented, for seven years from 1998-2005.

Dr. VanTassel-Baska has received numerous awards for her work, including the National Association for Gifted Children's Early Leader Award in 1986, the State Council of Higher Education in Virginia Outstanding Faculty Award in 1993, the Phi Beta Kappa faculty award in 1995, the National Association for Gifted Children Distinguished Scholar Award in 1997, the President's Award, World Council on Gifted and Talented Education in 2005, the Distinguished Service Award, CEC-TAG, in 2007 and was inducted as an American Educational Research Association (AERA) Fellow in 2010 along with receiving the Distinguished Service Award from NAGC in the same year. In 2011, she received the Mensa Award for Lifetime Achievement in research and service to gifted education. In 2013, she received the Distinguished Service Award from The World Council on the Gifted and Talented. In 2014, she received the Legacy Award from NAGC for her lifetime contribution to gifted education and a recognition award from Rutgers University for her work in establishing gifted education coursework at that institution. She also has received awards from five states - Ohio, Virginia, Colorado, South Carolina, and Illinois - for her contribution to the field of gifted education in those states. She was selected as a Fulbright Scholar to New Zealand in 2000 and a visiting scholar to Cambridge University in England in 1993. Her major research interests are on the talent development process and effective curricular interventions with the gifted. She has served as principal investigator on 65 grants and contracts totaling over \$15 million, including eight from the United States Department of Education (USDOE). She holds B.A., M.A., M.Ed., and Ed.D. degrees from the University of Toledo, an institution that awarded her its Distinguished Achievement Alumna Award in 2002.





## Book Review (1):

# Your Passport to Gifted Education

Monita Leavitt (2017)

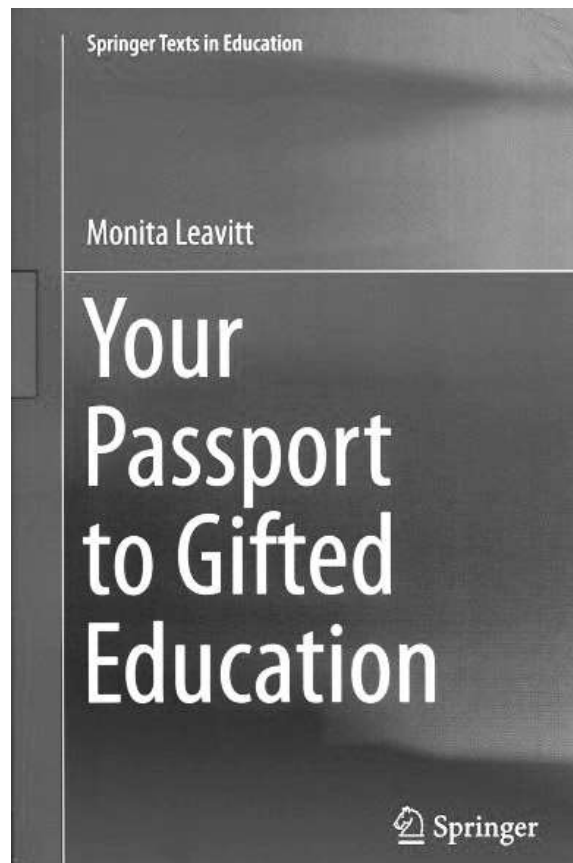
Jasna Arrigoni <sup>1</sup>; Maruška Željeznov Seničar <sup>2</sup>

<sup>1</sup> University of Rijeka, Croatia; <sup>2</sup> University of Ljubljana, Slovenia

The book *Your Passport to Gifted Education* by Monita Leavitt, *Ph.D.*, represents a journey to first discoveries about people who, due to their specific characteristics, are considered gifted.

Introductory words were written by the author herself and they highlight her rich experience in teaching the gifted and talented in the United States, as well as her work as a consultant in this field. Through this experience she has recognized the extremely important role of the teacher, not only in the process of identifying gifted children, but also in ensuring a stimulating learning environment for each child and gifted student.

She notes in the introduction that the book is primarily intended for novice teachers in North America, who have just stepped into the field of education and have little, if any, knowledge about gifted children. The book is written in three sections with each representing one part of the path in the field of gifted education. The author compares the entry into this area to the flight of an airplane in three sections: *Embarking on a Journey*, *Preparing for Departure*, and *Planning for Arrival*. The book serves as a “passport” for all interested stakeholders in this field, from parents and teachers to other interested individuals or institutions.



In the first section of the book, *Embarking on a Journey*, (consisting of three chapters), the author conceptualizes the issue of historical development of giftedness and its definition, as well as the problems educational institutions face when it comes to the gifted. It presents a short international historical journey of giftedness development in specific cultural conditions such as in the Old Greece, China or Western cultures. By mentioning Lewis Terman as the founder of the first IQ test, Lete Hollingworth as the most important figure in the early studies of education and psychology of the gifted, experiences from the former Soviet Union, conditions during the Cold War, and the development of the English model of giftedness, the author highlights some of the important

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historical moments in the development of giftedness that have influenced the creation of national programs for the gifted around the world.

One of the most important issues is determining the difference between the terms *gifted* and *talented*, because different authors conceptualize them in different ways. The author of this book chose Françoise Gagné's approach, according to which gifted individuals are those who achieve 10% of the highest results as well as possess and use spontaneously expressed superior natural abilities in at least one ability domain. "Talent" for Gagné is found in 10% of individuals demonstrating "superior mastery of systematically developed abilities (or skills) and knowledge in at least one field of human activity."

In the next chapter, the author emphasizes the importance of setting up an action plan for the identification and education of gifted children for every school and every area or district. Each institution, or area, should in a multitude of different concepts choose the one that best suits the needs of gifted children in that area or institution. Therefore, in this chapter, the author offers the opportunity to get acquainted with four identification models of giftedness: Renzulli's *Three-Ring Conception of Giftedness*; Tannenbaum's *Sea Star Model*; Gagné's *Differentiated Model of Giftedness and Talent*; and Eyre's *High Performance Learning Framework*. She further advocates planning identification in five effective steps.

In the third chapter of this section, the author emphasizes that giftedness appears as a natural category independent of formal education, thus bringing to the forefront the importance of early encouragement, the notion of unequal development of the gifted, and the importance of early intervention. Early intervention can be achieved by teaching differentiation as one of the more effective ways of preventing boredom and the appearance of unacceptable behavior which the gifted at times exhibit. For a better understanding of this chapter, the author mentions the first case study written by a gifted child. The author in a way warns parents and teachers to be aware of possible problems and, therefore, recommends certain strategies in the process of identification and differentiation of learning and teaching gifted students.

In the second section of the book, *Preparing for Departure*, the author devotes three chapters to very important problems on the development of the gifted that include the discovery of gifted children, recognizing the differences between gifted and bright students, twice-exceptional learners, possible misunderstandings in the identification process, which is then followed by the question of motivation of the gifted and the question of being familiar with different levels of giftedness. For each of these problems the author opens up discussions and provides suggestions for possible interventions for parents and teachers. Each section contains examples of case studies that provide insights into the child's perspective of this issue, most certainly to parents and to teachers, i.e. the current reader, which is extremely important for a better understanding of potentially-gifted children. The author provides interesting and provocative case study examples on the basis of personal experiences and research so as to highlight the unique challenges which parents and teachers face in their attempts to meet the specific needs of gifted children.

Each section and chapter of this part begins with quotations from well-known people, whose content correlates with the content of the text. One of the most striking quotations that marks the beginning of the third part of *Planning for Arrival* is "Teaching those types of voracious minds in a regular classroom without enhancement is like feeding an elephant's one blade of grass at time. You'll starve them" (Elizabeth Meekstroth). This quotation points very clearly to the fact that gifted individuals, if the education system does not address their needs, will be deprived of much knowledge and skills which they are yearning to acquire; they will remain "hungry." Just as passengers are awaiting their plane to land and to get off at their desired destination, so too do potentially gifted children need to face the real life and opportunities at some point in their development. Therefore, in this section, the author presents key strategies to encourage gifted students within the school system. In addition to each proposed strategy or problem, she specifically describes the roles of the teacher and the parent. The first suggestion is program enrichment, a form of incentive that can be very

effective especially if it is integrated into the regular curriculum. In this sense, each school should develop enrichment programs, taking into account the interests and needs of all children, while combining programs with real-life situations. Three strategies are proposed as part of the enrichment program that would ensure enrichment: 1) learning problem solving; 2) integrating different subject areas; and 3) developing the leadership role. In each of the proposed strategies, the author emphasizes the role of the teacher and gives particular guidance to parents. The eighth chapter describes acceleration, which in the American education system appears in many forms, but also reveals a number of problems. Acceleration is a diagnostically prescribed approach that requires a very serious reflection on the academic, social, and emotional needs of the gifted student. In the same chapter, intervention strategies are proposed for teachers and parents that include reducing expectations for the gifted student, self-supporting projects or learning, and talking about future plans.

The quotation at the beginning of the ninth chapter, “Seek to understand, then to be understood” (Stephen Covey), fully corresponds to the content in this chapter that focuses on a very important segment of child development, socio-emotional development and overexcitable gifted children.

Interventions, which are suggested here, include dedicating enough time and attention to emotions, creating a supportive environment, and raising awareness of one’s own behavior. In the tenth chapter, the author dedicates her concluding remarks to teachers and to parents. These are messages that could be useful in class planning, in their communication with the parents, and working with gifted children. Learning to deal with the perfectionism of a gifted child is one of the important tasks facing both the teacher and the parents. Therefore, strategies for promoting children’s work include strengthening social and emotional skills, changing myths about giftedness, and evaluating the uniqueness of each potentially gifted child. Some of the most important myths are that all children are gifted, that gifted students have equally high abilities for all academic areas, that gifted children grow to be gifted adults, and that teachers know exactly how to work with gifted students. At the end of this chapter, the author congratulates every reader who has reached the end of the book, highlighting thereby his interest in providing support to a gifted child. This is an important step in acquiring knowledge that enables taking up the role of the “patron” of the gifted.

At the end of each chapter the author lists the literature used in the texts and by doing so she helps the readers, especially beginners, to more easily manage in the multitude of sources available on the market, especially the American one. At the very end of the book, there is a list of key contact information for numerous institutions and organizations in the United States and around the world that deal with the topic of giftedness and their education. In the Appendix section she once again lists all the strategies for teachers and for parents that were mentioned in some of the chapters (early intervention strategies, twice-exceptional learners, discovering hidden talents, working with different levels of giftedness, enrichment strategies for acceleration, for hypersensitive-gifted children, and for perfectionism).

Compared to other sources in the field of gifted education, this book is an excellent “ticket” into the world of gifted individuals, into becoming acquainted with their peculiarities, as well as potential problems. Through simple content and easy-to-read language the author constantly addresses the two most important factors in the lives of gifted children: parents and teachers. They appear to be the most prominent advocates of gifted children’s rights to an adequate approach in education and in society in general.

The author begins her book by making a comparison with the flight of an airplane and she reaches the end of the book by providing the reader with answers to a wide range of questions and clarification of possible doubts. The book is a guide to helping everyone involved in the life of a gifted child to better understand his potential and to the need for intervention, and to becoming advocates of developmentally-advanced individuals. It certainly has an educational effect as it offers, describes, and advises more effective methods and models of working with gifted children. This book is certainly recommended to all those who are entering the world of the gifted for the very first time:

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to parents in order to better understand the needs of their children and to get an excellent incentive in the struggle for their rights, to teachers, especially to young people, to beginners so as to get an excellent foundation in the field of gifted education, and to encourage them to engage in further training. Psychology and pedagogy students, as well as other orientations are also the target readers since research shows that the first positive attitudes towards the gifted are developed already during the course of university studies, and they certainly contribute to the change in possible prejudices and stereotypes.

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## About the Authors

**Dr. Jasna Arrigoni** graduated from the University of Rijeka, Croatia, Faculty of Pedagogy. She worked at the Elementary School level as a pedagogue for more than 20 years. Since the academic year 2003/2004 she has been teaching an elective course: The Education of Gifted Children. Dr. Arrigoni has been working as an external associate at the Faculty of Teacher Education in Rijeka, Croatia since 2010. She defended her doctoral dissertation in the field of gifted education at the Faculty of Philosophy in Zagreb, Poland. In 2016-17, Dr. Arrigoni received the Rector's Award from the University of Rijeka, Croatia for her teaching excellence. She has participated in professional and scientific conferences and has exhibited and published works from the field of gifted education. Dr. Arrigoni initiated the establishment of the association "Centre for Gifted Children" in Rijeka, Croatia and organized a number of educational activities for potentially-gifted children, parents, and teachers. (e-Mail: jarrigoni@uniri.hr)

**Mag. Maruška Željeznov Seničar** is an expert and Ph.D. student in Pedagogy (general and gifted education). She was a geography teacher in basic education and the editor of the Slovenian Publishing House. At that time she worked as the assistant editor of Contemporary Pedagogy. Between 2005-2008 she was elected the assistant for School Pedagogy and School Counseling at the Department of Pedagogy and Andragogy, Faculty of Arts, University of Ljubljana, Slovenia. Currently she is leading the MiB International Education Center and Institute ZVIS, and she is the organizer of educational and scientific conferences in the field of pedagogy and gifted education and is a partner in many local and international projects in the fields of teacher training and of child development. She has participated in professional and scientific conferences and has exhibited, published works from the field of gifted education, and has been involved in the Erasmus+ project Talent Education. Mag. Senicar is also ECHA (European Council for High Ability) the national correspondent for Slovenia. (e-Mail: maruska.zeljeznov@mib.si)

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## Book Review (2):

# The SAGE Handbook of Gifted and Talented Education

Belle Wallace; Dorothy Sisk; John Senior (Eds., 2018)

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## Dorothy Sisk

Director of the Gifted Child Center, Lamar University, U.S.A.

The SAGE Handbook of Gifted and Talented Education was edited by Belle Wallace, Director of TASC International, Dorothy Sisk, Professor and Director of the Gifted Child Center, Lamar University, and John Senior, Independent consultant and writer. The *SAGE Handbook of Gifted and Talented Education* provides a comprehensive and international overview of key challenges and issues in the field of gifted education, making this a valuable volume for individuals in the fields of education, public and private school administration, psychology and beyond. The book contains contributions by a range of authors from around the world. Chapters include discussions of the wide range of human abilities and talents which impinge upon academic success, and explore the various political, social and economic factors which influence how "giftedness" and "gifted education" is defined and understood in different regions around the globe. The book is organized in three parts. Part 1 Explores concepts of giftedness and identification: Social and Emotional Needs. Part 2 Discusses educational provisions: Programs and strategies, and Part 3 Includes Global response to emerging gifted & talented provisions: Defining the future.

## Preface to the Handbook

Chris Yapp, an independent consultant specializing in Innovation, Technology, Policy and Futures Thinking provides a Preface to the Handbook. He is a Fellow of the British Computer Society, the Royal Society of Arts, and a graduate of Oxford. He describes teaching and learning as part science and part craft, and says it is important to create a legacy where educational research is valued and integrated into the change process. He emphasized that the question is not is this child gifted, but how is the child gifted? He predicts that the next 30 years will be a battle of ideas and values, and he quotes Nelson Mandela who said education is the most powerful weapon we can use to change the world. Yapp closes the Preface by saying this volume was compiled to provide a current global overview of the challenges and issues in the field of gifted education, with particular emphasis on diversity, and he describes the handbook as being full of people's wisdom and ideas.

## Part 1 Explores Concepts of Giftedness and Identification; Social and Emotional Needs *Introduction to Part 1*

Researchers continue struggling to generate appropriate definitions and theories of giftedness in students and adults, and this section addresses the struggle in the first chapter by Robert Sternberg, *Is Gifted Education on the right Path?* He proposes his model Active Concerned Citizenship and Ethical Leadership (ACCEL) for identifying and developing giftedness. Sternberg stresses there is more to giftedness than intelligence, and his model ACCEL can be used to develop transformational leadership to address real world problems for a common good. Sternberg identifies skills needed for transformational leadership including: Analytical, creative, practical and wisdom-based ethical skills.

In Chapter 2, Dorothy Sisk expands the definition of gifted to include spiritual intelligence. She shares the development of the theory of Spiritual Intelligence proposed by Sisk and E. Paul Torrance in *Spiritual Intelligence: Developing Higher Consciousness (2001)*. Spiritual intelligence is

defined as the capacity to use multi-sensory approaches including: Intuition, meditation and visualization to tap inner knowledge to solve problems of a global nature. Sisk views spiritual intelligence having the capacity to integrate all of the multiple intelligences to solve global problems, and she agrees with Sternberg's contention that real-world problems be addressed for a common good.

In Chapter 3, *Exchanging Giftedness for a Better Gift*, Janet Davidson uses the literature of "gift giving" to explore issues of identification and definition of giftedness. She suggests we analyze our motivation for bestowing the designation of giftedness, and questions viewing gifted individuals as a national resource. Davidson recommends adapting a developmentally and focused definition of giftedness that is domain specific and includes psychosocial variables.

As the global world continues to become more and more multicultural, one issue is the under-representation of culturally and linguistically different gifted students.

In Chapter 4, *Tapping the Untapped: Untold Stories: Revitalize the Concept of Giftedness Through the Mirror of Multicultural India*, Krishna Maitra and Yukti Sharma address this issue. They propose asking the questions of Where is Giftedness? and In What Form? By exploring the potentiality of giftedness as a construct that is responsive to the micro stories that different cultures create, this would yield a multicultural education that includes the social, cultural, and economic needs of students.

In Chapter 5, *Honoring Differences: Improving the Representation of Culturally Different Gifted Students Based on Equity*, Donna Ford, Ramon Goings, Jeremiah Young, and Brian Wright address the issue of access and equity. They call for this issue to be a top priority of educators and policy makers. They suggest a number of solutions including: involving parents, making multicultural education available for educators, hiring more teachers of color, using culturally responsive tests and materials, setting equity goals, and implementing culturally based definitions, theories and philosophies.

In Chapter 6, *Creativity and Genius*, Dean Keith Simonton discusses creativity and genius as manifestations of giftedness. He says formal education can prove irrelevant to creative development and the emergence of genius. He concludes creativity cannot be inculcated, but it can be encouraged in a supportive environment in which creative potential can be realized, and students are encouraged to be open to new experiences. Simonton says equally important to the development of creative potential is the need and demand for instruments to detect creative potential that have up-to-date scoring systems.

In Chapter 7, *Why Bother Being Different? The Role of Intrinsic Motivation in Creativity*, Kelsey Procter Finley and Mihaly Csikszentmihalyi discuss impediments to excellence and focus on the psychological states and traits that are associated with intrinsic motivation that help individuals to persevere through external impediments to excellence. The chapter shares interviews conducted over 20 years ago with highly creative individuals. The individuals in the interviews were selected to exemplify some of the impediments, benefits, and ways of promoting excellence.

In Chapter 8, *New Dynamic Approach to Measure Creativity: Implications for Identification*, Taisir Subhi Yamin introduces his new battery called Evaluation of Potential Creativity EPoC. It is a multivariate approach that employs the creative process definition of Sandra Linke who defines the creative process as a breakthrough discovery in any domain that causes a paradigm shift in a field. EPoC was initially developed in 2009 with norms for use with primary school children in France. Recently ICIE developed an EPoC online system for scoring and online training which can offer EPoC to researchers and institutions interested in exploring and assessing creative potential.

There is increasing interest in atypical gifted learners, described generally as ethnic, racial and linguistic minorities, economically disadvantaged, gifted females, twice- exceptional gifted,

gifted students with disabilities, sexually/gender diverse, and the profoundly gifted. Intragroup characteristics of atypical gifted students need to be addressed as well as intergroup characteristics of these typical learners.

In Chapter 9, *Profoundly Gifted: Outliers among the Outliers* by Stephanie Tolan, the profoundly gifted are a minority within a minority with faster, wider-ranging, more intense and active mental processing that affects the child's experience of the world from birth onward. These children are out of sync and to address their genius potential, requires a range of suitable educational strategies to meet their idiosyncratic needs. Tolan suggests providing them with the challenge and support they seek and then get out of the way.

In Chapter 10, *Eminence in Talented Women by Domain: Issues, Similarities, and Differences Utilizing the Piirto Pyramid as a Theoretical Framework*, Jane Piirto discusses female talent in six domains: Visual arts, creative writing, science, acting, music, and dance. Piirto uses biographical sketches in which she found gender discrimination was rife across all domains, and she concludes that women battle environmental forces to rise to eminence.

In Chapter 11, *Accepting Exceptionality: Giftedness and ADHD*, Kelly Lee and Richard Olenchak discuss the overlap of giftedness with ADHD. They point out the reality that the traits of giftedness and talent can easily be confused with those of ADHD. In addition, they identify barriers to measurement of twice-exceptional students, such as the two diagnoses of giftedness and ADHD can mask each other or downplay certain characteristics.

In Chapter 12, *Hidden Treasures: Twice Exceptional Students*, Linda Krager Silverman discusses twice-exceptional learners (2e) who are gifted with learning disabilities. Silverman points out it seems paradoxical to think a child can be gifted and learning disabled at the same time; yet, these students exhibit the high intelligence and personality characteristics of gifted without the school achievement. Silverman stresses that classroom accommodations for struggling 2e students yield surprising success, and most of all 2e students thrive on relationships with caring teachers who see their gifts and teach to their strengths.

In Chapter 13, *Serving and Honoring Gender Diversity in Education*, Robert Seney shares the progress that has been made in accepting the sexually/gender diverse student. Students who are gifted gay, lesbian bisexual, transgender and questioning (GLBTQ) continue to be plagued by verbal harassment and physical abuse. Seney suggests that prominent GLBTQ adults be identified to serve as role models for gifted students and identification models for educators.

In Chapter 14, *The Emotional Development of the Gifted and Talented*, Joan Freeman shares her 35 year study on the long term emotional effects of being gifted. Freeman found that the participants in her study who had emotional problems which were due to specific challenges from others such as unrealistic expectations, grade skipping and family conflict. She noted that gifted and talented children have special emotional needs, notably exposure to the stimulation of like minds of their own age, honest communication, and opportunity to follow their interests, and acceptance as children.

In Chapter 15, *Friendships of Gifted Children and Youth: Updated Insights and Understanding*, Bruce Shore, Tanya Chichekian, Petra Gyles and Cheryl Walker refute the notion that the gifted are loners and have difficulty with friendships. In their research they found the number of friends of gifted students increased at university, and social-emotional contributions were most often cited as the foundation of their friendships. One pillar on which gifted friendships were developed was competing for fun. The authors suggest that the rhetoric about gifted friendships change from difficulty and challenges to differences in patterns and priorities.

In Chapter 16, *Parental Influence on Perfectionism among Chinese Gifted Children in Hong Kong*, Lai-Kwan Chan investigated perfectionism in gifted children. She found that parenting styles

or practices of fathers and mothers did influence the development of perfectionism. She suggests an emphasis be placed on positive and effective parenting by educators and counselors to provide insight to parents on supporting their gifted children.

## **Part 2. Educational Provision and Programs and Strategies**

### ***Introduction to Part 2***

The chapters in this section address a range of practical approaches to providing learning opportunities for gifted children and youth within formal educational settings. These settings include a whole school model program for the development of thinking skills and problem-solving, developing appropriate learning climates or cultures, and the use of IT. Chapters describe a range of specific techniques: Acceleration, differentiation, mentoring, English language learning, and life-career counselling. This section concludes with a review of ‘what works best?’

In Chapter 18, Joseph Renzulli and Sally Reis in *Engineering the School Wide Enrichment Model: A case study of the Process of Change in Education* describe a broad concept of giftedness through their Schoolwide Enrichment Model (SEM) which advocates the provision of opportunities for all students to discover their respective “gifts and ‘talents.” SEM has an underlying policy of inclusion of all students in enrichment activities, thereafter providing appropriate creative problem-solving projects that vary in depth and breadth.

In Chapter 19, Belle Wallace and Harvey Adams in *TASC: Thinking Actively in a Social Context: A Universal Framework for Developing Thinking Skills and Problem-solving Across the Curriculum* outline their development of TASC which was developed to raise the achievement of able disadvantaged learners in the apartheid era in South Africa. Wallace later worked with teachers and learners to apply the TASC principles in a western context with similar problems to the South African context. Wallace's major principle is to help teachers approach the curriculum content from a base of thinking and problem-solving activities and to differentiate learning activities to accommodate the needs of able learners.

In Chapter 20, *Real Engagement in Active Problem Solving: An International Collaboration*, June Maker and Randy Pease share the model (REAPS) which was created as a strategy to serve gifted students in a variety of programs and settings: general classrooms, pull-out programs, special classes, after-school and summer programs, and special schools. Three teaching models make up REAPS, Problem Based Learning (PBL), Thinking Actively in a Social Context (TASC) and Discovering Intellectual Strengths and Capabilities while Observing Varied Ethnic Responses (DISCOVER). An additional theoretical contribution is the concept of multiple intelligences with the inclusion of spiritual/ethical and mechanical/technical as domains of ability.

In Chapter 21, *Designing Dynamic Learning Space for Gifted Learners: Authentic Augmented and Actualized Places and Placements*, Gillian Eriksson explores the rapid development of complex educational technology and examines the potential for developing extension activities to stimulate gifted learners. She discusses the characteristics of the “technologically gifted” suggesting that these students can be programmers, inter-facers or fixers. Eriksson suggests gifted learners should experience authentic learning and augmented learning with authors which uses virtual simulations whereby teachers and learners interact with avatars or visit places as if they are real.

In Chapter 22, *How to Create and Sustain a Culture of Excellence that Benefits Highly Able Students to Enter Top Research Universities*, Ian Warwick he shares his research findings on what excellence looks like in both state and independent schools. Warwick's research was driven by the following UK statistics: Three prestigious independent schools and two elite sixth form colleges produced as many entrants to Oxford and Cambridge, as 1,800 state schools and colleges across England combined. Warwick's research findings reveal an exciting and comprehensive list of teaching and learning interactions that make a classroom come alive with energy, challenge, critical and creative thinking and high self-confidence and aspiration.



In Chapter 23, Karen Rogers in *Meta-analysis of 26 Forms of Academic Acceleration: Options for Elementary (Primary) and Secondary Learners with Gifts or Talents*, provides a critical meta-analysis of the research examining the strengths and weaknesses of various models for accelerating very able students. She says that the category of acceleration option that will be most successful with a gifted learner is dependent upon the interaction of the learner's cognitive functioning levels, learning strengths, personal characteristics, interests inside and outside of school, and general attitudes toward learning and school.

In Chapter 24, *What Works Better than the Rest? The Impact of Various Curricula Provisions for Gifted Learners*, Janna Wardman and John Hattie continue the discussion on curricular provisions for very able learners presenting a meta-analysis carried out over 30 years on ability grouping, enrichment and acceleration for gifted learners. Regardless of what strategy is adopted, they report differentiating the curriculum to cater for various learning needs remains an issue for busy teachers with large classes. They report globally, acceleration strategies are rarely utilized with most systems preferring ability grouping and/or some form of enrichment.

In chapter 25, *Continuum of Differentiation*, Sandra Kaplan examines a continuum of differentiated practice that spans the multiple needs, interests and abilities of academic, linguistic, cultural and economic diversity among gifted students, enabling educators to design and practice differentiation as a fluid rather than a fixed phenomenon. The continuum presents a series of alternative activities encompassing varying levels of difficulty, acknowledges different types of gifted abilities, and encourages expressions of personal activities, academic strengths, and special talents and interests.

In Chapter 26, *The National Mentoring Program in Israel: A Model for Developing Leadership among Highly Gifted Students*, Rachel Zorman describes her national mentoring program in Israel for highly gifted scholars in grades 10 and 11. The program cultivates future national leaders in various talent areas, and the young scholars are matched with appropriate mentors who are experts in their field. The scholars undertake year-long professional research to create projects in response to community needs, and develop their organizational and leadership abilities.

In Chapter 27, *Capacities, Challenges, and Curriculum for Australian learners with Exceptional Potential for English-Language Learning*, Aranzazu Blackburn and Susen Smith discuss the challenges that face gifted English-Language Learners (GELLS) in Australia. They recommend that GELLS need a differentiated curriculum and pedagogy designed to meet their advanced language ability. They suggest that GELLS need immersion in a third language so they can apply their advanced skills. Blackburn and Smith suggest that bilingualism with giftedness can result in high academic achievement, but such learners need understanding from sympathetic teachers and support from policy makers.

In Chapter 28, *Career life Counseling for the Gifted in Sub-Sahara Africa*, Jacobus Maree reports that in most African countries, giftedness is often considered a creative combination of features that include aptitude (the cognitive view), respectfulness and obedience (the values view), and trustworthiness and care for others (the emotional-social and spiritual view). African concepts of intelligence and giftedness tend to emphasize the wellbeing of the group rather than that of the individual, leading to the subsuming of the individual in the group. Maree strongly argues for life-career counselling for learners who show potential; enabling them to construct careers and design successful lives in which they can make social contributions for the benefit of the collective.

The section on Education Provisions and Programs concludes with Chapter 29.

In Chapter 29, *Recognizing, Developing and Offering Talents as Educational Gifts through Living Theory*, Jack Whitehead and Marie Huxtable are engaged internationally with the continuing professional development (CPD) of teachers who research their classroom practice in order to reflect upon it; and make reasoned, professional decisions with regard to desired changes. Living Theory is a research paradigm in which practitioners accept

responsibility for their own learning, the learning of others and the learning within the social environment in which they work.

### **Part 3. Global responses to emerging gifted and talented provisions: Defining the future**

#### ***Introduction to part 3***

This section provides a stimulating and informative range of different perspectives on many of the central themes of this Handbook including: Identification, definition, and developmental support of children and youth who demonstrate high ability through their gifts and talents. The authors in Section 3 examine in detail the global concerns in their different nations regarding the gifted and talented including: Economic, political and the humanitarian context of actions and challenges which drive decision making and the establishment of priorities.

In Chapter 30, *The Education of Highly Able Children in England: Challenges and Achievements*, Hilary Lowe states at least two major areas of interest should be of concern. One is the economic contribution resulting from attending to the needs of the gifted, and two the individual rights and legitimate expectations of the gifted as people. She says clearly, one concern does not exclude the other. Lowe suggests that we continue to seek and find ways in policy and practice to nurture the special abilities and talents of young people, and she emphasizes that recognizing and "realizing" them is of critical importance to the country and to the individual.

In Chapter 31, *Creativity Competition for Gifted Students' Communication and Self-esteem Development*, Finarya Legoh writes from an Indonesian perspective and discusses the world-wide problem of provision and enablement of gifted students and their teachers; namely the issues of providing a differentiated curriculum and training the teachers with the knowledge and skills needed to deliver an appropriate curriculum for gifted students. Currently in Indonesia, the education strategy is to provide a standard curriculum for all students. Legoh states that if no attention is given to differentiating the education for students with regard to their individual skills, interests and talents, then excellence will arise randomly and depend solely on the students' interests and motivation.

In Chapter 32, *Gifted Education in Brazil: Historical Background, Current Practices and Research Trends*, Eunice Alencar; Denise Fleith; and Liliane Carneiro highlight the emergence of the first educational policy in 1929, ensuring policies from the federal government in support of gifted and talented education. Programs for gifted and disadvantaged gifted are shared and barriers for providing educational programs are discussed including the need for teacher training and financial support. Recent research in Brazil includes a focus on twice-exceptional gifted students and creativity. The authors note the need for family counseling to help meet the needs of gifted students.

In Chapter 33, *New Century Gifted Education in Mainland China*, Jiannong Shi and Pin Li report talent development has attracted increasing attention from the government and the public. Programs that have grown rapidly since 2000 include a gifted program in kindergarten for young children and a new accelerated gifted program for K-12 students. In addition, there is a government large-scale program for highly able students in the Beijing metropolitan area.

In Chapter 34, *Gifted Education in Asia: Vision and Capacity*, David Dai says the rise of gifted education in the last thirty years in Asia was primarily a response to economic and social development in the region. Dai assesses the state of gifted education in representative countries in Asia in terms of an implementation hierarchy from developing a vision to developing capacity. He argues a change of culture is needed to develop a vision of education devoted to the cultivation and realization of human potential.

In Chapter 35, *Development and Issues of Gifted Education in Taiwan*. Ching-Chih Kuo says that the development of Gifted Education in Taiwan has attained a significant level of achievement between 1973 and the present. She reports there are national regulations, identification criteria for

gifted and talented students, research projects and national gifted education policies. Research in Taiwan is sponsored by the Ministry of Science and Technology and city governments to promote special education for gifted and talented students.

In Chapter 36, *Development of Gifted Education in Turkey*, Ugur Sak; Bahadir Ayas; Bilge Bal-Sezerel; N. Nazli Ozdemir; Ercan Opengin; and Sule Demirel report that education of the gifted and talented in Turkey has gone through a big change in the last thirty years. Turkey has a global agenda to become one of the leading countries in the world. The authors list challenges to gifted education that include: Contradictions between educators on identification and definitions, inadequate programs types, lack of expertise in program development, and opposition against gifted education. In spite of these challenges the authors report that since 2000 the number of educational programs and enrichment centers in Turkey have multiplied.

In Chapter 37, *Gifted Education in Europe*, Andrzel Sekowski; Barabara Cichy-Jasiocha; and Martyna Pludowska consider types of giftedness, early identification, classification criteria and types of giftedness. They discuss the important issue of choosing between an integrative approach and a special system of education to appropriately cater to the needs of high ability students.

In Chapter 38, *Giftedness in a Context of 21st Century Globalization*, Don Ambrose says content matters when the global context for talent development is considered. Two recent large scale collaborative projects are discussed that reveal the pressure that 21st century globalization is exerting on the development of creativity and implications for gifted education. Creative studies are shared.

In Chapter 39, *The Creative Being and Being Creative: Human Machine Neural Networks*, Eva Gyarmathy and Jon Senior report that after reviewing the research on creativity, they conclude that artificial intelligence (AI) is superior to the human brain in all most all levels and types of creativity, except for what Calvin Taylor called the emergent creativity level. They explore the question of whether all types of creativity can be programmed for an artificial intelligence, resulting in being able to learn to recognize an authentic creative act given both the social repression of creative behaviors and increasingly rapid development in the technologies of AI.

In Chapter 40, *Gifted Education: The Future Awaits*, Ken McCluskey says in a truly just and effective school, developing and accommodating the talent of students should be a part of the educational systems. He champions seeking to identify and nurture the talents, strengths and sustained interests of a larger and more diverse group of students. He points out the importance of talent spotting, expanding opportunities to make gifted programs more inclusive and accessible to underachieving high ability young people, he calls "lost prizes". He says we must embrace the future and in a rational manner, respond to new possibilities arising from globalization, seek interdisciplinary collaboration, value morality and embed values and citizenship within enrichment curriculum.

This *Handbook on Gifted and Talented Education* has the potential through the wisdom and research of the authors to help ensure that future generations of gifted and talented students develop the skills needed in the 21st Century, and become the much needed creators and innovators that can implement change.

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## About the Author

**Dorothy Sisk** holds an endowed chair in education of gifted students at Lamar University in Beaumont, Texas. Throughout her career, she has been intensely involved with the education of gifted and talented children. Sisk is an international consultant focusing on leadership, communication, and creativity development. She was a professor at the University of South Florida, coordinating programs for training teachers of the gifted, and former director of the US Office of Gifted and Talented in Washington, DC. She currently directs the C.W. Conn and Doroth Ann Conn Gifted Child Center at Lamar University and teaches courses in gifted education. She received the Distinguished Leader Award from the Creative Education Foundation (CEF) in 1989, the Distinguished Service Award from the National Association for Gifted Children (NAGC) in 1983 and 1994, the Creative Lifetime Award from CEF in 1994, and was selected for the Hall of Fame Award of CEF in 2005. Sisk served as one of the founders and the first president of the American Creativity Association, and president of The Association for the Gifted (TAG), the Florida Association for the Gifted, and the World Council for Gifted and Talented Children, where she also was the executive administrator and the editor of Gifted International from 1980 to 1990. She has conducted training sessions throughout the U.S. and internationally. Sisk is the author of *Creative Teaching of the Gifted*; coauthor with Doris Shallcross of *Leadership: Making Things Happen*, *The Growing Person*, and *Intuition: An Inner Way of Knowing*; coauthor with E. Paul Torrance of *Gifted Children in the Regular Classroom* and *Spiritual Intelligence: Higher Level Consciousness*; and coauthor with Susan Israel and Cathy Block of *Collaborative Literacy: Using Gifted Strategies to Enrich Learning for Every Student*. In addition, she has contributed numerous articles and chapters in books on gifted education, creativity, and leadership development.

## Conference Highlights:

# Inovação, Criatividade e Excelência: Global Perspectives on Innovation, Creativity, and Excellence

**Kenneth L. Reimer**

University of Winnipeg, Manitoba, Canada

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I am honoured to provide the following brief review of the 15<sup>th</sup> annual International Centre for Innovation in Education (ICIE) conference in Lisbon, Portugal. In July 2017, my wife Heidi and I had the opportunity to participate in the conference. I was invited to deliver a keynote address highlighting my research concerning the importance of creating authentic connections with students, colleagues, and institutions. I was also fortunate to present a breakout session that focused on the promotion of teaching



critical thinking skills to students. Although this was the second ICIE conference that I have attended, this one was a special trip for me. I had just received an Assistant Professor position at the University of Winnipeg, and was joined by my Dean Ken McCluskey, Aboriginal Academic Advisor Andrea McCluskey, my new Faculty of Education colleagues Philip Baker and Alan Wiebe, and Melissa Harder and Lisa Neufeld, two recent graduates from the University of Winnipeg's ACCESS program.

This was my first visit to the magnificent and historic city of Lisbon. Upon arrival, we registered in our conference hotel, which we found both comfortable and convenient in terms of location. On the first full day of the conference, we took a short walk to the wonderful conference venue located at the University of Lisbon's Faculty of Psychology. Upon arrival, we received our bountiful conference packages and were immediately registered. Each attendee who arrived this morning was personally welcomed by Dr. Taisir Subhi Yamin, General Director of ICIE. From the moment of arrival to the conclusion of the conference, everything was meticulously planned for conference attendees. Meals and refreshments were delicious and plentiful. Conference staff and volunteers were exceptionally welcoming and helpful.

Many prominent scholars and educators came from across the globe to present over the three days at the conference. The conference offered a particularly astonishing array of keynote speakers. On Day One of the conference, Keynote presenters included Ken McCluskey, Dean of Education from the University of Winnipeg, Canada (The Future of Gifted Education); Douglas P. Newton, Professor from the School of Education, Durham University, England (Purposeful Thought in the Classroom: Do Emotions Matter?); Don Ambrose, Professor of Graduate Education at Rider University, New Jersey, USA and Editor of the Roper Review (Innovation in STEM); and Alessandro Antonietti, Professor of Cognitive Psychology at the Catholic University of the Sacred Heart in Milano, Italy (Creativity through the Lens of Language Impairments).



On Day Two of the conference, Keynote presenters included Alan C. Wiebe, Community Outreach Mentorship Coordinator at the University of Winnipeg with Melissa Harder, an Early/Middle Years teacher, University of Winnipeg's 2016 Gold Medalist, and Faculty of Education's Valedictorian (Developing Resilience and Self-Esteem in Marginalized Populations through the Dynamic of Mentorship); Todd Lubart, Professor of Psychology at the Université Paris Descartes (Creative Thinking in Virtual Reality Environments); Roland S. Persson, Professor of Educational Psychology, School of Education & Communication at Jönköping, Sweden (The Few, the Proud and the Brave: Finding, Hiring and Managing Gifted Employees in a Time of Talent Wars); and Ugur Sak, Professor and Director of the Center for Practice and Research on Gifted Education at Anadolu University, Turkey (The ASIS (Anadolu-Sak Intelligence Scale): A New Measure of Intelligence).

On Day Three of the conference, Keynote presenters included Vlad Glăveanu, Associate Professor in the Department of Communication and Psychology, Aalborg University, Denmark (Creativity and Wonder); Fred Bonner II, Professor and Endowed Chair in Educational Leadership and Counseling at Prairie View A&M University (Gifted Black U.S. Students in STEM: The Faculty's Role in Sustaining Success in the Historically Black College and University - HBCU Context); Philip Baker, Executive Director/Instructor with the University of Winnipeg's "ACCESS" Education Program with Lisa Neufeld, an Educator and Restitution Facilitator and three time University of Winnipeg Gold Medalist (An Enrichment, Talent Development Model for an Undergraduate Alternative Education Program); Professor Dr. Klaus-Peter Eichler, Professor of Mathematics and Mathematics Education at University of Education Schwabisch Gmünd, Germany (Children Discover the Beauty of Mathematics in Elementary School); and myself (Authentic Connections: Recipes for Student Success).

Although each keynote address illuminated novel, compelling, and promising acumens, I would like to draw attention to a few that significantly impacted me as an audience member. Although the following addresses that I highlight were unique to themselves, each emphasized the significance of creative correlation and multi- and interdisciplinary collaboration. One such presentation titled, “Innovation in STEM” by Don Ambrose (Rider University, New Jersey, U.S.A.). Dr. Ambrose’s keynote examined innovation in science, technology, engineering, and mathematics (STEM) fields. He cautioned the audience on the dangers of blindly following dogmatic idea frameworks. Instead, he spoke passionately about promoting creative and critical thinking strategies, and emphasized collaboration between multiple academic disciplines and professional fields. His brilliant usage of the “visual” metaphor in his presentation was a personal highlight of Dr. Ambrose’s keynote address for me. For example, Dr. Ambrose showed the audience a slide resembling what at first glance appeared to be a simple cartoon drawing of some futuristic characters. He then highlighted several key components of the drawing, indicating the many sophisticated aspects of what the drawing represented. In a very real sense, Dr. Ambrose presented a visual representation of a thesis.



Douglas Newton’s (Durham University, England) keynote address entitled, “Purposeful Thought in the Classroom: Do Emotions Matter?”, which provided a fascinating exploration into the relationship between reason and emotion. Rather than promote the common misconception that moods and emotions are counter-obstruct thought and reason, Dr. Newton posited that moods and emotions play key roles in teaching and learning. He proposed that pedagogy should include ‘emotional design’, and that further research is needed to explore the interaction between emotions and cognition when applied in educational contexts.

It was a joy to listen to Vlad Petre Glaveanu’s (Aalborg University, Denmark) keynote address entitled “Creativity and Wonder”. As stated in the program, Dr. Glaveanu shared that wondering is “grounded in the possibility of adopting multiple perspectives on a certain reality, many of which are yet unknown to the creator while anticipated and actively looked-for.” Throughout his address, Dr. Glaveanu shared stories and highlighted important implications of connecting wonder with excellence, creativity, and innovation.

Based on the hundreds of scholars, educators, and students from across the globe who attended and presented over the three days, it is clear that the ICIE is an internationally renowned forum. Still, one of my personal highlights of the conference was delivering keynote addresses and presentations along with my colleagues from the University of Winnipeg. For example, Faculty of Education Dean Ken McCluskey presented “The Future of Gifted Education”. Dr. McCluskey emphasized the importance of identifying talent in traditional and nontraditional settings, (example of each) and drew attention to the role that interdisciplinary collaboration can have on expanding enrichment opportunities for all students. In particular, he spoke about University of Winnipeg’s *Lost Prizes* program, which was designed to identify and develop the talents of marginalized populations. By inviting former University of Winnipeg students Melissa Harder and Lisa Neufeld to share the

stage with them, Alan Wiebe (Developing Resilience and Self-Esteem in Marginalized Populations through the Dynamic of Mentorship) and Philip Baker (An Enrichment, Talent Development Model for an Undergraduate Alternative Education Program) added a level of authenticity and genuine impact to their addresses about resilience, mentorship, and talent development. Finally, Andrea and Ken McCluskey's morning session titled, "ADHD: Disorder or Gift?" provided both valuable empirical research and candidly personal vignettes leaving audience members filled with insight, inspiration, and hope.

It was a pleasure for me to attend the 15<sup>th</sup> annual International Centre for Innovation in Education (ICIE) conference at the University of Lisbon, Portugal. The world-class city of Lisbon was charming and hospitable. The conference site was convenient, and all three days were exceptionally well organized. I found the presentations and workshops to be wide-ranging and thought-provoking. I was offered an extensive variety of global perspectives, all while still experiencing a local touch. I look forward to attending many more ICIE conferences in the future.

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### **About the Author**

**Ken Reimer** is an Assistant Professor at the University of Winnipeg (Canada). Prior to this, he had a twenty-five year career in Canada's public school system. This included positions as a mainstream, special education, and resource teacher, guidance counselor, and school principal in six different schools in two different school divisions. Dr. Reimer holds a PhD in Education from the University of Manitoba. His primary research interests have focused on inclusive special education, school leadership, creativity, educational policy, graduation rates, at-risk learners, and teacher collaboration. He has served as President of the Manitoba Council for Exceptional Children. Dr. Reimer has taught at the University of Winnipeg (Canada), University of Manitoba (Canada), and guest lectured at North-Caucasus Federal University (Russia) and Cambridge University (UK). He has presented papers at several different provincial, national, and international conference sites.

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