International Journal for Talent Development and Creativity

(Volume 9, Number 1, August, 2021); and (Volume 9, Number 2, December, 2021)

ISSN: 2291-7179 (Print)
ISSN: 2563-6871 (Online)

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The International Journal for Talent Development and Creativity (IJTDC) is a refereed journal published twice a year by both the International Centre for Innovation in Education (ICIE) & Lost Prizes International (LPI): **www.ijtdc.net**

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Dr. Karen Magro
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Exploring Possible Global, School-Based Partnerships in Gifted Education

Taisir Subhi Yamin; Ken W. McCluskey

The pandemic is not about to magically disappear, but at the International Centre for Innovation in Education (ICIE) and Lost Prizes International (LPI) we continue to take a realistic, steady-as-she-goes approach with respect to safely offering what we can in the way of publications, conferences, networking, and service delivery projects. Our 18th ICIE International Conference to be held in Helsinki, Finland has been postponed a second time; we are now hoping to hold our person-to-person gathering there on July 4-8, 2022 (www.icieconference.net). Should this prove impossible, we will consider delivering that event (and other professional development sessions) in a virtual, remote-program format.

Despite the challenges, ICIE's *International Journal for Talent Development and Creativity* – under the direction of Editor-in-Chief Karen Magro – continues to receive, review, and publish many relevant articles from respected scholars. Free access is available via our website. And Dr. Magro, in what can only be described as a labour of love, is working on a number of fronts to strengthen and improve IJTDC as we move forward. More about that in future volumes.

In 2021, along with the journal, ICIE has published the following books and monographs:

- *Ambitious Humanity: The Uses and Abuses of Competing*, by Roland S. Persson;
- *Focusing on Strengths and Talents: Using Enrichment Pedagogy to Challenge and Engage 2E Students*, by Susan Baum and Sally M. Reis;
- *Gifted and Creative Without Limits*, Developed and Arabized by Taisir Subhi Yamin and Bahaa' Zoubi;
- *Living with Digital Teachers: AI, the Classroom, and the Future*, by Douglas P. Newton;
- *Mind the Gap: Ideas for Enhancing Creative-Critical Thinking, Authentic Communication & Empathetic Collaboration*, by Christine Boyko-Head;
- *The Catch-A-Wave Theory of Adaptability: Core Competencies for Developing Gifted Behaviors in the Second Machine Age of Technology*, by Joseph S. Renzulli;
- *Providing Students with Creative Spaces: The Power of Edutainment*, Maher Bahloul;
- *Powerful Teaching with Cooperative Learning*, Ludger Bruening and Tobias Saum; translated into English by Heinz Neber, and edited by Taisir Subhi Yamin; and,
- *A Call to Action: The Urgency of Cultural Competency Training for Teachers Working with Racially Diverse Gifted Students*, by Joy Lawson Davis.

In 2021, we have also offered the following ICIE Talks & Presentations on the YouTube Channel (See: https://www.youtube.com/channel/UCExDwolWpC46lp6lJMMqKUQ):

Date	Speaker	Title
23.12.2020	Ken McCluskey	ADHD: Latest Developments.
14.1.2021	Connie Phelps	It's a Small World: Connecting Excellence, Innovation, and Creativity.
21.1.2021	Maher Bahloul	The Power of Edutainment.
23.1.2021	Taisir S. Yamin	The Latest Developments in Gifted Education.
25.1.2021	Christine Boyko-Head	Three Simple Questions to Deepen Thinking and Learning.
28.1.2021	Taisir S. Yamin	Dialogue: Gifted Education.
5.2.2021	Taisir S. Yamin	Gifted Workers.
6.2.2021	Jyoti Sharma	Gifted Education in India.
9.2.2021	Fred Bonner II	African American Giftedness: The Problem of the Colour Line.
10.2.2021	Joseph Renzulli; Sally Reis; Taisir S. Yamin	Using Strength-Based Pedagogy to Engage and Challenge High Ability and Talented Youth: Renzulli Learning System (RLS).
6.3.2021	ICIE-Croatia	International Symposium: Capacity Building and Gifted Education in Croatia.
13.6.2021	Christine Boyko-Head	Empowering Learners for a Creative Tomorrow: Communication, Collaboration and Critical Thinking.
25.3.2021	Vlad Glaveanu	Pedagogies of the Possible.
11.6.2021	Todd Lubart	Homo Creativus and Measure of Creative Potential.
15.6.2021	Jack A. Naglieri; Dina Brulles; Kimberly Lansdowne	The Naglieri General Ability Tests: International Implications.
18.6.2021	Ken Reimer	The Critical Necessity of International Collaboration.
19.6.2021	Fred Bonner II	Building on Resilience: Models & Frameworks
22.6.2021	Richard M. Cash	Differentiating UP! Using the Enrichment, Extension & Enhancement (E3) Model.
23.6.2021	Gülşah Batdal Karaduman	Gifted Education in Turkey.
28.6.2021	Abdallah Al-Zoubi	University 4.0: Impact of the Fourth Industrial Revolution on Higher Education.
30.6.2021	Arthur Gogatz	Creative Crisis Management: A Global Perspective.
15.10.2021	Ghada Sfeir	Roundtable Symposium II: Cosmopolitanism for Canada's Growing Diversity: A Better Strategy Than Multiculturalism.
28.11.2021	Ghada Sfeir	Building Trust Between Marginalized Communities and the Police.

Over the years, ICIE and LPI have worked hand in hand with scores of educators to design and put in place a number of enrichment programs in schools worldwide. Of late, we have entered into conversations about building upon an existing partnership between the University of Winnipeg (UW) and Maple Bear Global Schools. In terms of background, Maple Bear currently provides Canadian Education in 550 early childhood, elementary, middle, and high schools in 30 countries across the globe. The partnership began in 2013, with UW offering a Post-Baccalaureate Diploma in Education (PBDE) for Maple Bear educators in Brazil. To date, close to 200 teachers have upgraded their skills and enhanced their practice by completing their PBDEs. At present, Maple Bear and UW are also

developing an Early Childhood Certificate program for teachers in Maple Bear schools throughout the world. As well, members of UW's Faculty of Education and ICIE's Advisory Board have been invited to sit on Maple Bear's Advisory Committee which is, in effect, a think tank designed to bring the latest ideas and creativity to the Maple Bear Curriculum.

Recently, teachers, administrators, and owners of Maple Bear Global Schools have expressed an interest in gifted education. Discussions have only just begun, but already some exciting possibilities have been identified, including connecting with existing ICIE and LPI regional and international conferences, broadening Maple Bear conference offerings, networking to link Maple Bear with resource people in the gifted domain, accessing appropriate assessment inventories (e.g., authentic and dynamic assessment instruments, Evaluation of Potential Creativity{EPoC}, etc.), and introducing the powerful Renzulli Learning System to Maple Bear Global Schools (which would enrich professional development opportunities for educators). In short, the future looks bright for enrichment programming that can benefit learners both locally and globally.

From the Editor's Desk:

Informing Educational Scholarship and Practice through Creative and Transdisciplinary Lenses of Learning

Karen Magro
The University of Winnipeg, Canada

Welcome to our 2021 volume. Our volume 2021 features a diverse range of research and theoretical articles that extend our insights into talent development and creative learning. Many of the articles extend our understanding of creative teaching; there is an attempt to go beyond disciplinarity toward a deeper level understanding of the psychology of teaching and learning. While there are distinctive practices specific to particular subjects, there are also cross-disciplinary dimensions in the scholarship of teaching (SoTL) that can enrich our conceptions of professional identity, effective teaching, and encouraging diverse academic communities (Kreber, 2013; Shulman, 1987). Dr. Caroline Kreber (2013) highlights the importance of teaching toward growth and authenticity in higher education. Building on the work of learning theorists like John Entwistle, Parker Palmer, Jack Mezirow, Patricia Cranton, and Stephen Brookfield, Kreber writes:

> Promoting the authenticity of students implies helping students realize the importance of learning for themselves and grasping a subject in their own way. For this to happen, the subject needs to be perceived as meaningful and relevant so that students are able to make connections between what they are learning and their personal lives. However, authenticity also has more profound connotations. Students who grow into their authenticity do not only know more, but they come to know differently than before. (Kreber, 2013, p.8).

A transformative learning climate engenders self-agency, critical thinking, self-authorship and relational maturity. These skills, notes Kreber (2013), have implications for creating greater social justice in the world. "Fostering authenticity means helping students understand themselves as members of the wider social community towards which they feel a responsibility"(p.9). Along these lines, Walker (2006) suggests that higher education learning contexts should encourage capabilities that include *practical reasoning, educational resilience, knowledge and disposition, learning dispositions, social relations and integrity, respect, dignity, and recognition, and educational integrity* (p.127). Every course or program could integrate the specialized pedagogical content knowledge with these far-ranging skills. Further research is needed into what our students learn and how they choose to interact with local and global communities in inclusive, equitable, and sustainable ways that would continue to advance the scholarship of teaching and learning. Maxine Green (1997) writes about the importance of teachers ever evolving and becoming. Greene emphasizes the value of experience, reflection, creative expression, and social imagination which can lead to the development of new texts, new ideas, and new social orders that are more equitable and hopeful. Teachers might symbolize their practice and understand their colleagues or students' perspectives in imaginative ways through art, role play, song, poetry, and storytelling, for example. Greene speaks to the importance of creativity, imagination, and innovation in

teaching and learning as precursors to dynamic and transformative social change. In 2021, these ideas resonate deeply. Relationship building is also central to re-visioning new learning pathways that work to solve pressing problems that include the climate crisis, refugee resettlement, and the search for greater equity, diversity, and inclusion.

Morwenna Griffiths (2014) writes about the important role that creativity, imagination, and innovation play in re-vitalizing education today. While creativity is "imaginative activity fashioned so as to produce outcomes that are original and of value" (NACCCE, 1999: 2), innovation is "the implementation of new ideas to create something of value, proven through its uptake in the marketplace" (Craft, 2005, p.20, cited in Griffiths, 2014, p.8) Griffiths asserts that nurturing a creative mindset in teachers is "key to a continuing reassessment of beliefs, values, perceptions, and personal commitment….Boden's three possibilities for the generation of new ideas: a subjective inner life symbolized through imagination, and creative social action" (pp.13-14). Creativity in teaching involves risk taking, dilemmas, and tensions but the "rewards" are multi-faceted. Encouraging greater creativity in the teaching profession would lead to a learning climate that nurtures creativity among diverse learners. A shift away from the "managerial, assessment driven approach which requires clear pre-defined outcomes would open a window to enriching learning experiences. Citing the work of Hannah Arendt, Griffith writes:

In the continuing creation of a common world each of us has to bring not only who and what we are, but also who and what we are not yet—a continuing becoming of ourselves and our common world. So teachers need to do this work off deep democracy—to participate with each other, the wider community educators, and the rest of society to work out the values we see in education and best to realize them. That sounds very grand, but it begins with teachers' individual and collective reflective practice in their classrooms and schools (p.13).

The contributions in this volume address many of the above themes.

In "Thinking Preferences (TP), Leadership Skills, and Learning Behavior," Dr. Christine Boyko-Head asserts that current post-secondary educational programs are too often still based on rigid, outdated models characterized by large class sizes, top-down passive learning strategies and summative final marks—all of which can inhibit students' success in developing the skills that employers today require: creativity, problem-solving, critical thinking, risk-taking, and iterative solution-building. Using the *FourSight* creative problem solving framework, Dr. Boyko-Head examines the positive relationship between students' awareness of their own thinking preferences (TP) and their ability to communicate, to collaborate and to exercise leadership skills in group learning projects. Unanticipated findings suggest that TP self-awareness may encourage empathic responses as to how fellow members of the group can contribute to the learning tasks. TP self-awareness may also enable the avoidance of potential conflicts within the group.

In "Designing an Educational Environment in Six Steps: Teaching for Understanding and the Motivation for Understanding," Dr. Yoram Harpaz provides both a theoretical and practical lens to navigate the psychology of teaching and learning within broader socio-cultural, political, historical, and philosophical applications. His article points to the complexity of teaching; Harpaz synthesizes the works of well-known educational psychologists and learning theorists as he explores individual and collective learning, the role of the educator, learner engagement and motivation, meta-narratives linked to the purposes of

education, teaching and learning strategies that are aligned to the 'mission' of an educational institution, and approaches to assessment. How can we build upon and apply Dr. Harpaz's intriguing model as we consider new narratives and stories of historically under-served and minoritized communities? We need to move beyond instrumental and subject-based learning. Learning and education can be viewed as ever-evolving; there are realms for new possibilities and opportunities. More focus can be placed upon the way current and existing social, historical, and environmental factors impact ecosystems of education.

The idea of educational platforms as opportunities for continuing personal and social growth holds great promise for innovations in learning.

Recognizing and working to reduce and remove overcoming significant barriers to learning are essential in creating a learning climate that encourages greater equity, and diversity. In their article "Academically talented students with financial need succeed," Drs. Laurel Brandon, Reis, and McCoach explore the importance of financial support as a way of reducing situational barriers for academically talented students. Brandon, Reis, and McCoach assert that academically talented students who experience financial need are currently underserved in their pursuit of a university education. The problem is particularly acute for Black and Latino children and youth, many of whom do not graduate from high school, let alone enroll in post-secondary programs. Those who do not enroll may have to leave before completing their degree. The authors examine the outcomes for 1,364 students who were able to benefit, according to need, from a variety of support programs awarded by the Jack Kent Cooke Foundation (JKCF). This support included full or partial financial aid to cover college planning, tuition, living expenses, and ongoing advice related to career selection and post-graduate studies. Results indicated that these students were exceptionally successful in completing their degrees and in aspiring to advanced degrees. The authors stress that thousands of academically talented students who graduate from high school each year in the United States would be capable of completing at least a 4-year degree, were it not for significant financial burdens. Educators could assist such students by spreading the word concerning available scholarships and by giving advice and help in applying for university.

In this volume, we feature a number of articles that draw upon psychology, personality, and cultural studies. In his theoretical article, "On Psychoses, Conspiracies, Creative Flow and the Absent-mindedness of Genius: An Evolutionary Function-dysfunction Taxonomy of the Multiple Subjective Realities of the Human Mind," Dr. Roland Persson elaborates on an evolutionary-function-dysfunction taxonomy of the multiple subjective realities of the human mind. His theoretical analysis provides a cross-disciplinary synthesis of academic disciplines' understanding of "illusion and reality." The human mind is "adaptive in an evolutionary sense" and that "illusion" as a positive force in human behavior has been neglected in favour of an over-emphasis and focus on "dysfunctions" of the human mind. Dr. Persson's perspectives challenge scholars and practitioners to reflect on important dimensions of personality theory, well-being, creativity, social psychology, and cognitive processes. Dr. Persson's transdisciplinary bridges psychology, giftedness, sociology, psychiatry, history, science, and cultural studies.

In **"**An Analysis of a Conflict between the Theories of Creationism and Science in the Experience of a Pre-service Physics Teacher," Dr. Michael P. Lukie applies elements of Jungian Psychology to significant student teaching experience that he reflected upon. His ideas provide a valuable lens to explore the way socio-cultural and psychological frames impact the dynamics of teaching and learning. When Dr. Lukie, as a pre-service science

teacher, introduced his high-school students to the scientific evidence for the Earth's climate as it existed hundreds of thousands years ago, he had not anticipated how this topic would be received by his supervising teacher, who reacted with disbelief and condemnation. He reminded Dr. Lukie that the school adhered to the Bible-based evidence which proved that the Earth originated only 6000 years ago. Dr. Lukie's dismay and trauma over this conflict led him to embark upon a detailed application of Jungian analytic psychology, which enabled him to understand and to resolve the conflict to his satisfaction. In this article he shares his experience with educators who may face similar conflicts while teaching in schools that have differing world-views.

In "Supporting Mindfulness for the Next Generation," Dr. Dorothy Sisk summarizes the research on mindfulness programs developed, over the last forty years, mostly for adults and for "emerging adults" in high school and university; the latter have shown "...increasingly high rates of depression, anxiety and loneliness", often coupled with self-chosen "remedial" practices such as video-gaming and online browsing that may exacerbate rather than alleviate their problems. Mindfulness practices encourage members of this group to reduce their overdependence on technology and to "...reconnect with real experiences." More recently, Dr. Sisk emphasizes that mindfulness programs developed for grade-school, and even preschool children, have included age-appropriate educational components such as yoga, guided imagery, breath exercises, music, art, storytelling and cooperative games. Research results have revealed a reduction in stress levels, anxiety, mood disturbances, aggressive behavior and impulsiveness, along with improvements in pro-social behavior, emotional control and academic achievement.

In "Global Principles for Professional Learning in Gifted Education and Italian Primary Teachers," Professor Martina Brazzolotto and Dr. Connie Phelps explore gifted education programs in Italy. Until 2019, Italy's educational system required teachers to modify their programs to accommodate children with intellectual and other disability conditions which slowed their learning progress. These requirements excluded gifted students whose fast-paced learning achievements were met with unappealing busy work, leading some gifted students to misbehave, to reject school-based learning or to quit school prematurely. In response to the law passed in 2019 by the Italian Ministry of Education, Dr. Brazzolotto collaborated with elementary school teachers in developing enrichment activities in Geography, Science, Math, Italian and History. Due to time constraints, only the Geography, Math and Italian components could be implemented. Most teachers responded with interest and enthusiasm. Those who were hesitant to make the proposed changes were nevertheless willing to accept additional training.

In "Two Centres for the Gifted, One Moon-The Program," Drs. Bengio, Margaliot, Saar-Hyman and Benakovic describe an international learning program carried out during the 2019-2020 pandemic with students from two centers for gifted children: the "Hofim" Center in Israel and the "Wind at your Back" Center in Croatia. Students from each Center were included in one of four groups studying the Moon. The Science group researched how to reach the moon and settle there using existing resources. The Acting and Theater group built a shadow theater and filmed a role play about lunar politics. The Creative Writing group wrote a shared story based on cultural myths about the moon. The Emotion and Behavior group designed a questionnaire, sent via Google to 40 participants, querying the influence of the full moon on human sleep quality. Each group was guided in Zoom sessions by appropriately qualified adult mediators. Of particular value in this study is the inclusion of students' written responses to their learning projects.

Profiles and Interviews

The interviews and profiles of creativity in this publication feature the work of exceptional scholars like Dr. Lynn Newton (Durham University, England), Dr. Don Ambrose (Rider University, New Jersey), and Dr. Dean Keith Simonton (California). Their professional accomplishments and on-going research into creativity, giftedness, and talent development provide a strong foundation to consider the promise and possibility of education from a multi-disciplinary stance.

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A Call for Papers:

Cosmopolitan Education

We would like to invite you to write a theoretical or research paper based for a specially themed issue of the *International Journal for Talent Development and Creativity* (IJTDC) issue. This issue will explore perspectives on teaching and learning, curriculum design, innovative education, themes, projects, and ideas related to Cosmopolitanism/ Multicultural Education. The idea of cosmopolitan education speaks to a more creative, inclusive, diverse, and meaningful learning climate that encourages emotional and social awareness, an appreciation for diversity, an extension of global knowledge, and a commitment to peace and planetary sustainability. How do we break down harmful stereotypes and misconceptions that too often exclude and marginalize learners? What theoretical and practical pathways do we need to explore as we work toward a transformative vision of education today?

Stan van Hooft (2009, p. 83) writes:

> A person with a cosmopolitan outlook would respond to the vital needs of others, whether they are near or far and irrespective of their nationality, race, caste, religious commitments, gender or ethnicity. The cosmopolitan outlook refuses to allow the distance, difference or anonymity of those who suffer oppression, poverty or catastrophe to obscure the responsibility we all have to respond to their needs.

Kwame Anthony Appiah (2006, pp. xviii-xix) writes,

> Thoroughgoing ignorance about the ways of others is largely a privilege of the powerful. The well-travelled polyglot is as likely to be among the worst off as among the best off—as likely to be found in a shantytown as at the Sorbonne. So cosmopolitanism shouldn't be seen as some exalted attainment: it begins with the simple idea that in the human community, as in national communities, we need to develop habits of coexistence: conversation in its older meaning, of living together, association.

Dr. David Hanson, Professor and Director, Program in Philosophy and Education, Teachers' College, Columbia University writes:

> One of the words we hear a lot about these days is "globalization." The term describes a process of migration, trade, communications and exchange across borders that has been going on for millennia. "Cosmopolitanism" is a less familiar word but it, too, describes a process that is very old. Cosmopolitanism represents a creative response on the part of people to the realities of globalization and cultural change. In this response, people learn how to develop what I call reflective openness to the world combined with reflective loyalty to the local. In other words, cosmopolitanism (unlike "universalism") does not imply sacrificing local culture and tradition. Yet neither does it mean sacrificing the immense opportunities to learn and grow that the world provides. Instead,

cosmopolitanism means learning to inhabit the "crossroads" where individual and cultural differences meet. It means learning to learn from other people, a process much richer and more enduring than merely "tolerating" them, as important as that aim can be.

Dr. Hanson highlights the value of embracing cosmopolitan education as an important step in building bridges and a re-visioning of teaching and learning in a changing and globalizing world.

Call for Papers

Due: February 25, 2022

The special issue will involve an international collaboration. *The International Journal for Talent Development and Creativity* highlights a transdisciplinary and creative approach that is open to educational innovation.

In this co-edited special issue, Dr. Ghada Sfeir and I are inviting you to write a paper (approximate word count: 4000-8000 words) that delineate your understanding of cosmopolitanism with the context of education. The above quotations might serve as a catalyst or guide for your writing ideas. You can explore and interrogate the contesting conceptions of cosmopolitanism and cosmopolitan education in potentially transformative ways that encourage the "equal moral worth" of every individual.

Contesting definitions of Cosmopolitanism and Multicultural Education: List of Topics to Be Considered as an area of focus, but not limited to:

- Cosmopolitan educational initiatives
- Curriculum Applications
- Global Citizenship Education
- Emotionally and Socially Engaged Learning
- Anti-racist Pedagogies
- BIPOC themes
- Social Justice Education
- First Nation, Metis, and Inuit Education/Ways of Knowing/Pedagogies
- Education for Human Rights
- Global Competence
- Multicultural Education
- Environmental Education and Planetary Sustainability
- Transcultural literacies
- Transcultural learning
- Transformative learning
- Visionary and transformative education
- Transdisciplinary & Innovative Education Curriculum Approaches
- Cosmopolitanism and Religious Studies
- Creative Learning Approaches
- Pedagogies of Possibility
- Conceptions of Identity, Belonging, and Home
- Arts-based Pedagogies that encourage awareness and empathy
- Learning Spaces (Expanding contexts of learning)
- Lifelong Learning
- Hybrid Learning Technologies
- Asset-based learning (growth vs. fixed mindset to educational design, etc.)
- Place-based learning

Please send your papers to:

Dr. Karen Magro
k.magro@uwinnipeg.ca

Dr. Taisir S. Yamin
taisir@icieworld.net

Dr. Ghada Sfeir
ghada.sfeir103@gmail.com
(Please use the APA 7th edition as a guide for writing).

Approximate Time Line:

- Deadline for Manuscripts: February 25, 2022
- Length of Article: Approx. 4,000 to 8,000 words
- Publication Date: Early June, 2022

The *IJTDC* will be indexed with Érudit (Concordia University) and ERIC. Both platforms are in the process of uploading the current and past issues of the journal. Your students/ colleagues will be able to access your article through the Open Journal Systems (OJS).

http://www.ijtdc.net/

Thank you again, and please feel free to contact me for further details or if you have any questions.

Sincerely,

Dr. Karen Magro

- Many thanks to Ms. Jocelyne Scott for her research work and editorial assistance for this issue.

Thinking Preference Awareness, Leadership Skills and Learning Behaviour

Christine Boyko-Head
Mohawk College of Applied Arts and Technology, Hamilton, Canada

Abstract
Prior to Covid-19, studies identified a gap between the skills employers needed and the skills graduates had (IBM, 2012, 2016, WEF2016b). Still impacted by the pandemic, graduating classes of the future may not be any different. This paper shares findings from an Applied Research in Innovation and Education (ARIE) pilot project conducted between 2016-2017 at Mohawk College, Ontario Canada with 117 students enrolled in a 14week, mandatory Communications course. Specifically, the pilot project explored perceptions of leadership, employability skills and attributes in post-secondary students and how they perceived and assessed their leadership skills and developmental needs for future employment. The study also examined how learner awareness of their own and others thinking preferences when problem-solving impacted their academic behaviours and development goals. The aim was to determine the impact thinking preference awareness in learners might have on their communication, collaboration, and development of personal and professional learning targets. Using a mixed-methods, transformative-emancipatory critical approach, the research highlights the classroom as a living laboratory rich in emergent research questions and revealed additional areas of research regarding thinking preference theory and language, self-differentiated learning and inclusive, learner-focused curriculum design.

Keywords: Higher education; teaching and learning; curriculum development; thinking preferences; 21st Century skills; leadership; creativity studies; transformative pedagogy; assessment.

Introduction

Today's culturally, linguistically and academically diverse learners require experiences that build on learner autonomy, content relevance, a sense of mastery, and a positive sense of community (Burns, 2016; Drapeau, 2014; Freeman, Anderman & Jensen, 2007; Gregory & Kaufeldt, 2015; Hammond, 2015; Yuhas, 2016; Dweck, 2016; Hammond, 2015; Pink, 2009). Yet, the challenge of creating dynamic learning experiences is very real. Daniel Rigney (2010) disparagingly notes that "the cognitively rich will only get academically richer while the cognitively poor will get academically poorer, as small differences in learning abilities such as information processing are allowed to grow into large gaps" (Hammond, 2015, p124). While he is referring specifically to the achievement and opportunity gap facing racialized children in the United States, at the post-secondary level, these gaps, regardless of race, are not magically erased. In fact, they are compounded by large class sizes, passive learning strategies, an under-utilization of formative assessment *as* learning, and an over-reliance on summative assessments of learning.

Further, experimentation into alternative delivery models, such as pre-Covid, online learning and hybrid or blended courses, that are financially efficient, yet pedagogically unsupported, can increase learning gaps. Thus, the educational challenge remains one of creating an educational ecosystem where learning is a dynamic action occurring in *all* learners rather than a passive transference touching only a few.

Fundamental to student success is engagement, collaboration and self-awareness (OECD, 2014). Likewise, the World Economic Forum (WEF) (2016) lists critical thinking, communication, collaboration and creativity as essential skills for mitigating Adamson's (2012) volatile, uncertain, complex, ambiguous (VUCA) employment landscape. *C21: Canada* (2012) identifies that "highly

creative and innovative people are the drivers of the 21st-century" (p13), and that this 21st-century educational imperative recognizes that post-secondary institutions need to educate learners for a future that has not yet been imagined. According to the Programme for International Student Assessment (PISA), as quoted by the OECD (2011), competition among countries now focuses on human capital and a knowledge economy. Graduates need to display leadership skills even in entry level positions. A 2012 IBM study identifies a threatening skill gap between what employers need and graduates have. When these exigent economic and social contexts are combined with a disempowered and disenfranchised learner population, the situation inspires the question of how might learners perceive and assess their own leadership skills and developmental needs for future employment? This question aligns with my own queries into thinking preferences' impact on learner behaviour and developmental indices. Specifically, I wondered how might learners' awareness of their own and others thinking preferences enhance self-directed personal and professional development goals?

Employability skills

Partnership for 21st Century Skills (2017) identifies critical thinking, creativity, communication and collaboration as system-wide learning outcomes. All four skills can be developed; but, critical thinking and creativity foreground a minimizing of the familiar and a maximizing of the diverse that enable and reinforce the attributes that employers are looking for in graduates and leaders (WEF, 2016b; IBM, 2016). This growth-rich learning environment reflects the diversity in classroom demographics and invites us to ask how might we leverage diversity in order to provide richer learning opportunities that simulate industry's needs?

According to Yorks and Kasl (2002), familiar habits of mind and habits of being are challenged when a group of learners have more diverse perspectives and experiences. They advocate that the possibility for growth and transformation is directly and positively related to the presence of diversity within the classroom. However, the paradox of diversity suggests that cognitive reflection only works when a group is homogenous and shares a sense of knowing through cognitive patterns based on "common experiential grounding" (Yorks & Kasl, p186). While diversity has a great learning potential, according to Yorks and Kasl (2002), it also has a negative shadow: "the more diverse the learners, the less likely it is that they will be able to create an empathetic field that enables them to understand the other's point of view, thus blocking their capacity to lead each other toward growth and transformation" (p186). To counter this, they suggest that a whole-body affect be implemented by educators through the consistent application of strategies that provide reflective conduits into the " 'felt knowing' of the self and others" (p187). They caution that many of these pathways are arts-based or innovative techniques not valued as part of traditional educational practice.

In this case, the diversity of learners does not encourage a diversity of instruction; the familiar is privileged over creative strategies that stretch the definition of education. As a result, cognitive, social and emotional learning opportunities are being overlooked in some, if not all, learners. Likewise, since problem-solving requires risk-taking and iteration, a risk-averse educational milieu short-changes learners on creative, critical thinking practice and development. Indeed, reliance on summative testing privileges perfection over iteration. Thus, the failure in promoting critical and creative thinking leads me to ask, again: might an awareness of thinking preferences help learners' self-select the personal and professional competencies needed for their future success?

Thinking preference theory

Before diving into the research let's review the Creative Problem-Solving (CPS) model and its four stages of thinking. Depending on the task, problem-solving requires a clarifying of the problem, ideating solutions to the problem, developing a workable solution, and implementing the developed solution in the real world. Thinking preferences (TP) highlight the individual's cognitive predilections and bias for specific stages of CPS when solving simple to complex tasks. It notes that differences in problem-solving stem from different mental processes rather than different personal

features (Puccio, Miller, Acar, 2018; Puccio & Acar, 2015). Seeing thinking preferences as an inclination, an energized state and a default choice, educators can reverse fixed mindsets that are based on a prioritizing of certain abilities and a privileging of certain personalities and behaviours. Everyone can learn beyond their preference because preference does not equal ability (FourSight, 2014). Yet, while preference may not be linked to ability, abilities are linked to preferences. Areas of deficit can be overcome through education in and practice of preference-specific tools and strategies. It is this final point – the ability to teach proficiency in CPS – despite our individualized proclivities – that makes thinking preference awareness an exciting contribution to differentiated instruction and individualized learning goals. Furthermore, TP's clarity, universality, and judgement-neutral positionality and potentiality makes it adaptable to various educational applications.

During an International Centre for Innovation in Education (ICIE) presentation in Paris (2018), I discussed the potential in providing educators and students with a common, judgement - neutral language in which to describe learning experiences and group interactions. The descriptors associated with each TP phase has the potential to shift teacher bias and its "deficit-focused language to asset-based discourse" (Hammond, 2015, p154). A common example would be the assumption by educators that students who are not 'actively participating' – indicated by verbal inactivity – are disengaged, uninterested, complacent, lazy or 'slow'. Covid-19's online learning only accentuated this assumption. But educators have always been poor judges of what constitutes learner engagement, (Hammond, 2015), especially since they often observe their classrooms through a biased lens (Gurak-Ozdemir, 2019). So, rather than default to deficit-laden language that shows a bias toward certain learning behaviour, educators could use the judgement-neutral language of thinking preferences that presents non-verbal student behaviour as reflective, introspective, methodical, cautious, rather than disengaged. Describing classroom behaviour with TP language avoids teacher bias' and the assumptions around the appropriate semiotics of learning by explaining the behaviour through the empathetic lens of the particular learner's thinking preference profile as opposed to the preferences of 'louder', supposed ideal, students. This shift leads to a shift in perspective was based on my assertion that an awareness and application of TP and CPS may have the very real potential to transform the classroom into a safe, reflective, inclusive, empathetic ecosystem for all learners.

Area of focus

The 2016-17 project explored how we might create a positive learning environment that encourages learner autonomy and responsibility in all students as they develop 21st Century competencies. Significantly, the pilot explored how increased self-awareness regarding one's TP and CPS process might contribute to better communication, collaboration and the development of empathetic leadership perspectives in students. I also wanted to see if TP awareness might help learners interact with each other from a more empowered, empathetic and effective position. The research explored potential correlations between thinking preferences, learning behaviours, and perceptions of leadership skills. Quantitative and qualitative evidence showed that TP awareness enhanced learners' inter- and intra-personal communication, empathetic collaboration, and self-directed, personal and professional development.

Method

This pilot used a mixed methods approach combining quantitative assessments and surveys with qualitative observations, discussions and reflections. It was philosophically framed through a critical social science lens informed by transformative-emancipatory, critical pedagogy that is action-oriented. This pedagogical approach makes power structures transparent in order to empower learners as it invites them to become co-researchers, co-creators, co-activists by inviting them to "examine critically their beliefs, values, and knowledge with the goal of developing a reflective knowledge base, an appreciation for multiple perspectives, and a sense of critical consciousness and agency" (Ukpokodu, 2009). Inspired by Freire's *Pedagogy of the Oppressed*, the pilot aimed to advance approaches to teaching and learning and to empower participants to transform themselves by providing them "with a resource that will help them understand and change their world" (Neuman,

2000). This transformative imperative is also what makes it an emancipatory experience freeing learners from an institutionalized structure that sees deficits rather than strengths.

The project involved 117 Mohawk College students. 83.5% were between the age of 19-27. It was conducted between September of 2016 - April, 2017, covering two college semesters. In phase one, quantitative data collection included a pre-assessment online survey linked to the FourSight TP online assessment. The pre-assessment used a five-level Likert scale. The leadership section included the following labels: 1 = not at all important, 3= somewhat important, 5 = very important. The learning behaviour profile used a five-level Likert scale with the same labels as above, as well as 1= strongly disagree, 3= neither agree nor disagree, 5= strongly agree, and 1= a lot of discomfort, 3= some discomfort, 5= no discomfort at all. Some questions required a yes/no response with open commentary. All participants were invited to a follow-up Thinking Preference workshop. The workshop followed a constructivist approach to delivering TP theory and a threefold follow-up data-gathering procedure comprising of 1) an individual, arts-based activity, 2) a collaborative, arts-based task, and 3) a whole-group debrief of each event. The impact and transferability of TP language to students' learning contexts was measured through reflective writings done by participants (N=66) in a Communications class eight weeks later.

General findings

The pre-assessment survey involved 117 Mohawk College students across four schools: Applied Health, Engineering and Skilled Trades, Community, Justice and Liberal Studies, Business, Media and Entertainment. Students were in semesters one to five (Figure 1).

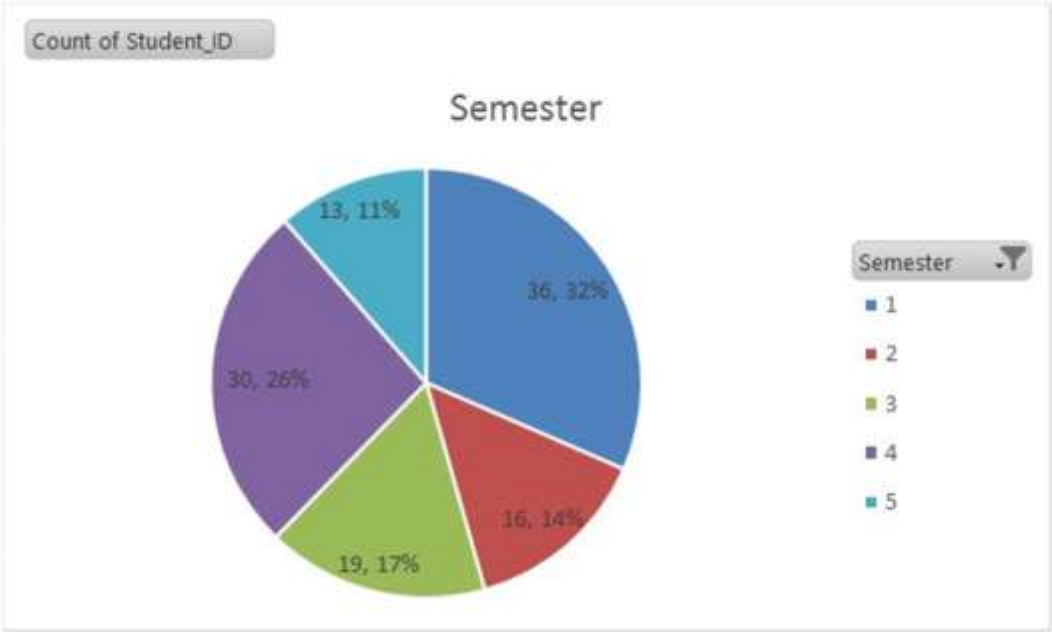


Figure 1: Participants semester of study.

Depending on their program of study, most participants spent 12-16 hours in class (46.5%), 26.7 % spent over 17 hours in class, and 22% spent 7-11 hours in class.

FourSight TP terminology around leadership attributes were used in the survey. Responses regarding attributes that leaders need mirrored research by Puccio & Acar (2015) with 50% selecting the ideating cluster (Figure 2). However, responses regarding attributes leaders do not need countered Puccio & Acar (2015) with 61% selecting the implementing cluster as unnecessary (Figure 2).

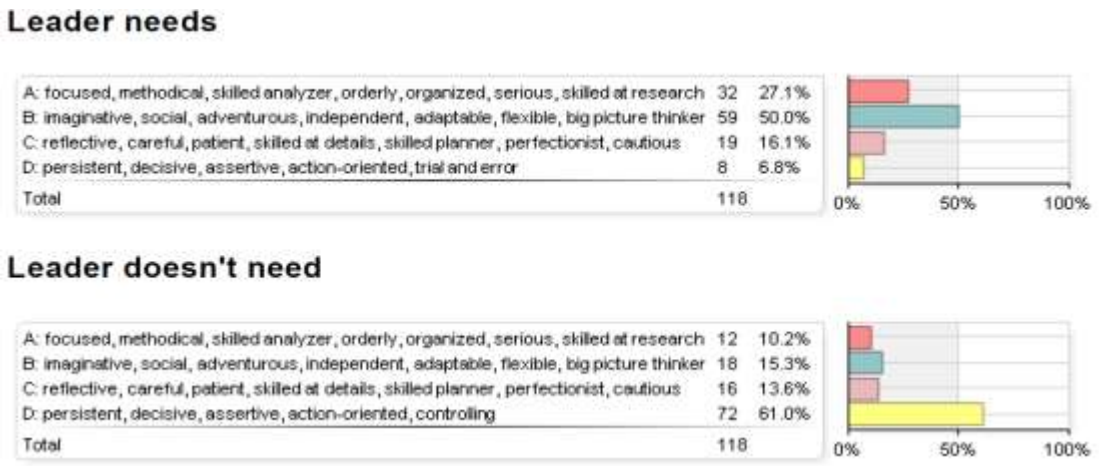


Figure 2: Qualities leaders need and don't need.

Regarding the development of a quality leader, participants ranked personality (89.9%) as being most important followed by work experience (78%), life experience (77%) and then educational experience (66%) (Figure 3).

The importance of work experience on leaderhsip development aligned with the high value students placed on field placements and co-op opportunities (83%). Personality, work and life experience ranked higher than education as factors contributing to the development of good leaders. This should pose a concern for educators and adminstrators and highlight the need to transform "the old industrial-era engine of schooling" (Reville, 2016, p126) and move toward a model more relevant to current contexts and needs. The result also suggests the necessity for more student autonomy, content relevance and mastery of competencies, and reinforces the argument by educational scholars for problem-based enquiry, experiential learning, Capstone projects and education-industry partnerships that amplify these essentials.

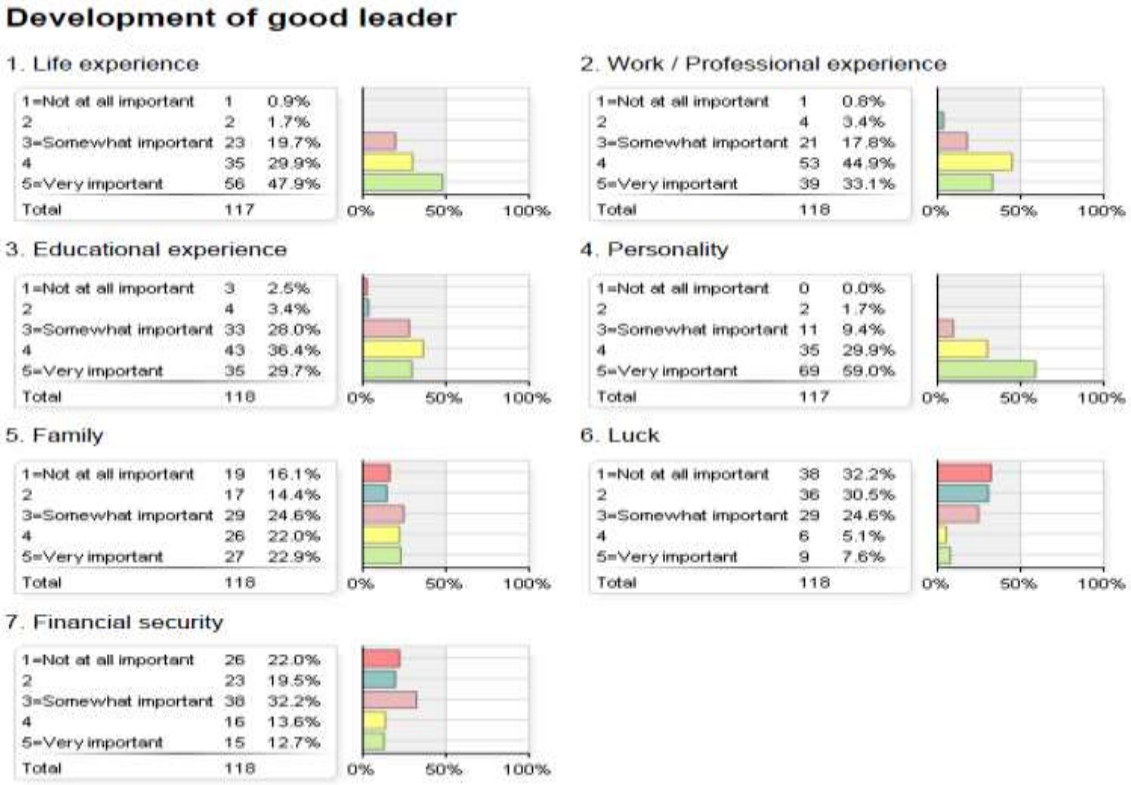


Figure 3: Factors contributing to the development of a good leader.

Participants indicated that competent and skilled leaders needed to be excellent communicators (72%), followed by excellent collaborators and continuous learners (61%). Critical and creative thinking skills were viewed as strongly needed by only 50% of participants. Considering the research ranking critical thinking and creativity as essential employability skills (WEF, 2016; OECD, 2011; Partnership for 21st Century Skills, 2017), participants' perception of these skills, as well as the low number of ideators in the study, indicates a serious disconnect between the skills industry needs and the skills students *think* they need in order to be employable.

Further, how might the current educational milieu's discomfort with, and subsequent resistance to, teaching and assessing creativity and critical thinking contribute to this disconnect? These are questions that need further consideration and may inspire professional development regarding how to develop, integrate and assess critical and creative thinking across the curriculum.

Participants signified that student-instructor interaction (84%), mentoring (83%) and peer collaboration (82%) were more significant to their development than individual achievement (74%). This suggests that participants value relationships in the learning process. This may influence how we move forward in our technologically-enhanced delivery models and encourage curriculum development to integrate online, community-building processes with content.

Most participants study for an exam or major test 3-5 days before (40.5%), followed by 1-2 days (39.7%), and only 2.6% study less than one day before an exam or major test. However, only 14.7% study more than 5 days before a summative evaluation. Thus, students favour cramming, despite research (Kim, 2017) showing the importance of incremental study habits to long-term memory. However, 24.8% of participants spend more than five days when working on an essay or major project. This may indicate that project-based learning encourages study habits that are more conducive to knowledge retention. Comparing these responses to the work done on working memory, retention and intervention (Fenesi et al., 2014) would be beneficial, especially since responses to the survey questions regarding assessment provided intriguing information about what assessment types did and did not increase stress, anxiety and discomfort in learners.

The pre-survey indicated that many common learning strategies, such as summative assessments, were sources of stress for learners. 70% of those learners surveyed were more stressed over pop quizzes than a final exam (1-3 = 43%), while 57% were anxious about doing group projects. Announcing a group presentation increased the discomfort to 59%, and 61% were more uncomfortable when having to do the presentation alone compared to working with a partner (1-3 = 43.1%). Also, 64.1% indicated they were uncomfortable presenting first, and 59.8% when presenting last, indicating that presenting, overall, caused stress. This reflects the finding by the National Institute of Mental Health stating that 73% of people fear public speaking more than they fear death (2017). Only 37% (1-3) experienced discomfort when asked to write a reflection, and 63% (1-3) felt discomfort when asked to write a 1500-word essay.

These findings suggest that further research into how learning strategies contribute to student stress might examine differences in comfort level between assessment *for* learning, *as* learning and *of* learning. Since presentations seem to be uncomfortable learning practices, a more incremental, cross-curricular, cross thinking preferences approach to presentation skills may be a beneficial, safe way of learning these vital 21st Century skills.

Thinking preference findings

Although FourSight Thinking Preference profiles can identify hybrid styles, participants were categorized into the five main profile types in order to avoid diluting the data. The *n* was reduced to 94 since 23 participants completing the pre-assessment did not complete the FourSight assessment. Figure 4 illustrates the number of TP profiles of all participants with Figure 5 showing the profiles according to academic area.

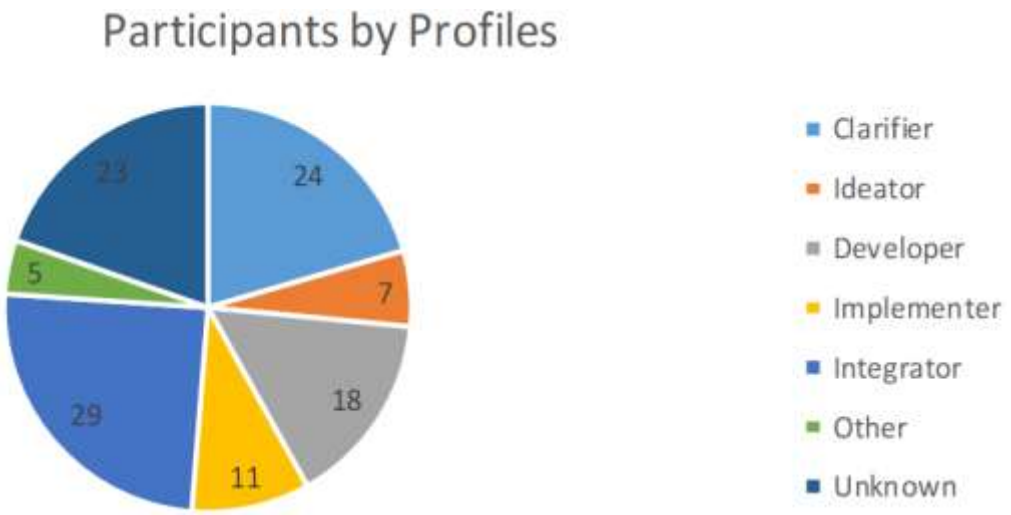
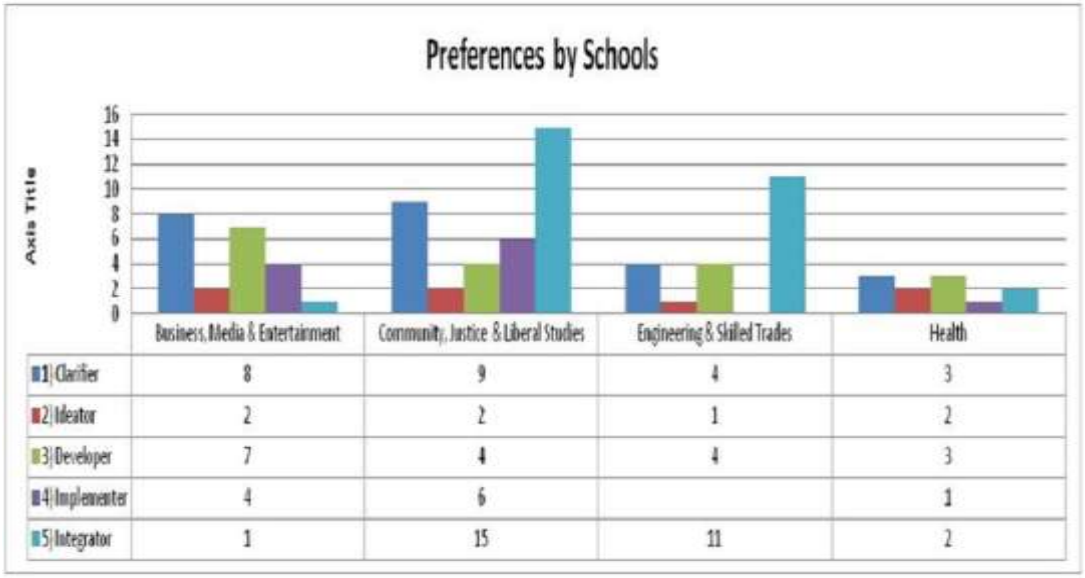


Figure 4: Total participants TP profile.

In the study, clarifiers recorded no discomfort working alone and would rather struggle through a problem than work with others. They also preferred to leave a problem they didn't understand for another time. They requested instructor assistance more than did students with any other profile, corresponding to TP research stating clarifiers are the students who ask the most questions (Thurber, 2014). Clarifiers indicated a lot of discomfort in doing group and individual presentations, especially when going first. Only integrators showed a higher level of discomfort when asked to present first. When given three weeks to perform a task, clarifiers showed no discomfort, even when the task was a final exam. This may relate to clarifiers being focused, orderly, organized and deliberate, making methodical studying their optimum learning strategy (FourSight, 2014). In contrast, a pop quiz, characterized as spontaneous and ambiguous, produced a lot of discomfort in clarifiers compared to students with other profiles. Autonomy in assignments was somewhat important to clarifiers, possibly reflecting their preference for explicit instructions rather than vague, open-ended, self-paced tasks.



	Business, Media & Entertainment	Community, Justice & Liberal Studies	Engineering & Skilled Trades	Health
1 Clarifier	8	9	4	3
2 Ideator	2	2	1	2
3 Developer	7	4	4	3
4 Implementer	4	6		1
5 Integrator	1	15	11	2

Figure 5: Thinking preferences according to academic schools.

Unlike clarifiers, the ideators ranked collaboration and group work as very important to their learning. Similarly, ideators indicated no discomfort in working with a partner, alone, or doing a group project, reinforcing the profile's flexibility and adaptability. While all profiles were

uncomfortable with pop quizzes, ideators and implementers showed less discomfort than the more detail-oriented profiles. The small number of ideators in this study contradicts thinking preference research (Puccio & Acar, 2015) and may be indicative of education's risk-adverse culture (Eng, 2017; Dweck, 2016; Pink, 2009).

Clearly, more research in this area is required and could indicate that educational practices might be working counter to some learners' innate motivation and energy. If this were the case, prolonged involvement in a learning setting antithetical to one's TP could increase learner stress and anxiety. This suggests a possible analogy between research on TP and occupation fit (Puccio et al., 2018), as well as more recent research into TP and mental health (Puccio et al., 2018).

In this study, there were 13 developers across four schools (Figure 6).

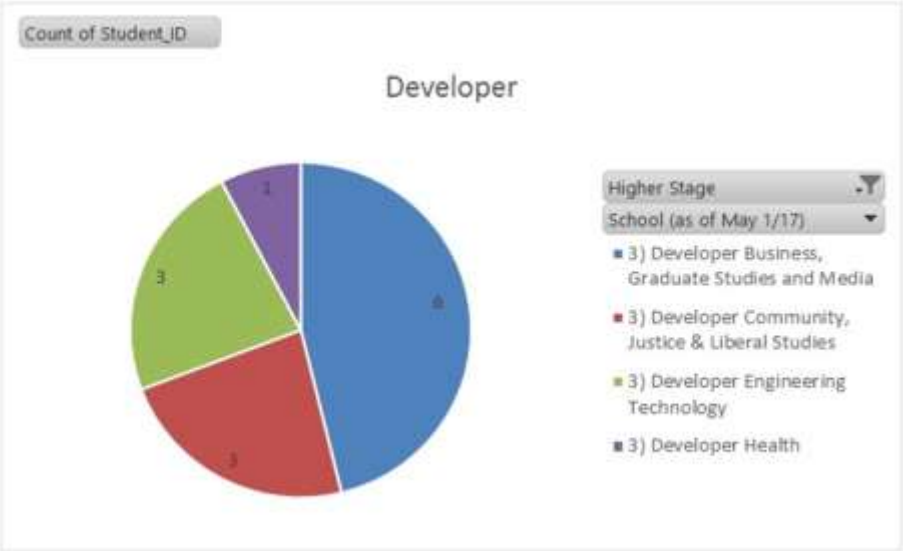


Figure 6: Number of developers across schools.

They showed no discomfort working alone, with a partner, in a group, or on an individual presentation and showed no discomfort presenting first, or last. This apparent confidence in sharing work may relate to the profile's focus on accuracy and reliability. Their meticulousness is indicated by the variety of strategies they use when studying such as colour coding, reading their notes, using practice quizzes, studying with others, asking the instructor for help and searching the internet – a go-to option for all profiles. Essay writing and having to do a task in five minutes created the greatest discomfort and may reinforce developers' perfectionist tendencies through systemic analysis. While developers may generate precise work regarding format and style with few, if any, careless errors, their thoroughness may increase their anxiety if time were a factor in the task.

In this study, developers, clarifiers and integrators displayed similar results regarding important academic elements. Students with three of these preferences showed career specific content, individual achievement, field placement and co-op to be important to their learning. Unlike clarifiers and integrators, developers also valued autonomy in assignments and due dates possibly because they are adept at creating lists and timelines (Thurber, 2014).

Implementers related closely to the findings of ideators in this study. Since they are action-oriented, they did not see student-instructor interaction as very important to the learning process. Relationships take time; maybe they would rather realize their ideas than talk about them. Similarly, implementers felt less discomfort over pop quizzes than exams, and matched the discomfort level over writing essays expressed by clarifiers.

According to the research, developers are rare in corporate profiles while ideators are abundant (Thurber, 2014; Puccio, Miller & Acar, 2018). This study indicates the opposite and poses an interesting challenge regarding the impact education's highly coded, hierarchal and role-

entrenched environment has on learner identity and behaviour. The low number of ideators and high number of developers may signify that the institution of education has a conforming influence on learners and that the over-emphasis on high-stakes, standardized evaluations shapes some learners' thinking patterns in a way that runs counter to their natural preferences. Education's role-defined, unnatural environment might coerce some learners into displacing their natural preferences for a provisional preference that is more appropriate to the context and expectations of being a learner. While people can't always act within their preferences, prolonged deferral of their energizing thinking tendencies, as experienced over the timeframe of obtaining a degree, may contribute to increased mental health issues among learners. Again, more research is required in this area.

The unexpected

The slippery and subjective nature of language was foregrounded in this study. When self-assessing their leadership traits using TP terminology, participants gave affirmative responses (over 50%) to all attributes except the word "controlling". Only 28.6% thought they were controlling and 38% thought they needed to develop this attribute. In questions where participants had to assess the value of controlling to current and future skills, they gave this attribute the lowest score of all descriptors. Similarly, the term "independent" received the highest score for skills participants currently had (96%) and the second highest, next to controlling, as an attribute they do not need developing. Yet, independence was part of the ideator cluster. This suggests the "cool factor" – as defined in marketing geared toward youth consumers – may have influenced responses with culturally-specific connotations playing a role in accurate self-assessment.

The ever-changing nature of language may require a re-examination of the FourSight measure of creative thinking preferences and its privileging of the word over other literacies, such as the visual and spatial, especially when assessing diverse generations, ethnicities and non-linguistic audiences. By ignoring language's malleability, the FourSight measure privileges linguistic intelligence and may miss opportunities for inclusivity of non-linguistic, yet valid, measures, such as a kinaesthetic or visual demonstration of preferences.

Reflective enquiry toward empathy

The project showed TP as a valuable framework for reflection leading to autonomous learning and skill development. The following excerpt is a reflection written by a healthcare student before learning thinking preferences:

One challenge our group faced was initially getting started. We had a very slow start, which was in part due to *members not taking time* to meet to discuss the overall project. Another issue we faced was one individual not being present for group meetings, which we felt was *unfair* that *this person did not participate equally* with the *rest of us*. In the future, it would be best to set-up group expectations early on in project collaboration so that all group members are aware of *their responsibilities* and what the *repercussions are if they fail to do so* [*my italics*] (2013).

The italicised discourse reflects a fracture between group members and suggests future punitive action. In contrast, the next excerpt illustrates a reflection written through the lens of TP:

Thinking preferences really foretold the way *our group* functioned. . . *our group* was made up of two developers, which really brought out structure, organization and planning. . . The two ideators were the ones who took on the creative ideas. . . For my next collaborative assignment, *I will try to learn* a little more from the way *my other group members* prefer to think by *expanding my ideas from a different angle [my italics*] (2017).

The emotional and interpretative maturity shown here highlights the value of TP's precise, asset-focused language describing behaviour: "Learning about the types of people you are working

with. . . can be a great asset in strengthening the team and ensuring that you are not *butting* heads. By knowing your team, you can maximize on everyone's strengths to create an equilibrium" (2016). Another student example typifies the autonomous learning that thinking preferences encouraged in students:

- Knowing the type of problem solver, I am will allow me to identify what role I can partake in the group. This information has also allowed me to identify the areas I need to work on so I can improve on my interactions with other types of problem solvers in the future (2016).

- Employing a thinking preference framework in the classroom encourages a social-emotional intelligence that appreciates, rather than fears, heterogeneity, and in our ever diverse and globalized world, this is a 21st Century skill worth acquiring (Boyko-Head, 2018).

Conclusion

This project investigated the impact learner awareness of cognitive bias and strengths can play in the development of intra-personal skills leading toward autonomous and responsible learning behaviour. In addition, the project highlighted the value that awareness had in the development of inter-personal skills enhancing a sense of community through empathetic communication and equitable collaboration. The project used the FourSight Creative Thinking Preferences assessment tool as an evidence-based means of identifying, personalizing and applying TP language and theory within the classroom. Results indicated that thinking preferences became a flexible, reflective framework for all learners, regardless of their program of study. By utilizing a common language and interpretation of experience, participants demonstrated an empathetic perspective regarding those experiences and accepted differences, difficulties, and failures as steps, rather than obstacles, toward learning autonomy and personal and professional development.

The project's workshops demonstrated that an awareness of TP helped learners collaborate with others because they communicated better through a shared, value-neutral language depicting process tasks. Thus, the pilot study demonstrated that Thinking Preference awareness in education helps develop creative, democratic and empathetic learning spaces (Boyko-Head, 2018). Along with its enhanced communication, collaboration and conflict-avoidance, TP also accommodates a maximizing of the diverse as manifested in the very nature of the 21st Century post-secondary classroom. According to M.J. Allen, "learning is viewed as a cognitive and social process in which students construct meaning through reflection and through their interaction with faculty, fellow students and others" (2003, p3). The workshops highlighted the diverse ways that learning takes place within learners, helping them to develop empathetic, empowering learning experiences.

Central to this project's transformative emancipatory approach was learners' reflective ability in seeing educational interactions through a TP lens. This makes the post-secondary classroom an innovative playground for perspective-shifting and role-playing where all become curriculum co-creators and leaders. The pilot also showed how Yorks and Kasl's (2012) "paradox of diversity" can be overcome through TP's value-neutral framework. Likewise, the study revealed TP's empowering potential. By increasing learners' cognitive awareness, TP provided development strategies to improve leadership competencies, and to build the capacity identified by the World Economic Forum (2016) and Organization of Economic Cooperation and Development (2011). The impact of TP on learners' progress toward personal and professional mastery, autonomous learning strategies and empathetic perspectives is encouraging for future research and classroom application.

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Designing an Educational Environment in Six Steps: Teaching for Understanding and the Motivation for Understanding

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Abstract

The first part of this article describes in brief the Six Steps methodology for designing educational environments—be they K-12 schools, tertiary institutions, community centers, youth movements, or the like—as set forth in my book *Educational Design in Six Steps: A Strategic and Practical Scaffold (*Routledge 2020). The second part of the article illustrates application of the Six Steps method in designing an educational environment the aims of which are teaching for understanding and the motivation for understanding.

Keywords: The six steps method; The three educational meta-narratives; The six educational means; Teaching for understanding and motivation for understanding (U&M); The relational concept of understanding; The performance concept of understanding; Big ideas; Self-determination theory; Realm of understanding; Education for wisdom.

Part 1: The Six Steps Method

The Six Steps method is needed today more than ever, as never before so many organizations and individuals been engaged in designing so many new or renewed educational environments. Schools—the most common educational environment—which only a few decades ago were considered one of the world's wonders (Perkins, 1992, p. 1), nowadays seem to evoke more embarrassment than wonder. Many people question whether schools resonate the values and challenges of the twenty-first century, whether they equip students with necessary competencies.

Two principal reasons account for this deterioration of the public image of the school. The modern school emerged and expanded in the nineteenth century because it supported two interrelated historical developments and, in turn, was supported by them—the consolidation of the nation-state and the expansion of the industrial revolution. Zvi Lamm wrote: "Schools were to nation-states what houses of prayer were to religions: they served to disseminate the national ideology. In many instances, that ideology actually was fashioned by them" (quoted in Harpaz, 2020, p. 38). And Edward Fiske wrote: "By and large the factory-model school accomplished the mission it was given […]. It helped stabilize the new urban culture and turned out the kind of workers needed by the industry of the day" (1991, p. 33). The enervation of these two historical processes diminished significantly the tailwind of the school and rendered its original function redundant. With the firm entrenchment of the nation-state over the course of the last two centuries, we no longer need schools to generate and sustain national consciousness. Rather, in today's world the purpose of school should be to cultivate cosmopolitan consciousness and global citizenship (not in place of, but in addition to, national consciousness and state citizenship) to cope with the challenges threatening human lives on our planet that no nation can address on its own—the climate crisis, pandemics, nuclear weapons proliferation, dangers implicit in artificial intelligence, to name only a few (Harari, 2019). And in the post-factory economy or the knowledge economy in which knowledge is the raw material, energy and product of industry and services, the purpose of the school should be to cultivate sophisticated and flexible competencies such as higher order thinking,

inventing new and useful ideas, effective collaboration and communication, etc.

Absent from many of the educational initiatives that have proliferated in response to these challenges in recent years is educational design thinking, a method, a scaffold. Educational initiators become infatuated with an idea and are driven to establish a new/ alternative/ innovative educational environment. The idea might be a good start, but it's not anchored in a systematic and holistic design. The design presented here is in no way intended to dampen the initiators' enthusiasm but, rather, offer a scaffold that will impose discipline on their designs and aid in actualizing its potential. The gist of the design process is presented in the following chart and clarifications.

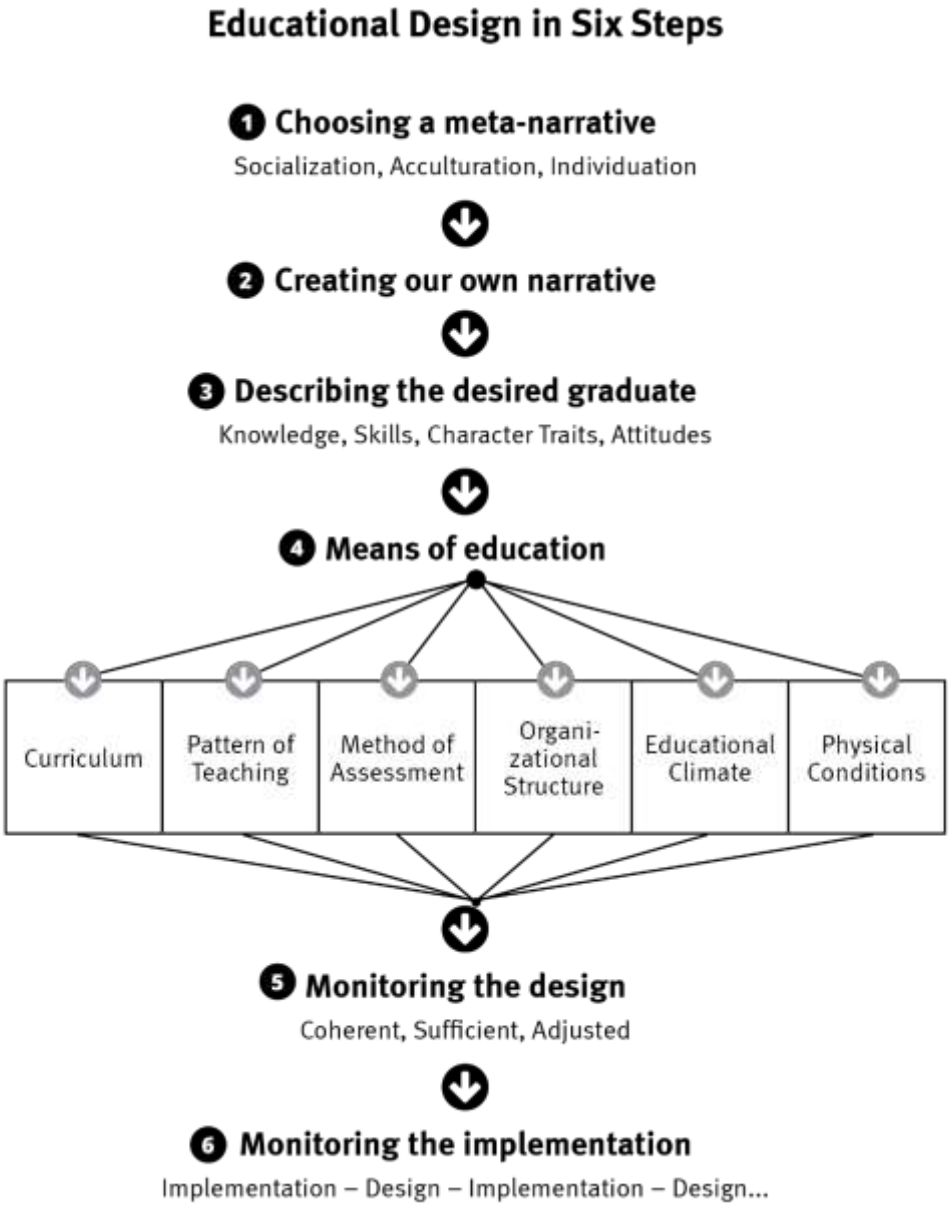

Figure 1: Educational design in six steps.

Step 1: Choosing a meta-narrative

The point of departure of the Six Steps is recognition that there is no one correct or good education but three "correct" or "good" educations, or three educational paradigms—each one of

which imparts its distinct meaning on the design steps. Quite a few thinkers and researchers have espoused this view and expressed it in various formulations (cf. Dewey, 1938; Kohlberg & Mayer, 1972; Adler, 1982; Fenstermacher & Soltis, 1986; Schubert, 1986; Scheffler, 1989; Egan, 1997; Rorty, 1999). Our designing method adopts Zvi Lamm's version (1976; 2000). In his view "education serves three masters": the society, the culture and the individual. For the first master, society, the aim of education is to impart tools (practical knowledge, skills, codes of behavior) that graduates need in order to integrate into the society and to work. For the second master, culture, the aim of education is to mold students' personalities in the light of the values and truths of the preferred culture. For the third master, the individual, the aim of education is to enable each student to fulfill him or herself, to realize his or her unique personality.

These three educational aims are supported by three meta-narratives that justify them and motivate educators. We may speak in terms of three "educations": education as socialization, education as acculturation, and education as individuation.

In Step 1 designers need to choose one educational meta-aim and meta-narrative that will serve as the framework for their overall design. It's a "tragic choice" since it entails a sacrifice of the advantages offered by the other two, unchosen educations.

Why must designers choose?! Why not impart tools, influence values and enable self-fulfillment together in the same educational environment!? Because each education is directed by a particular set of convictions and beliefs, and the corresponding educational means of each (see Step 4) convey different and contradictory messages. The messages implicit in the educational means of the three educations contradict and negate one another; each education abrogates the pedagogical impact of the other educations. An affective educational environment is guided by one consistent education.

How does one go about choosing an educational meta-narrative? There is no empirical way to choose an education—for instance, to diagnose the students and then provide them a suitable education. That's a medical, not an educational, model. Rather, the choice is made by reference to a "pedagogical sentiment"; one meta-narrative appeals to the designer, resonates with his or her beliefs and yearnings. The educational choice starts with the educators' "sentimental" preference, their pedagogical identity. To be sure, the characteristics of the students imposes some constraints, sometimes severe, but they do not compel the choice of one education over the others. In principle, each education suits (almost) all students. Education is condemned to freedom. Recognition of the pedagogical sentiment does not necessarily occur at the beginning of the design process, in Step 1; it may reveal itself or be generated gradually through the design process.

The choice made in Step 1 marks the boundaries of the design arena. Every subsequent step will take place within these boundaries and will be generated by them.

Step 2: Creating Our Own Narrative

In Step 2 designers create their own interpretation of the educational meta-narrative they chose in Step 1—their unique version of it, their own narrative. In Step 1 they chose the scheme; in Step 2 they vest it with substance.

In *The End of Education* Neil Postman posited that education came to its end because it lost its end—a meaningful narrative. Without such narratives "schools are houses of detention, not attention" (1995, p. 7). In Step 2 the designers create a meaningful educational narrative and ascertain that the designed environment will be educational and not detentional.

Step 3: Describing the desired graduate

Step 3 extracts from the previous steps an image of the educated person or the desired graduate—the product of the designed educational environment.

Educational activities are essentially "closing the gap activities"—activities intended to reduce the gap between the actual student and the ideal graduate. In fact, the image of the ideal graduate generates the image of the actual student. For example, a teacher does not see a real student who is "weak in mathematics"; she sees him as such because she has an image of ideal graduate who is "strong in mathematics." The diagnosis of the "real" student is derived from the ideal image and not vice versa.

We may delineate the profile of the desired graduate in terms of four categories: knowledge, skills, character traits and attitudes. The first two are generally associated with instruction, and the second two with education. Teaching imparts knowledge and skills; education shapes character traits and attitudes that coalesce into a world view.

Step 4: Implementing the narrative in the means of education

There is an intrinsic link between aims and means in the realm of education; particular aims require particular means. When the educational means do not "broadcast" the educational aim, the educational aims are a hollow declaration. Students do not encounter the aims of education as such; they encounter them as they are embodied in the means by which they are educated—how they are taught, assessed, organized and so forth. Students are educated through the means, not the aims. In this respect, in education, as in communication, "the medium is the message": the means of education (the medium) form the (real) educational aims (the message).

There are six fundamental means of education—six levers by which educational environments try to leverage students to realize the ideal image of the desired graduate: curriculum; pattern of teaching; method of assessment; organizational structure; educational climate; and physical conditions. Each educational aim imparts different practical meanings to these means. The designers should be mindful that their educational means are dictated by the declared educational aim and do not bespeak other, inconsistent aims, in other words, that the overt curriculum matches the covert curriculum.

Curriculum

Essentially, curriculum is chosen content organized according to some guiding principle. When education is socialization, the curriculum is mainly comprised of tools—practical knowledge and skills. They might be organized in hierarchical order, according to their level of complexity. When education is acculturation, the curriculum is mainly comprised of canonical content—content that reflects the values and truths of the preferred culture. The content might be organized in spiral order in which the same content is taught and learned at different levels of depth. When education is individuation, the curriculum is "written" largely by the student and organized flexibly according to the student's developing interests.

Pattern of teaching

The pattern of teaching is the way in which the teacher mediates content to the students. When education is socialization, the pattern of teaching is based on exemplifying and practicing. When education is acculturation, the pattern of teaching is based on modeling and initiating. When education is individuation, the pattern of teaching is based on facilitating and supporting.

Method of assessment

The method of assessment is formal evaluation through tests, grades etc., or informal evaluation through feedback. The key question in this context is what is assessed. When education is socialization, the assessed element is mastery of the tools imparted. When education is acculturation, the assessed element is internalization of values endowed. When education is individuation, the assessed element is personal development.

Organizational structure

We may speak of organizational structure in terms of organizational regularities. The aim of the organizational regularities is to enable behavioral regularities—mental and physical forms of behavior. When education is socialization, the organizational regularities seek to enable behavioral regularities that relate to the mastery of tools. When education is acculturation, the organizational regularities seek to enable behavioral regularities that relate to the internalization of values and truths. When education is individuation, the organizational regularities seek to enable behavioral regularities that relate to self-fulfillment.

Educational climate

The educational climate relates to the organizational culture, to its explicit and implicit messages. When the aim of education is socializing the students, the educational climate is characterized by practicality and efficiency. When the aim of education is acculturating the students, the educational climate is characterized by excellence and inspiration. When the aim of education is individuating the students, the educational climate is characterized by laissez fair and creativity.

Physical conditions

The physical conditions relate mainly to the architectural contours of the educational environment. When the aim of education is socializing the students to the technological society and work environment, the architectural contours resemble a hi-tech building. When the aim of education is acculturating the students, the architectural contours resemble a cultural center. When the aim of education is individuating the students, the architectural contours resemble a park. In all instances, the architectural design should emerge at the end of the designing process and serve it, not as is most often the case in which architects design, builders build, and education is "imprisoned" in a concrete block to which it must adjust itself.

Step 5: Monitoring the design

Step 5, like the following one, encourages designers to be reflective practitioners, designers who reflect on their work and try to improve it. The designers should consider their product from three perspectives. Is it coherent: Do the means (Step 4) derive from the aim (Steps 1, 2, 3)? Is it sufficient?: Does it suggest an initial plan that allows implementation of the design? And is it adjusted? Does it suit the community to which it is targeted?

Step 6: Monitoring the implementation

The previous step evaluated the design prior to its implementation. This step evaluates it during and following implementation. The purpose of the design is to guide performance, but performance also guides design; the design should be reconsidered in the light of its implementation.

In Conclusion

The premises of pedagogical design thinking suggested here are: (1) There is no one good education, or as it commonly referred to today "education of the 21st century." There are three ideal types of education that, in reality, are manifested in myriad and mixed versions. (2) Educational means derive their practical meaning from educational aims and narratives. Accordingly, there is no good curriculum/teaching/assessment, and so forth; the educational means are formed, or should be formed, by the educational aim and narrative. (3) Designing educational environments should be systematic and holistic and should reflect the epistemological structure of education.

The strategic and practical scaffold presented above enables those who seek better educational environments to design it rationally and effectively. The second part of this article exemplifies the process.

Part 2.
Designing a Teaching for Understanding and the Motivation for Understanding Environment

The design presented here seeks to illustrate the effectiveness of the Six Steps strategy and, no less, to express the author-designer's belief that schools nowadays should "go back and onward to basics"—education for understanding and the motivation for understanding.

Step 1: Choosing a Meta-aim and Meta-narrative

The "tragic choice" of the designer of teaching for understanding and the motivation for understanding (U&M) is education as acculturation. The designer strives for students and graduates who will understand, and will desire to better understand, the world and themselves. The designer believes that in the era of "late capitalism" (Jameson, 1994), which embeds its utilitarian values in all realms of life, including education, and cultivates egocentric individualism, the status of education as acculturation has receded in comparison to the other two educations — education as socialization and education as individuation. Education, therefore, should be buttressed by "useless" values-oriented educational environments, values that constitute our humanistic, liberal and democratic culture and view humankind as autonomous beings that are an end in themselves. In the context of the following designed environment, U&M are perceived as a key element of acculturating education, particularly its intellectual dimension. In the spirit of Socrates, the designer believes that an unexamined life—life without understanding and the motivation for understanding—is not worth living.

Choice of an acculturating education, that is, education guided by the truths and values that constitute the preferred culture, provides the conceptual framework and contours of the remaining design steps.

Step 2: Creating our Aim and Narrative

The point of departure for creating our aim and narrative is the following question: What is the fundamental thing that teachers—acculturating teachers committed to the intellectual and moral development of the students—want to achieve in each lesson? The answer is: understanding and the motivation for understanding. Teachers wish students to understand the lesson's topic and to have a better understanding of it and its discipline beyond the classroom in their future lives. Hence, in our educational context, the fundamental aim of teaching is understanding and the desire to understand more deeply: cognition and motivation. And not simply U&M, but U&M of meaningful contents, of "big ideas" (see below).

Nowadays schools evade the basic aim of teaching. To brand themselves as "innovative" or "21st century" schools, they yield to flashy trends like gamification, escape rooms, makerspace, mindfulness and others—most of which belong to the category of "edutainment." The designed educational environment calls for "back to basics!"—U&M. And not just "back to basics!" but also "onward to basics!" since the structure of the traditional school (Lamm, 1976), its "grammar" (Tyack & Cuban, 1995), or its regularities (Sarason, 1996) do not enable U&M. Schools promote superficial and flawed knowledge for the purpose of recycling information on exams. David Perkins (1992) denominated this sort of "schooled" knowledge as "fragile knowledge": inert (not transferable to different contexts); naïve (nondisciplinary, based on personal experience); and ritualistic (stored exclusively for school-based demonstrations). Lee Shulman applied the term "pathological knowledge"—knowledge that suffers from three pathologies: inertia (not transferable to different contexts); amnesia (quickly forgotten); and fantasy (the illusion that it is understood). Therefore, the designed environment, which goes back and onward to basics, must offer an environment organized differently, in ways that support U&M and yield non-fragile and non-pathological knowledge—knowledge that is understood, that is meaningful both subjectively (experienced as such by the learners) and objectively (imparting meaning to concepts and phenomena).

What is understanding? What is motivation for understanding?

Understanding: Relating and performing

Following philosophers and researchers, let's conceptualize understanding as an intellectual process of *relating* and *performing*. According to the relational concept, understanding is a process in which the intellect creates sound relationships among concepts and generates understanding webs (Harpaz, 2018). According to the performative concept, understanding is a process in which the intellect thinks with knowledge and generates "understanding performances": explains knowledge, interprets knowledge, criticizes knowledge, creates knowledge, and the like (Wiske, 1998). We will enlist these two concepts for the benefit of teaching, which goes both back to and onward to its fundamental mission, and to designing an educational environment that provides conditions for learning that is rich in U&M.

Understanding as relating

John Dewey wrote:

> To grasp the meaning of a thing, an event, or a situation, is to see it in its *relations* to other things: to note how it operates or functions, what consequences flow from it, what causes it, what uses it can be put to. In contrast, what we have called the brute thing, the thing without meaning to us, is something whose relations are not grasped. (1933, p. 137–38)

To understand something is to grasp its meaning; the meaning of something is generated through its relationship to other things. We cannot understand a "brute thing," something detached from its relationships, out of context. The process of understanding, therefore, is a process of releasing something from its isolation and connecting it to other things—capturing it in a web of relations. And not only in a single web but in many: webs of operations, functions, causes, consequences, uses and more.

Relationships are the essence of understanding; to understand is to relate. But not any relating; *the relating must be proper*. In contrast to subjective experience of understanding ("I see"; "I heard a click"; "Aha …"), teaching seeks to achieve universal understanding: understanding of concepts and phenomena by means of the natural sciences, the humanities, or the arts—understanding subjected to intersubjective rules of justification and verification, or to scientific methods (natural sciences) and interpretive methods (the humanities and arts). The process of understanding manifests itself in the mind of individual student, each in his or her unique way. Yet, it must be performed properly; the student should reconstruct the understandings implicit in the taught content.

Traditional school encourages *reconstructive understanding*. It expects the students to reconstruct in their minds, in an elementary or initial or "amateur" way (Perkins maintains that the desired graduate to which we can realistically aspire is an "amateur-expert." 2014), the understandings of experts mediated by teachers, books and websites. The research institute, on the other hand, encourages *innovative understanding*. It expects researchers to develop new understandings or discoveries within the dominant paradigm (to do "normal science" in Thomas Kuhn's terminology). But even in reconstructive understanding there is a degree of innovation or creativity (routine creativity, with a small *c*): the student must generate the relationships and connect the concepts that construct understanding for him or herself, in his or her mind. Only rarely does a student create truly new connections and generate a "breakthrough" understanding (creativity with a capital *C*); most of the time students reconstruct pre-existing connections (Newton, 2012, p. 2).

Understandings based on personal experience or intuition are comparatively easy, but when content transcends or contradicts these subjective resources, as is often the case in the academic disciplines, understandings are difficult and challenging. For instance, it's difficult and challenging to understand that objects tend to persist in motion (in our personal experience after some motion we

need a rest), or that human beings forgo freedom (in our personal experience we desire freedom). The mission of school is to teach knowledge that was generated in the scientific and interpretative disciplines, namely knowledge that often contradicts commonplace intuitions and undermines them. Therefore, the understandings expected by schools are often difficult and challenging, and when conditions for their emergence are not provided, they do not tend to emerge or to be reconstructed, connected or webbed.

And when a student does create or connect proper networks of understanding in spite of the obstacles school poses, it becomes easier to understand new content, to assimilate it, in Jean Piaget's term, into an existing understanding web. But webs of understandings are not static or stable; they transform or, in Piaget's term, accommodate themselves in order to resolve internal contradictions or to grasp phenomena or concepts that are important for someone to understand.

According to the model of the mind accepted by cognitive science (cf. Entwistle, 2009, chap. 2; Newton, 2012, chap. 4; Willingham, 2009) we can describe the process of generating understandings as follows:

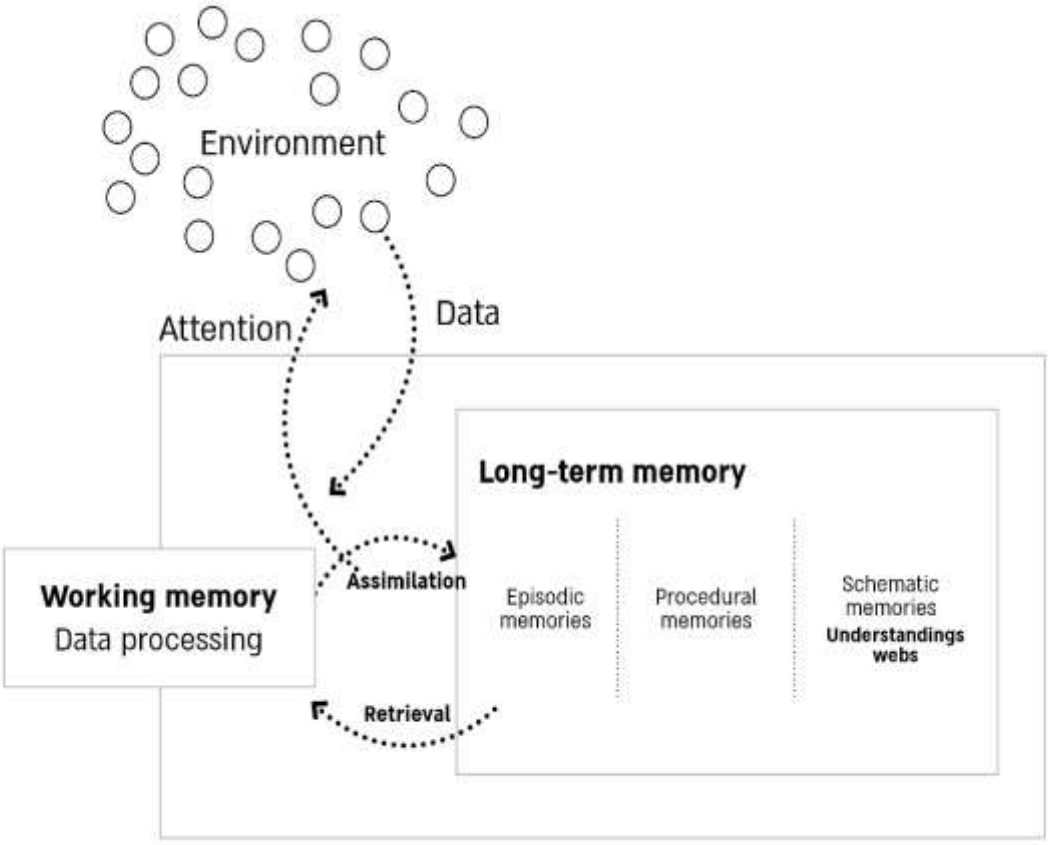

Figure 2: The process of generating understanding..

The mind's attention mechanism is directed to the external or internal environment and extracts data it seeks. That data is processed in the working memory. The working memory processes data by means of relevant content stored in long-term memory. Long-term memory stores its content in three different repositories (separated by penetrable walls; their contents are connected and support one other): episodic content—memories of myriad occurrences; procedural content—memories of "how to" (to ride bicycles, to use a computer, etc.); and schematic (or semantic) content—memories

of concepts and ideas. The third repository is most relevant to our analysis since it stores schemata—concepts, ideas, understanding webs—whose generality and flexibility enable transference of knowledge from the context in which it was learned to new contexts. Transference is the quintessential characteristic of understanding of a concept, idea, rule, etc. Moreover, it facilitates understanding of the content to which they were applied and render them meaning. When students are equipped with relevant understanding webs, they achieve understanding of content taught in the classroom more quickly and more deeply.

But sometimes the student's schematic repository is equipped with mis-understandings or naïve theories—intuitive false and intransigent theories that youth develop to explain phenomena in their lives—that hinder them from generating correct understanding webs. And on occasion a student retrieves from his or her schematic repository irrelevant content that diverts understanding of the topic taught. Sometimes a new piece of knowledge is not assimilated in a proper schema. The process of understanding is replete with obstacles and difficulties that stem from the quality of the understanding webs stored in long-term memory, the accuracy of their retrieval and assimilation, and more.

But it merits emphasizing that understanding is not a mechanical process of paying attention, processing, assimilating, accommodating, retrieving and the like, that leaves the person unaltered. Understanding—particularly of big ideas—exerts holistic impact on a person, on his or her modes of thought, imagination and emotion. In such cases, we may talk about *insight*, holistic understanding, sometimes sudden and fleeting, that generates a conceptual change and switches the perspective on the particular issue he or she is trying to understand. (It worth warning here that the feeling of understanding is misleading. Someone can experience a strong feeling of understanding but not understand, while someone else understands without a strong feeling.)

Moreover, understanding is not always a linear and smooth process—a continuous improvement of a series of understandings. At times it entails transforming understanding webs or replacing them with others. We might call this kind of understanding *disruptive understanding*, an understanding that disrupts or undermines an understanding web and suggests a new one. When a new web resolves contradiction in the existing one or helps capture something it could not grasp, it is accepted willingly. But when it disrupts dearly held understandings, understandings that implicate personal identity, then it is accepted, if at all, with resistance, sometimes with pain.

From the perspective of the relational concept of understanding, the aim of teaching is to improve the understanding webs and the process of webbing. Improved webbing is achieved through established or verified processes and concepts, and improved webs are cogent, rich, coherent and abstract, namely, webs that explain effectively. The process of webbing empowers the webs, and the webs empower the process of webbing. Empowered webbing and webs enable the students to understand conceptual content, and through them the world and themselves, more wisely.

Understanding as performing

According to this concept *understanding is a capacity to perform thinking operations with what one knows—understanding performances.* This concept reduces or translates understanding to thinking—the ability to think with the knowledge that is taught and learned. According to David Perkins, "understanding is the ability to think and act flexibly with what one knows. To put it another way, an understanding of a topic is a 'flexible performance capability' with emphasis on the flexibility" (1998, p. 40). And according to Tina Blythe, "performances of understanding require students to go beyond the information given to create something new by reshaping, expanding, extrapolating from, applying, and building on what they already know. The best performances of understanding help students both develop *and* demonstrate their understanding" (1998, p. 56).

There are a good many understanding performances. The following table presents eighteen key understanding performances divided into three categories (Harpaz, 2018):

Table 1: Key understanding performances.

To present knowledge	To manipulate knowledge	To criticize and create knowledge
To express knowledge in your own words	To analyze and synthesize knowledge	To give reasons and justify knowledge
To summarize knowledge	To suggest example, metaphor, analogy, comparison	To reveal contradictions or tensions in knowledge
To explain knowledge	To generalize from detailed knowledge	To question knowledge
To suggest interpretations of knowledge	To predict from knowledge	To reveal basic assumptions of knowledge
To represent knowledge in various ways	To contextualize knowledge	To suggest counter-knowledge
To generate perspectives on knowledge	To apply knowledge	To generate knowledge on the basis of knowledge

Understanding performances should be qualitative. The explanations, examples, predictions, questions, etc. should advance the understanding of the topic under discussion and "go beyond the information given." Trivial or misleading explanations, examples, predictions, questions, etc. are not understanding performances; at times they are misunderstanding performances.

Understanding performances are not the aim of teaching and learning but a means; the aim is understanding significant content—big ideas. Like Perkins, who identifies four attributes of "big understandings" (2014), we might characterize a big idea as an idea that is: rich in insights—it explains a lot and makes us wiser; rich in values—it has an ethical dimension and makes us better; rich in motivation—it has motivational potential (it undermines, since it suggests a new perspective, and it resonates, since it echoes our implicit thoughts and questions; this double move, undermining and resonating, stimulates motivation); and rich in presence—it is relevant to the individual and society and promotes our involvement.

A big idea should be formulated as an affirmative statement. For example: "Gender identity is a social and cultural construct"; "In communication, the medium is the message"; "Beauty is in the eyes of the beholder"; "The mechanism of evolution is 'directed' by a 'blind watchmaker'"; "The power of the *Homo sapiens* stems from his ability to imagine nonexistent entities (God, state, money, etc.)"; "Understanding is relating and performing."

Wiggins and McTighe (2005) also reduce understanding to performances, extended performances, or six abilities: to explain; to interpret; to apply; to have perspective; to empathize; and to have self-knowledge.

From the perspective of the performance concept of understanding, the aim of teaching is to encourage and improve thinking operations with knowledge—understanding performances. Understanding performances are applied to worthwhile contents—big ideas. Big ideas enable students and graduates to understand the world and themselves.

The relational and performative concepts of understanding might complement each other and create positive synergy (though there is a certain theoretical tension between them). We advocate preserving the two separate concepts, as they help understand understanding and promote it from two different perspectives.

Motivation for understanding: Intrinsic motivation

Motivation for understanding is not merely a means to achieve understandings of ideas. *Motivation for understanding is an aim in itself*. The designed educational environment seeks to cultivate students and graduates who are curious, inquiring, and eager to gain understanding of phenomena and concepts. In our educational context the search for understanding is "the taste of life."

And note: *Understanding and the motivation for understanding are not entirely separate entities, one associated with conciseness and the other with emotions. Motivation is embedded in understanding; it's an essential component of it*—the effort to understand, to go beyond information given, to immerse oneself in the root of the matter, to understand what "under-stands" behind it.

And the more one understands, the more one wants to understand. Namely, understanding something is not the ultimate destination of understanding, as if having understood something our passion to understand is satisfied and abated. Understanding something is a refreshing or energizing way station; each new understanding opens new horizons and reinforces the motivation to understand further. Understanding though is contagious; or to use a less intimidating metaphor, it's a magnetic field that attracts new understandings.

Moreover, understanding generates understanding gaps, and they, in turn, produce motivation to understand—to fill the gaps. Hence, the more we understand, the more we understand how much less we understand, and the more and less we understand, the more we want to understand. We must speak, therefore, about *motivated-understanding*—understanding as a state of mind imbued with motivation; and also, about *understanding-motivation*—motivation imbued with cognition, since understanding not only generates motivation but is generated by it. If, for instance, you understood that the one who harmed you was well-intentioned, then your motivation "to settle the account" is replaced by motivation to reconcile. In the same manner, students understand that they can get by in school, that's to say get reasonable grades with superficial ("fragile" or "pathological") understanding, and thus their motivation to understand is diminishing, and they conduct cost-effective economy of motivation. In the spirit of Israel Scheffler's classic article "In praise of cognitive emotions" (1991, pp. 3-17), we may speak in praise of cognitive motivations and motivated cognitions.

At this point it merits adding that our designed educational environment does not purport to invent motivation for understanding out of thin air; motivation for understanding is a basic human desire. We might signify it differently, such as the will to power, the will to meaning, or some other will, but there is no reason for us to perform a "geology of wills." The motivation to understand looms as one of the elementary motivations of human beings; it drives each individual and every culture. Therefore, *the optimistic starting point of education for understanding is the assumption that all people possess a natural motivation to understand and that all educators need do is support it and enable its self-actualization.* (According to Kieran Egan's developmental theory of understanding [1997; 2008], young adults are in the philosophical stage in which they are eager to understand the world through conceptual schemes.)

But we are not simply naïvely optimistic (though dealing with education demands a measure of naïve optimism), but also soberly realistic. In addition to the natural motivation to understand, there is a motivation, perhaps no less natural, not to understand, to dim the lights, to shut the widows, to narrow the horizons. (Nietzsche wrote that man is measured by his ability to bear the burden of truths or understandings, and that rather than seeking truth and understanding, people are in search of "metaphysical comforts." And Roger Scruton wrote: "Aristotle told us that all human beings desire to know, but he failed to point out that that they do so only when first reassured that knowledge will be reassuring" [2014, p. 89]. "Understanding is useless, you have to have faith. I believe in the *Führer*" declared a German worker in one of those days [quoted in Snyder, 2017, p. 69]).

Certain environments reinforce and encourage the motivation to understand, and others weaken and suppress it. *That is why the educational environment suggested here is so vital: it is designed to support a distinctly human but vulnerable motivation to understand reality and respond intelligently to it.*

In order to support the "vulnerable" motivation to understand, our educational environment enlists the "self-determination theory" of motivation (Ryan & Deci, 2017). This theory suits the motivational-cognitive nature of understanding and our educational aim—cultivating intrinsic motivation (what Ryan &

Deci call autonomous motivation) for understanding.

It is possible, of course, by means of certain conditionings in which schools specialize to cultivate heteronomous motivation for understanding (for instance, an effort to understand in response to exam pressure), but we prefer autonomous motivation because: (1) it is more efficient; understanding flourishes when it experienced as an independently chosen goal (Daniel Pink wrote his book *Drive* [1995] from this perspective; intrinsic motivation is the fuel of the knowledge economy); and (2) it is more ethical; it respects the individual's autonomy, the person as an end in itself.

Intrinsic motivation, according to Avi Assor (2018), requires "two concepts of freedom": negative freedom, that is freedom from external and internal pressures (autonomy) and positive freedom, that is a will to achieve a meaningful goal that reflects the inner self (authenticity). *Similarly, intrinsic motivation for understanding requires these two kinds of freedom. Intrinsic motivation for understanding is autonomous and authentic*.

According the self-determination theory, *intrinsic motivation, including motivation for understanding, can emerge and thrive when three basic psychological human needs are satisfied*: a need for autonomy ("the need to self-regulate one's experiences and actions."); a need for competence ("competence refers to our basic need to feel effectance and mastery"); and a need for relatedness ("people feel relatedness most typically when they feel cared by others.") (Ryan & Deci, 2017, pp. 10-11). When people are not satisfied in these respects, they cannot exert mental energy in the effort to understand; their mental energy is invested in efforts to satisfy other, more primary needs. U&M, therefore, demands a supportive educational environment that responds to human basic needs.

According to the self-determination theory as applied to motivation for understanding, the aim of teaching is to cultivate and nurture intrinsic motivation for understanding—a motivation that stems from the experience of free choice and that reflects and generates the selfhood of the person who seeks to understand.

Summing up Step 2: In this step we generated our version of the educational meta-aim and meta-narrative we chose in Step 1. Our version includes an educational aim, U&M, and a narrative that includes two practical concepts of understanding and one theory of motivation applied to motivation for understanding. Step 2, perhaps the most important step, and certainly the most "our own," lays the foundation for the following steps.

Step 3. Describing the desired graduate

The image of the desired graduate or the educated person is implicit in Steps 1 and 2. It's important to make it explicit since the educational aim and narrative are represented in the teachers' minds as an image of the desired graduate. This image enables them to educate—to close the gap between the real student and his or her ideal image. The essence of the educational activities is closing the gaps between the ideal image of the student and his or her real image (which is derived from the ideal image of the student, and not vice versa).

Let's extract the image of the desired graduate from the previous steps by means of four categories: knowledge, skills, character traits and attitudes. The different educational aims and narratives charge these categories with different contents.

Knowledge: In our educational environment knowledge is organized in big ideas and also in "small" integrated ideas. The desired graduate knows—or, better, understands—ideas rich in meaning, value, motivation and presence. He or she conducts after school life with deep insights about the world and themselves.

Skills: Some are generic—understanding (relating and performing), learning, thinking, inquiring; some are disciplinary—skills needed "to know your way around" (to use Perkins' metaphor for understanding) in the various fields of knowledge and creativity. The skills are not taught separately but infused in the ideas taught.

Character traits: One is central: a passion for understanding, for disciplining chaotic reality and self to render them understandable. Additional desired character traits of our graduate are implicit

in the literature on thinking dispositions—cognitive traits with direct impact on the quality of thinking (cf. Costa & Kallick, 2014). We can reformulate them as understanding dispositions. For instance, dispositions to curiosity, clarity, flexibility, reflectivity, criticality and others support good thinking as they support deep understanding.

Attitudes: Among others, an admiration for the enterprise of human understanding, the ongoing endeavor to lend meaning to the enigmatic reality that eludes understanding. Choosing a meaningful life in search of insights and intelligence. Respect for human reason, scientific achievements, thoughtful ideas, and the freedoms that enable them. Moral, sometimes practical, support to education for U&M.

Step 4. Adjusting the means of education

Up to this point, the three designing steps dealt with the educational aim and the narrative that webs it and lend it meaning and vitality. If the webbed educational aim is not to remain a mere educational manifesto, it must be applied to the means of education. The design of an educational environment should be both practical and capable of implementation.

The means of education derive their conceptual and practical meaning from the educational aim and narrative and, in turn, provide the leverage for them to be realized. The following are short descriptions of the six means of education that leverage the kind of education we aim to promote.

Curriculum

A key term in our curriculum design is *realm of understanding*. Realms of understanding organize the knowledge for the sake of U&M. The meaning of knowledge is not implicit only in the knowledge itself, but also in the way it organized, and in educational contexts it organized by some educational aim and narrative. In education also, the medium—the curriculum, the pattern of teaching and the other means of education—is the message.

What is a realm of understanding? How does it differ from the school subject on the one hand and an academic discipline on the other? Amnon Karmon (2007) distinguished between the organization of knowledge in those two frameworks (see Table 2):

Table 2: Organization of knowledge.

The organization of knowledge → Basic characteristics ↓	**School Subject**	**Academic Discipline**
1. The ultimate goal	Transmitting existent knowledge	Generating new knowledge
2. The preferred cognitive performance	Final examinations	Research papers
3. The rule for choosing knowledge	Certain and consensual knowledge	Uncertain and controversial knowledge
4. The sources of knowledge	Secondary sources	Primary sources
5. The structure of questions	Closed	Open (within the paradigm, "scientific puzzles")
6. The deployment of knowledge	From fewer topics in fewer school subjects to more topics in more school subjects	From more topics in more disciplines to fewer topics in one discipline
7. The relation to knowledge	Passive and receptive	Active and productive
8. The picture of knowledge	Absolute truth; knowledge as a mirror of nature	Getting close to the truth, to a better mirroring of nature

The school subject and the academic discipline have different goals. (1) The goal of the school subject is to covey existing and privileged knowledge—knowledge selected by the society and the culture. The goal of the academic discipline is to generate new knowledge. *This fundamental distinction gives rise to a whole range of organizational differences*. (2) The subject assesses the ability of students to remember and recycle knowledge; the ultimate test of this ability is the final exam. The discipline assesses the ability of the researchers to generate new knowledge and interpretations; the ultimate test of this ability is a publication of research paper in a scientific journal. (3) The subject seeks to teach approved and conventional knowledge. The discipline seeks to inquire into doubtful and questionable knowledge. (4) The subject is based on secondary resources—teachers' talks, textbooks, websites, etc. The discipline is based on primary resources—observation, experiments, findings, documents, etc. (5) The subject asks closed questions—"Guess what I have in mind!" (Those who know the answers ask those who don't know.) The discipline asks open questions—as yet unanswered questions that lend themselves to resolution within the dominant paradigm ("scientific puzzles" in Kuhn's terminology). (6) The subject seeks to "cover the material," to transmit selected bodies of knowledge, and to favor breadth—the more subjects and topics the better (referred to as "the tastes method" – the students will taste as many subjects and topics and develop an appetite; Neil Postman and Charles Weingartner [1969] called it "the immune method"—students will be vaccinated against the subjects and topics they learn). The discipline tends to limit its deployment of topics to achieve expertise in a narrow field. (7) The subject fosters a passive and receptive relation to knowledge. The discipline fosters active and productive interaction with knowledge. (8) The subject promotes a correspondence picture of knowledge—knowledge as the reflection or the mirror of nature. The discipline promotes a progressive picture of knowledge—knowledge that approximates "the truth," a more accurate and sophisticated reflection or mirror of nature.

In contrast to the school subject and the academic discipline, *the realm of understanding is organizing knowledge for the sake of U&M*. As reflected in the above table: (1) The ultimate goal of the realm of understanding is generating understanding of big ideas and motivation to understand them more deeply. (2) The preferred cognitive performance is a scientific or artistic project that develops and demonstrates understanding—conceptual relations and understanding performances. (3) The principles that dictate the choice of knowledge for teaching are implicit in the characteristics of big ideas. (4) The sources of knowledge are primary and secondary. (5) The structure of the questions is that of "big questions"—questions derived from big ideas (questions derived from approximated answers and not vice versa). (6) The deployment of knowledge is limited to a number of realms of understanding to enable deep learning for understanding. It's impossible to understand a curriculum of too many school subjects with too much knowledge in each subject. Less is more. (7) The relation to knowledge is curiosity, questioning, a drive to understand. (8) The epistemic picture of knowledge is of meaningful truth, reasoned, verified, explanatory, enabling, inspirational. It is by no means the sole and absolute truth, but it is a powerful one. (It corresponds to the third phase in the epistemic developmental scale of William Perry [1970]. The first is "there is one absolute truth." The second is "there are many truths," "anything goes." The third, our phase, is "there is more than one truth, more than one way to understand reality," but there are verified truths and false ones. The fourth is a commitment to one truth or conceptual framework and activity within it with critical awareness to its relativity.)

As called for by his or her aim and narrative, the designer of the "Back and onward to basics!" educational environment highly prizes the academic disciplines; they are the best incubator of good ideas, the best lenses through which to view the world and come closer to understanding it. But the purpose of the academic disciplines is to propagate and train experts, whereas the realms of understanding are directed to propagating and educated people of insight who seek further insights. We may speak though about *discipline-oriented realm of understanding*.

And since our educational environment seeks to encourage U&M of the world and "myself" it should choose discipline-oriented realms of understanding that promote them. For instance, psychology, philosophy, brain research, cosmology.

But good ideas are also flourish across disciplines (interdisciplinary) and above them (metadisciplinary). Take history for example. Within the discipline: The causes for the revolution were ...; across disciplines: some of the causes were economic, some sociological, some psychological ...; above the discipline: different historical perspectives detect or emphasize different causes. History is always perspectival.

Moreover, our educational environment seeks to encourage U&M in realms of knowledge and creativity that are not typical academic disciplines, such as the arts and sports. People understand the world and themselves through aesthetic experiences and bodily experience ("somatic understanding" in Egan's terminology). We may speak about "multiple understandings"—various ways to understand the world and ourselves (which might relate to Howard Gardner's famous theory of multiple intelligences; each intelligence is a typical way to understand reality).

Pattern of teaching

The last two decades saw the development of various frameworks of "teaching for understanding." (Cf. Entwistle, 2009; Erickson & Lanning, 2014; Harpaz, 2014; Leithwood at al., 2006; Wiggins & McTighe, 2005; Wiske, 1998). Some go by this designation and some don't, but all are directed to promote understanding. The various teaching for understanding frameworks offer differing concepts and strategies, but generally they share a common view of understanding as a preferred "phase-state of knowledge"—the knowledge is generative, structured, reasoned, abstract, flexible, transferable, in a word, understood. (Apropos of the metaphor phase-state of knowledge, we may say that there are three ways to hold knowledge in mind: a solid phase-state in which knowledge is conjoined to the context in which it was taught and learned and not disposed to migrate to other contexts; a gas phase-state in which the concepts that constitute a set of knowledge are dispersed and lack logical connections; and liquid phase-state in which knowledge is consolidated but fluid and able to flow from one context to another—an understanding state of mind.) There is no evidence as to which framework of teaching for understanding is most effective, and the large number of variables in the educational field render it doubtful there ever will be. We are free to adopt one of them or generate a reasonable combination of all or part of them.

Based on what was said above, we recommend ten generic guiding principles—before, during and after class lessons. The principles are general and require more detailed development.

1. Formulate one or more grand ideas that correspond to your teaching goal in the realm of understanding you teach.
2. Derive big ideas from the grand idea(s) and organize each class around one of them.
3. Extract big questions from the big ideas, pose them to the students in relevant contexts and guide dialogue on them.
4. Introduce new concepts with "warm-up discussions," established by means of "warm-up discussions", a brief questionnaire and other means, to help determine whether students have prior understanding webs that will facilitate their understanding of the idea you intend to teach.
5. Relate phenomena and concepts, generate understanding webs, and encourage the students to do so.
6. Have students produce understanding performances related to the big ideas discussed in the classroom.
7. Stimulate the motivation to understand an idea—undermine and resonate the students; ask provocative questions; and supply, or better, guide them to supply, answers that restore the cognitive equilibrium.
8. Forge a climate of a search of understanding in the classroom by speaking directly about understanding and its worth, modelling a search for better understanding, and feedback directed to manifestations of understanding and efforts to achieve it.
9. Provide students with assignments that challenge their understanding.
10. After a class ask yourself, "Did I help students understand the ideas we dealt with? What should I do next time to more effectively help them to understand?"

The meta-principle of the above principles is *activating teaching*, namely a teaching that stimulates students to question, to inquire, to grapple with intellectual challenges. A good teacher does not ask him of herself, "What am I going to tell them?" but, rather, "How am I going to activate them?" namely, "to do understanding." (as the well-known Confucius' epigram goes: "When I hear, I forget; when I see, I remember; when I do, I understand").

Method of assessment

A method of assessment that seeks to advance U&M confronts two principal challenges: (1) U&M are elusive entities that do not lend themselves to simple quantification and measurement. Mindful of our severe limitations in this area, we have to "translate" them into defined entities that are subject to quantification and measurement. (2) U&M are vulnerable to the "assessment effect" since the reinforcement and the conditioning inherent in assessment potentially diverts students from the intrinsic value of U&M to externalities—marks, grades, certificates, and the like. The aim of our educational environment is to energize students to embrace U&M as an end in itself, as a meaningful objective. Assessment, however, jeopardizes the entire project of our educational environment; it requires sense and sensibility. While a measure of extrinsic motivation is indispensable to reinforce U&M, that reinforcement should be weak—verbal feedback, for instance—since, as we know, intrinsic motivation is hard to build and easy to destroy by strong extrinsic motivation.

Our designed educational environment addresses these two challenges: (1) The relational and the performative concepts of understanding define understanding as relationships and performances, and these entities lend themselves to measurement and assessment. The relationships, as noted above, should be proper, and the performances should be qualitative. For purposes of assessment, we must define proper relations and qualitative performances with the greatest possible specificity. (2) Having formulated specific criteria for assessing good relations and performances, we must be on guard that the assessment based on these criteria will not adversely impact students' U&M.

The conceptual framework of formative assessment called "assessment for learning" (AfL) can be beneficially employed in assessment for U&M. "Assessment *for* learning (AfL) is a conscious attempt to make assessment a productive part of the learning process. It does this by making classroom assessment an essential part of effective teaching and learning" (Stobart, 2008, p. 144). AfL is essentially "assessment *for* understanding," i.e., AfU, hence it is appropriate to adopt the rationale and techniques of AfL as this educational means of our educational environment design.

Organizational structure

It is worthwhile to design the organizational structure of any educational environment based on Seymour Sarason's concept of "regularities" (1996). Sarason defined two types of regularities: programmatic (which we shall call organizational) and behavioral. Behavioral regularities are modes of mental and physical behaviors that the environment seeks to promote; the former are the organizational structures that enable (but by no means guarantee) the latter.

The essential behavioral regularities called for in our environment is U&M, namely deep and investigative learning motivated autonomously and authentically. Our educational environment then should generate organizational regularities that support and enable such mental behaviors.

We have already mentioned organizational regularities that support and enable U&M related to curriculum, teaching and assessment. Additional organizational regularities that support and enable U&M relate to the organization of realms of understanding—a limited number of realms selected from among others offered to the students; to the organization of classes—not necessarily based on age but rather on ability and motivation, with a reasonable number of students (about twenty), divided now and then into smaller groups involving peer teaching; to the organization of time—longer classes, perhaps devoting an entire day to one realm of understanding; to the organization of functions—principals, teachers and students cooperating to achieve the common pedagogical aim; and more.

There are primary and secondary organizational regularities. Changes in the former drive changes in the latter. We have cited primary organizational regularities, which transform the traditional organizational structure of school, its "grammar," in order to provide the optimal conditions for U&M.

Educational climate

While it is not easy to define school climate, it is easily discernible. A sensitive visitor can detect an organization's atmosphere or vibe relatively quickly. For inspiration in forming a suitable climate for our educational environment we might take another look at Raphael's famous fresco of *The School of Athens* (1510). In isolation, in pairs and in groups, through thinking, reading and conversing, Greek, Christian and Muslim philosophers (lovers of wisdom) seek to understand the heavens (in the center Plato points up to the ideas) and earth (Aristotle beside him points down to the facts). The vibe that emanates from this masterpiece is of admiration to wonder, thought, inquiry, search for understanding. We can distill the climate of this "educational environment" as *excellence and inspiration*. Excellence reflects an effort to actualize the potential of human reason, and inspiration reflects a sense of spiritual uplifting derived from understanding or coming to understand the world and human nature through new ideas.

Raffaello Sanzio or Raffaello Santi (Raphael): *Scuola di Atene* or *The School of Athens* (1509-1511). Apostolic Palace, Vatican City: https://upload.wikimedia.org/wikipedia/commons/c/c3/Raphael_School_of_Athens.jpg.

True, we are not the school of Athens, we are only a school; we are not philosophers, we are teachers and students obliged to teach and learn a given curriculum. But still, our educational environment should convey overt and covert messages of excellence and inspiration, by teachers and

students who try to excel in U&M and occasionally experience a sense of inspiration in encountering and generating meaningful ideas and deep insights.

In addition to the described academic climate, we should show concern for the social-emotional climate; it should be *supportive*. As the self-determination theory teaches us, students will be engaged by intellectual work only so long as their basic psychological needs are satisfied. A constructive educational climate entails a good balance between the *demand* for excellence and inspiration and *support* in satisfying the three basic psychological needs.

Physical Conditions

The physical conditions, mainly the architectural design of our educational environment, encourage and enable understanding-rich learning in large and small groups and individually. It is worth emphasizing that the physical conditions should be designed and built to accord with and serve the express educational aim and means, and not vice versa as is so common.

Step 5. Monitoring the design

We may assess the quality of an educational design from three perspectives: coherence, sufficiency and adjustment. From the first perspective we assess whether our design is coherent—if it reflects an overall narrative; if the aims defined in Steps 1, 2 and 3 are logically connected; if the means of Step 4 are deduced from the aim. It appears our design is coherent. From the second perspective we assess if the design is sufficient—if it provides a theoretical and practical framework for implementing an U&M educational environment. It appears that our design needs refinements that can be accomplished through the process of its implementation. From the third perspective, we assess whether our educational environment is well adjusted to the social and cultural circumstances of our student population, all the while taking into account that historically education as acculturation was designed for the elite. By making some necessary adjustments, our educational environment can and should accommodate diverse populations. After all, the will to understand is universal, and lives of U&M are interesting and meaningful. Why then shouldn't we seek to respond to the existential needs of all people?

Step 6. Monitoring of implementation

This step can only be taken during the process of implementation. At this initial stage it is only possible to plan for orderly implantation of the design.

In conclusion

If understanding (of big ideas) + the motivation for understanding (of big ideas) = wisdom, then wisdom is our regulative ideal. And since wisdom is the product of lifelong experience—a set of growing insights developing over time—our educational aim is to lay foundations for wisdom. Our desired graduate, therefore, is “on the path to wisdom,” equipped with an initial set of insights and with a drive to expand and deepen them. Laying foundations for wisdom is an ambitious educational aim. It requires a wise educational environment. The Six Steps we have traversed (see Figure 1) draw its contours.

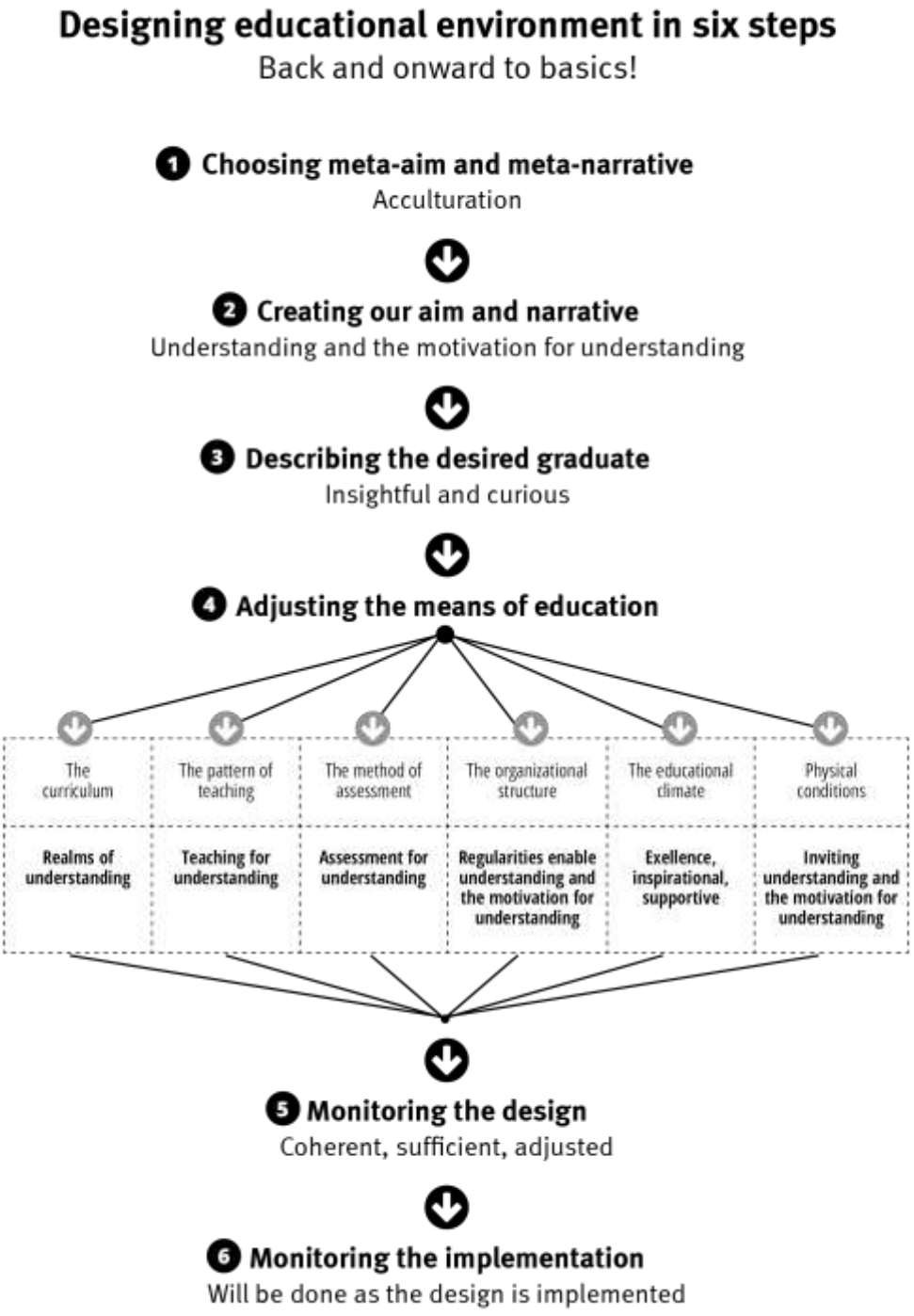

Figure 3: The six steps draw its contours.

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On Psychoses, Conspiracies, Creative Flow and the Absent-Mindedness of Genius: An Evolutionary Function-Dysfunction Taxonomy of the Multiple Subjective Realities of the Human Mind

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Abstract

The significance of illusion as a positive force in everyday life has been underestimated in both societal discourse and in empirical science. The objective of this study is to provide a synthesis of many academic disciplines' understanding of illusion and reality by proposing a taxonomy of functional and dysfunctional subjective realities as based on the assumption that the human mind is adaptive in an evolutionary sense and likely to be a quantum entanglement system. Assumptions and discussions needed to construct the taxonomy are generally based on empirical research drawing from evolutionary theory, neurology, biology, anthropology, psychology, psychiatry, physics and other disciplines. The purpose of the proposed taxonomy is heuristic, serving as a base for further studies drawing particular attention to the fact that, by evolutionary processes, Homo sapiens have been made dependent on multiple subjective realities where illusion and reality are not necessarily opposites. The article is concluded by discussing possible reasons for why illusions as a positive force in human behaviour has been neglected in comparison to the dysfunctions of the human mind of which research abound.

Keywords: Reality; illusion; delusion; hallucination; cognitive bias; evolutionary function; dysfunction; taxonomy; adaptation; psychological well-being; psychosis; diagnosis; DSM-5; quantum entanglement

Introduction and research objective

This study is an exploration into the structure and understanding of human illusion. It is easy to dismiss the subject as too philosophical, elusive and of little consequence for research and everyday life. But as I will demonstrate in the following nothing could be further from the truth. Illusions saturate everyday life in a positive way. In fact, they are so important to us that no-one is likely to have survived had they not lived by illusions. The importance of this is well established in biology. In psychiatry and cognitive psychology illusion is known by several labels, but they all have one thing in common. They represent dysfunction or error. Social psychologists, on the other hand, are well aware of the tricks that the mind can play, but such phenomena are usually referred to as cognitive bias. Importantly, their research does recognise the positive, even necessary, aspects of such bias. The same is often true of different schools of psychotherapy, although to them we interpret the world around us so as to defend the stability of our identity when needed.

There is, to my knowledge, no framework currently available that synthesises what different academic disciplines know of illusion and no attempt to date has been made to bring function and dysfunction together as related aspects of the human consciousness. The objective of this study,

therefore, is to provide such a synthesised framework to guide further studies into the field by drawing particular attention to the fact that illusion needs to be construed as reality, and that we are heavily dependent on multiple subjective realities in our daily lives, not only in the short-term to uphold psychological well-being but also over a longer period of time allowing the human species to,survive.

This study is best understood as a theoretical essay. While not directly empirical, and not a systematic literature review, the synthesis as such, and all assumptions made in the following, are based on published empirical research from many different disciplines. While the subject of reality versus illusion traditionally is an ontological issue, I will demonstrate in the following that, because of pioneering research in physics and mathematics, it is no longer meaningful to always distinguish between the empirical and the philosophical as separate domains of scholarship, at least not when exploring the workings of the mind. On this basis I aim to present a taxonomy of the multiple subjective realities of the human mind, and in so doing, also explain, for example, why an intellectual genius often seems to be so absent-minded to many, and always seems to have his or her head in 'the clouds.'

The elusive nature of reality

What is real and what is not? This question is simple enough a question. Most would perhaps reason that the answer is obvious, namely that what we observe and can touch is real and that which we cannot see and cannot touch is not. But there is no simple answer to the question. Philosophers have pondered over the problem for millenia without being able to agree what the answer might be. Most famous of them all was Greek philosopher Plato. He argued that what we perceive with our senses is not real. It is only a shadow of a universal true reality, one which cannot be perceived directly (cf. Holt, 2012). Hence, we exist in an unreal world being a mere reflection of a real world beyond our direct perception. A modern interpretation of this is the assumption that while the world around us cannot be real in any sense of the word the mathematics,underlying the existence of everything, is real (e.g., Balaguer, 2008). Another possible application of the same line of thought is to view our brain, as neurologist Michael Graziano (2019) puts it, 'as a machine that claims to be conscious'. In other words, the external world around us does not actually exist inside our heads. We experience inner subjective representations of an objective external world which the brain then interprets in a way that makes sense to us. The world around us would be real but, in a Platonicsense, our experience of it is indirect and only reflects the external world by an interpretation of it.

The notion of reality becomes trickier if, in a context which most would regard as real, some would dare to claim that they can see, hear or understand things that others cannot. Whose reality is true and whose is an illusion? We even fabricate alternative realities on purpose when we want others to believe what we say, although we know that what we convey is untrue. We aim to deceive someone, be it either for altruistic reasons such as when sparing someone unnecessary hurt, for self-preservation or being entirely selfish at someone else's expense (Everett, Walters, Stottlemeyer *et al*., 2011; Mokkonen & Lindstedt, 2016). We regularly deceive ourselves as well to preserve our sense of self-worth (Burton, 2020; Chance & Norton, 2015). To complicate matters even more, whichever reality we experience and hold as true, it can be changed. Someone who has had a religious experience or any other type of profoundly emotional experience, tends to transform their entire outlook on life and view it differently (Gutierrez, Hale & Park, 2017). One could argue that they go from one reality and to another; or alter their reality in significant ways. In addition, when someone is hallucinating for physiological, psychological or neurological reasons inner realities could potentially be created, which detach an individual so much from their external reality that they pose a danger to themselves and to others (Waters & Fernyhough, 2017). They might, for example, develop a sense of being persecuted, become convinced that they are chosen by god or that they have even become gods themselves. Some become convinced they are able to control the minds of others or that they are deeply in love with another, although the subject of their desire is not and may not even be acquainted with the delusional individual at all (e.g., Franey & Espiridon, 2018; Garety & Freeman, 1999; Rosch-Eifert, undated). Add to the complexity of understanding reality the fact that brain lesions might completely change our own understanding of who we are and how we perceive the world around us (Feinberg, 2001).

Furthermore, we cannot even trust our senses to always present us with objectively true information. In an effort to make sense of the world our brain may infer something that is not always objectively there. Optical illusions, for example, that yield visual ambiguities, distortions, paradoxes or fictions (Gregory, 1997; 2004), provide information which may not actually exist at all. Among these the Ponzo Illusion (Figure 1) is one of the most commonly cited. It demonstrates that, given certain visual cues, we tend to *wrongly* infer distance and size (Prinzmetal, Shimamura & Mikolinski, 2001).

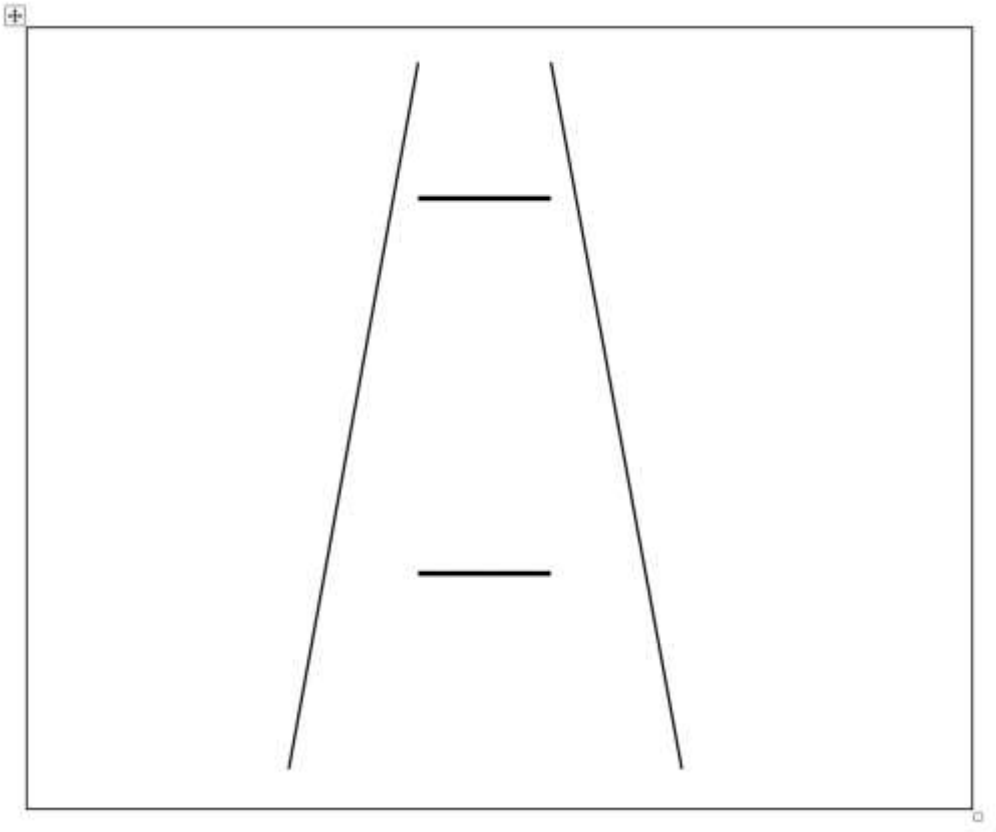

Figure 1: The Ponzo Illusion. Both horizontal lines between the leaning vertical lines are of equal length but are usually perceived as of different length in Western cultures.

Cognitive illusions are not perceived in the same way in every culture and are therefore likely to be the result of evolutionary adaptation over very long periods of time. The way we perceive our surroundings in the Western World may not be how individuals inhabiting the dense forests of Brazil perceive their surroundings. Interpretation of visual input, therefore, has survival value for a given population in a certain biotope and different biotopes offer varying conditions for survival (Deregowski, 1989).

Optical illusions can also be triggered by neurological damage or by psychoactive drugs (Gersztenkorn & Lee, 2015). Such have been used in the Western World for almost 200 years to 'expand reality' and thereby impact creative output favourably (Harman, McKim, Mogar, Fadmian et al., 1990; Krippner, 1985; Schäfer, 2007), but often at a cost to the user (Baylen & Rosenberg, 2006; Bouso, Palhano-Fontes, Rodriguez-Fornells, Ribeiro *et al.*, 2015; Gallimore, 2015; Millman & Bordwine Beeder, 1994). A case in point is famed Dutch painter Vincent van Gogh—a known epileptic—who was prescribed digitalis by his doctor for this condition. The drug, however, if overdosed, may affect perception by prompting a colour vision deficiency causing a predominance of yellow, as well as causing the patient to perceive haloes around light objects. It is undeniable that van Gogh had a particular preference for using yellow and his painting 'Starry Night' is famously characterised by haloes surrounding every light in the nightly sky. The reason for his peculiar style, it has been suggested, was perhaps a perceptual disturbance caused by digitalis poisoning (Arnold & Loftus, 1991; Aronson, 1990). Other examples of artists who created masterpieces of art, music or literature, under the influence of mind-altering drugs include composer Hector Berlioz and poets

Samuel Taylor Coleridge, John Keats and Jean Cocteau (Wolf, 2005; 2010). Needless to say, psychoactive drugs are addictive and may cause considerable harm when overdosed and used repeatedly for long periods of time. But considering their potential advantage, it is currently a matter of debate whether they can be used for therapeutic benefit but in a controlled manner thereby avoiding their undesired and addictive effects (Sessa, 2012; Tupper, Wood, Yensen & Johnson, 2015).

Your reality and my illusion, or your illusion and my reality?

Many throughout history, from ancient philosophers to modern scholars and playwrights, have been fascinated by human perception and how we handle or use the notion of reality and illusion in daily life. French enlightenment playwright Voltaire, for example, believed that having illusions is the first of all pleasures, while Romanian philosopher Emil Cioran more pragmatically suggested that illusion begets and sustains the entire world. A more utilitarian understanding is that of famed tennis player Rafael Nadal: '… I have to believe I can improve. I wake up every morning, and go to practice, with the illusion that I am going to get better that day.' A pleasant illusion, suggested American author Christian Nestell Bovee, is much better than a harsh reality, echoing a similar reflection by Hollywood actress Judy Garland. To her the loss of an illusion was almost like losing a child. 'Life has no meaning the moment you lose the illusion of being eternal', mused French existentialist Jean-Paul Sartre, whereas South African thinker Mokokoma Mokohonoana prefers to tie illusions in the 21st Century to the current Internet phenomenon Facebook and its 1.7 billion users (in 2020). He has suggested that being on Facebook gives people an illusory sense of being liked. In Facebook World they may have a vast social network of what they consider to be friends and acquaintances, but in everyday life their circle of real-world social contacts is much more limited, perhaps even non-existent. People exist in one social reality on-line and quite another when off-line (cf. Mokohonoana, 2019). Sigmund Freud has also given the notion of reality and illusion some thought. Illusions, he observed, commend themselves to us, save us pain and allow us to enjoy pleasure instead. Finally, American author Herman Wouk, ventures to define illusion as something that is bred by the gap between wishful thinking and reality and that cannot possibly cause offence or disagreement.[1]

Clearly, not only philosophers and scholars have pondered over the nature of reality and illusion. Existential musings, in one form or another, are of interest to most of us. This inclination is often regarded as a human universal; that is, that people in all cultures throughout recorded history have always, albeit in different fashions, pondered over existence and have nurtured ideas and beliefs about the unseen and the non-tangible (Brown, 1991). A few scholars have gone so far as to suggest that this human proclivity should perhaps be construed as a separate human intelligence (Gardner, 1999; Tupper, 2002). This assumption, however, is most likely incorrect, and whether our interest in existential musing constitutes a basic need for religious beliefs or not remains an ardently debated issue (Norenzayan, 2010). Regardless of religious constructs, however, it would seem that we are all, more or less, interested in trying to understand our own existence-- an inherent desire which, at least in the more secularised parts of the world, has evolved from professing formalised religious creeds to arguing that we are 'spiritual' but without any kind of religious affiliation (Ammerman, 2013). This transformation of how and what we choose to believe in suggests that existential thinking is indeed universal and cannot be confined to creeds or formal rules only. Even if abolished or forbidden, as in the former Soviet Union (cf., Anderson, 1994), spirituality will only take on other forms. Even the most ardent atheist is a believer in something although he or she is not likely to accept something supernatural or divine.

One phenomenon and its numerous labels

The large number of words and expressions we use when referring to our existence and what is real or imagined is confusing to scholar and layperson alike. Existing definitions tend to be vague or

[1] These quotes on illusion are all unreferenced since they are part of already existing compilations on the following URLs: www.wiseoldsayings.com, www.goodreads.com and www.brainyquote.com. Each of them can be found using the available search engines.

confined to certain contexts with no meaning or application in other contexts (e.g., Gregory, 1997; 2004). There is no consensus on how to render exact definitions of any of the most commonly used terms (see Table 1). Proposed standard definitions as appearing in well-regarded dictionaries and encyclopedias of the English language have a tendency to opt for circular logic. For example, if illusion is defined as an idea or a belief that is 'not true', we first need to know what is actually 'true' in order to be able to comprehend the concept which it intends to explain. Also, truth is possibly the trickiest ontological notion of them all to define and explain with any kind of accuracy.

The same problem is haunting the definition of hallucination. How do we decide if something exists or not? To understand the term, we must first know something about the enduring nature of reality in comparison to that which is hallucinated and represents non-reality. This is, of course, exactly the same dilemma that Plato and many of his followers have grappled with for centuries.

Table 1: Examples of different terms or expressions relating to reality in one way or another. Explanations are taken from the *Cambridge Dictionary* (Cambridge University Press, 2020) and *APA Dictionary of Psychology* (American Psychological Association, 2020) where available and also *Wikipedia* where neither of the other two dictionaries provided an explanation.

Terms or expressions	Suggested explanations or definitions
Altered states of consciousness (Flow/Peak experiences/Being cognition)	A different state of mind in comparison to a normal state of mind and therefore a differently experienced subjective reality.
Belief (or Faith)	Great trust or confidence in something or someone, seen or unseen.
Cognitive bias	Systematic patterns of deviation from norm or reality in assessment.
Consciousness	The state of understanding and realising something; of being aware of something either internal or external to itself.
Culture	The distinctive customs, values, beliefs, knowledge, art, and language of a society or a community. These values and concepts are passed on from generation to generation, and they are the basis for everyday behaviors and practices.
Deception	The act of hiding the truth.
Defence mechanisms	Unaware, psychological, mechanisms aimed at protecting one's identity as threatened by anxiety arising from psychic conflict.
Delusion	Belief in something that is not true.
Dogmatism	The tendency to act in a blindly certain, assertive, and authoritative manner in accordance with a strongly held set of beliefs.
Dreaming	A series of events or images that happen in your mind usually when asleep.
Daydreaming	Thinking about pleasant things that you would like to do or have happen to you, instead of thinking about what is happening now.
Eccentricity	Being strange or unusual, sometimes in a humorous way (as perceived by others).
Fantasy	A pleasant situation that you enjoy thinking about but is unlikely to happen.
Imagination	The ability to form pictures in the mind; something that you think exists or is true, although in fact it is not real or true; the ability to think of new ideas.

Table 1 continued

Illusion	An idea or belief that is not true or the result of a perceptual error.
Hallucination	To seem to see, hear, feel or smell something that does not exist.
Hope	To want something to happen or be true.
Hypnosis	A mental state like sleep in which a person's thoughts can be easily influenced by someone else.
Magical thinking	The belief that unrelated events are causally connected despite the absence of any plausible causal link between them often, but not necessarily, as a result of supernatural effects.
Mindset	A set of assumptions, methods, or notations held by one or more people or groups of people. It can also be seen as arising out of a person's world view or philosophy of life.
Pretence	A way of behaving intended to deceive for gain or entertainment.
Theory of mind	The ability to attribute mental states to oneself and others.
Unreality	Believing you are dead when still alive (The Cotard Delusion).
Visualisation	The process of creating a visual image in one's mind or mentally rehearsing a planned movement in order to learn skills or enhance performance.
Wishful thinking	The imagining or discussion of a very unlikely future event or situation as if it were possible and might one day happen .

As demonstrated, the notion of reality is complex and difficult to define. All definitions to date defy universal validity. The terms or expressions listed in Table 1 all have their own application and use in science, philosophy or in our everyday discourse. In one way or another they all allude to something that exists beyond; something not here or visible and not manifested in objective physical existence, at least not yet. But they all, for various reasons, demonstrate how common it is for us to make use of different realities, which may or may not eventually become more tangibly manifest.

Carol Dweck's (2006) idea of fixed and growth mindsets is one example of how one reality can be made into becoming another. In her view, having a fixed mindset means that you have an urgency to prove yourself because you are convinced that your qualities as an individual are unchangeable. This needs to be changed into a growth mindset, she suggests, in which you rather become convinced that your 'qualities' can be changed for the better through your own effort (see also Chen, Powers, Katragadda, Cohen *et al.*, 2020). This is a very American point of view, but it shows the possible application of different realities. In this case, one undesirable reality inappropriate in American culture should ideally be changed into a reality that is deemed more desirable (Duina, 2011; Stewart & Bennet, 1991). Other examples concern our intentional use of music, literature and drama. They offer an escape from a harsher reality, and at times also a way to cope with traumatic experience. They allow us to temporarily leave one reality for another, and in so doing we gain distance from the trauma and often find ourselves in a better position to be able to come to terms with, and process, what happened to us (Arthur 2007; Bunt, 1994; Mathies, 2020; Tan, 2008; Unkefer, 1990). Music, in particular, has a very long genetically inherited tradition in human history to mediate everyday life functionally with alternative realities for a variety of purposes (Gabrielsson, 2011; Merriam, 1964; Peretz & Zatorre, 2009; Rouget, 1985). Visualisation as practiced in sport psychology to improve an athlete's performance is another example of making use of an alternative reality, but its purpose to reinforce motor learning rather than necessarily reprogramme thought patterns (cf., Huang, 2014; Moreno & Mayer, 2007; Simon, 2007).

When there is no neurological or physiological dysfunction involved in forcing alternative realities upon us and confining us to them with no possibility of willfully affecting them, it is

undisputable that our relationship to a variety of illusions — or more suitable termed: our relationship to numerous subjective realities — is very central to how the human mind works. We all have hopes, dreams, beliefs, and we may move between different cultures and contexts, all of which may embrace realities alternative to our own everyday existence. Clearly, illusions are often not dysfunctional at all, nor are they necessarily imaginary in the sense that they do not exist.

Proposing a functional understanding of reality

We often say that beauty is in the eye of the beholder when discussing differences in taste and preference, but we rarely give much thought to the fact that the saying originated in Ancient Greece reflecting much the same struggle to understand the nature of existence as we have. With modern science we are able to test whether beauty is indeed in the eye of the individual beholder. Experiments designed to analyse how we perceive beauty in each other's faces, indicate that *most* aspects of how aesthetically appealing we are judged to be by others is, in fact, largely determined by our *individual* preferences drawn from our own social context (Germine, Russell, Bronstad, Blokland *et al.,* 2015). It needs to be noted, however, that being aesthetically appealing is not necessarily the same as perceiving someone as a suitable partner. We also know that such universal aspects of appeal such as facial symmetry, women's use of the colour red and men's status and popularity,to mention only a few are known universals tied to human courtship and sexual attraction (Dunn & Searle, 2010; Elliot, Tracy, Pazda & Beall, 2013; Shaw Taylor, Fiore, Mendelsohn & Chesire, 2011; Perrett, Burt, Penton-Voak, Lee *et al.,* 1999). The same is true of musical preferences. Music as human behaviour has evolutionary origins (Wallin, Merker & Brown, 2000), but our taste in it is largely decided by cultural and social factors (Lonsdale, 2020; Hird & North, 2020).

Arguably our perception of beauty and taste is impacted by the world around us generating different preferences in addition to the more basic and genetically inherited ones typical of our species. But the experience of beauty and preference for music are not the only aspects of life and existence that we perceive individually. Reality, it has been proposed, is the sum of all that exists *within a system*, as opposed to that which is imaginary (Wikipedia, undated). That which is subjectively imaginary, however, can sometimes become objectively real. This is, in fact, the nature and target of any creative process (see e.g., Morgenstern, 1956; Wallace & Gruber, 1989). The nature of the imaginary, in turn, is inevitably tied to known frames of reference. A clue to defining reality and making it less elusive, therefore, is to not pit the notion of reality against the imaginary as an opposite, but to rather view reality as something that is *confined* to a certain system serving as a frame of reference, consisting of one, several or all of the following: knowledge, perceptions, feelings, experiences and values which, when all taken together, constitute what we generally mean by culture (e.g., Kroeber & Kluckhohn, 1952). When encountering a different such system it is experienced as foreign and, in a sense, imaginary because we cannot immediately identify with it. It makes little sense. It is only when we acquaint ourselves with another such system that it becomes real, given that we have also possess the basic ability to understand it. This is not always the case.

The contemporary study of the nature of reality and its perception is skewed toward examining error and abnormality. It tends to position generally shared reality against individual reality, where individual reality is thought of as illusion and is construed as dysfunctional. It is understood as the result of physiological or neurological error or damage (e.g., Corlett, Krystal, Taylor & Fletcher, 2009; Currie, 2000; Leeser & O'Donohue, 1999; McKay & Kinsbourne, 2009; Ardhana Ardhana Sahoo & Josephs, 2018; Spitzer, 1990; Young, Robertson, Hellawell, de Pauw & Pentland, 1992). While this focus is by no means in dispute it nevertheless overshadows the fact that individual reality is not always dysfunctional. In fact, the opposite appears true. We rely to a considerable extent on the intentional and unintentional *functional* use of different subjective realities as we go about our daily lives. This use is no doubt *adaptive* in an evolutionary sense and necessary for our well-being and survival.

How to make sense of the age-old conundrum of the nature of reality has become even more pressing in recent times. The human species is increasingly existing in Cyberspace. This complicates

human ontology even more. Is a cyber-existence real, is it imaginary or is it something else altogether? Most of us are not bothered with the question because the Internet and what it has to offer fulfils an increasingly important, albeit technology-mediated, alternative reality previously unknown to Homo sapiens. This novel combination of subjective existence and technological objective reality, and the renewed interest in the nature of existence which it has brought with it, has not gone unnoticed by scholars (e.g., Riva, Baños, Botella, Mantovani *et al.*, 2016). Swiss physicist James B. Glattfelder (2019), for example, has observed (p. 515):

> In attempts to bridge the chasm between the objective and subjective, scientists and philosophers have opened up to the unspeakable … The human mind is witnessing the most radical paradigm shift in its own history. The well-served and previously glorious materialistic and reductionistic scientific worldview is yielding to a novel scientific conception of subjective consciousness and objective reality—and their unexpected intimate kinship.

One reality or many?

There must reasonably exist any number of subjective systems of reality, both individual and collective, to most normally functioning individuals. It matters not whether they are technology-mediated or psychologically generated. While we all differ to some degree in how we perceive and construe every aspect of the physical and social environment, there are by necessity aspects of subjective realities that we must also share. If not, upholding the social cohesion of groups and societies would be impossible. But rather than pitting a shared reality categorically against imaginary illusion, it seems more feasible to argue that we all exist in *multiple systems of subjective realities* simultaneously, and that these change, or are replaced, in relation to time, place, cause and, no less important, the fact that we are able to employ such alternative realities intentionally *without* relinquishing shared reality. Subjective realities are normally dynamic.

While it might seem farfetched in the current context, it is not without interest to note, as a comparison, that it has also been suggested by some cosmologists that we are positioned in a physical Multiverse. The observable Universe which we inhabit might not be the only universe simultaneously in existence (Linde, 2017; Tegmark, 2003; Vilenkin, 2006). This line of thinking is also relevant to the search for a Theory of Everything, in which scholars, in quite a Neo-Platonian way, are seeking to understand how everything in our physical universe is interconnected on some level as based on mathematical principles. The subjective human mind is indeed a part of this theorising (cf. Barrow, 1992; Bohm & Hiley, 1995; Capra, 1996). As computer power has increased in recent decades, physicists make discoveries into quantum reality and mathematicians follow suit to formally explain that which philosophers through the ages have only been able to speculate on. This progress has increasingly blurred boundaries between academic disciplines. It is no longer obvious to clearly distinguish between philosophy, mathematics, physics and an increasing number of other research fields and academic disciplines aimed at studying human behaviour and existence (e.g., Sheldrake, McKenna & Houston, 2001; Rosenblum & Kuttner, 2006). Maybe we will eventually reach a point in time when a theory of everything has become the obvious foundation for all study. Beyond any doubt it will include the workings of the human mind and be essential to the social sciences in general (cf. Haven & Khrennikov, 2013; Wendt, 2015).

To assume that the human mind exists in multiple subjective realities simultaneously, therefore, is not farfetched at all given the extensive research and experience that has already accumulated in psychiatry, psychology, anthropology, physics, mathematics, neurology and ideas relating to quantum reality and a theory of everything.

Illusion then, rather than exclusively being something dysfunctional and destructive as previously assumed, becomes a means to an end often willfully used to have a positive impact on human everyday life (cf., Kasten, 2008). Problems may certainly arise when we deviate from a collective subjective reality and are unable to, or at least find it very difficult, to relate to the shared reality of our social context. A few cases in point are the delusional schizophrenic, the mental

phenomena often following epileptic seizures (Elliot, Joyce & Shorvon, 2009; Mortimer, McKay, Quemada, Clare *et al.*, 1996), individuals suffering from delirium (Cunningham & MacLullich, 2013) or becoming addicted to Cyberspace and online gaming (e.g., Müller, Janikian, Dreier, Wölfling *et al*., 2015; Shapira, Goldsmith, Keck, Khosla *et al.*, 2000). Perhaps the most extreme manifestation of being entirely detached from the surrounding world psychologically is the Disassociative Identity Disorder (previously known as multiple personality disorder), which afflicts about 1.5% of the population (American Psychiatric Association, 2013). One criterion to determine the diagnosis is the following (p. 292):

> … a disruption of identity characterized by two or more distinctive personality states, which may be described in some cultures as an experience of possession. The disruption in identity involves marked discontinuity in sense of self and sense of agency, accompanied by related alterations in affect, behaviour, consciousness, memory, perception, cognition, and/or sensory-motor functioning.

While this is a somewhat controversial diagnosis, and there are different schools of thought on what causes it—no definitive biological bases have been found to date to explain why it occurs (Reinders, 2008). Yet, it is a problem that a certain percentage of any population struggles with (e.g., Walker, 2009; West, 1999).

Exceedingly creative individuals also appear to exist in what could perhaps be best described as a subjective reality between the everyday existence of normal functioning and a reality partly shared with phenomena typical of several psychiatric disorders (Mula, Herman & Trimble, 2016; MacCabe, Sariaslan, Almqvist, Lichtenstein, Larsson *et al.*, 2018; Redfield Jamison, 1993; Vellante, Sarchione, Ebisch, Salone *et al.*, 2018).

A much less obvious example, but a telling one, is the extremely intellectual individual whose mind exists in an abstract world that few others can even begin to comprehend since they lack the cognitive means to do so (Falck, 2019; Persson, 2007; Simonton, 1994). Such individuals process cognitive information with astounding speed and need an environment providing sufficient stimulation to keep their cognitive system alert and functioning optimally (cf. Geake, 2009; Geake & Dodson, 2005; Gross, 2000; Jung & Haier, 2007; Neubauer & Fink, 2009). If enough information is not available, which is frequently the case for intellectually extreme children in a normal classroom, or for intellectually gifted employees in an organisation void of proper talent management, they tend to become unfocussed, restless and exceedingly bored. This unenviable state is sometimes wrongly interpreted as Attention Deficit Disorder (Beljan, Webb, Amend, Web *et al*., 2006; Mullet & Rinn, 2015; Stapf, 2010). Having the ability to extreme abstract thinking is never a question of dysfunction and is not subject to any standard pathological diagnosis but, in line with the reasoning of this article, it is rather a question of such an individual existing in a different subjective reality, albeit a very abstract and fast-processing one inaccessible to most others thereby being perceived as strange or aloof. It is not likely that the absent-minded genius with his or her or head 'in the clouds' is somehow impaired, socially or cognitively. He or she tends to exist in an abstract subjective reality much different from that of most others, which in itself might occasionally be a problem (cf. Persson, 2007). Abstractions are not easily communicated to others unable to understand them.

Another issue of relevance in relation to shared reality is dogmatism which, drawing from several schools of thought, Furnham (2015) has defined as a strong desire to reject all ideas opposed to one's own; a low degree of connectedness among various beliefs, and many complex and positive ideas about things/issues believed in as opposed to those that are not believed in. Being dogmatic is being inflexible in one's thinking and unwillingness to change it in anyway (Arutunyan, 2018; Martin, Staggers & Anderson, 2011). Dogmatism could be understood as voluntarily holding on to one subjective reality being entirely insensitive to how it relates to a surrounding shared reality. While originally construed as a type of personality (cf. Rokeach, 1954), it is more appropriate to consider it as adaptive behaviour that is important either to the social cohesion of a group or when assuming a dominant position in a group. It has long been established that groups under pressure in relative

isolation from other groups, willingly or unwillingly tend to develop a delusional perception of shared reality by means of groupthink (Janis, 1982). A similar perceptual distortion occurs among upwardly mobile individuals ardently seeking increased social status by leadership, fame, wealth or all of these (Owen & Davidson, 2009; Prinstein, 2018; Robertson, 2013; Van Vugt & Tybur, 2016; Zitelmann, 2017).

Reality and illusion as evolutionary function

'Illusions are generally useful', Austrian neurologist Franz M. Wuketits (2008) suggested, 'they may as a result of evolution, through natural selection, actually be instrumental in serving our survival' (p. 6, author's translation). Importantly, they do not only pertain to states of the human mind. They are part of a multifacetted dynamic that is the result of evolution for a number of organisms. Many species make good use of mimicry. They possess the capacity to appear as if they belong to a species other than their own to gain an advantage by deception (Stevens, 2016). The perhaps most well-known example is the European common cuckoo. It is able to mimic the eggs of another bird and lay them in its nest effectively acting as a parasite. All eggs hatch, but the original brood of the host parents is ejected by the chick and the single cuckoo then becomes their only concern (cf. Caswell Stoddard & Stevens, 2010). Another example is the common octopus able to feign illusion in a different manner. It can swiftly change its appearance and completely melt into the background to hide in plain sight to either avoid danger or to trick a potential prey (e.g., Hanlon, Chiao, Mathger, Buresch Barbosa *et al.*, 2011).

Illusions expressed in a variety of ways among living organisms are tied to species survival in whatever species it occurs. While humans are able to deceive for gain or self-preservation as well, the human employment of illusion—or subjective alternative realities—would seem to mainly be one of protecting and maintaining psychological well-being. Cognitive biases, for example, are a ruse for our benefit. They are 'functional features designed by the wisdom of natural selection' (Haselton, Nettle & Murray, 2016; p. 982). We tend to opt for positive outcomes no matter what (Cummins & Nistico, 2002; Humphrey, 2011; Menne-Lothmann, Viechtbauer, Höhn, Kasanova *et al*., 2014), and we believe that we are more superior or excellent than we actually are (Johnson & Fowler, 2011; Yamada, Uddin, Takahashi, Kimura *et al*., 2013). We also tend to be convinced, to quote a common expression, that what goes around comes around. In other words, we are usually convinced that just behaviour will always be rewarded, whereas foul play will always be punished, somehow, in due course. This is the Belief in a Just World Theory (Lerner, 1980). Needless to say, believing in a just world is a fallacy. History is replete with individuals who were morally corrupt but who most certainly were successful by their own standards and those of many others around them. A timely example, and by no means unique, is current U. S. president Donald Trump (Lee, 2017; Trump, 2020), other U.S. presidents and British Prime Ministers (Owen & Davidson, 2009), some banking executives (Conroy, 2013) and no doubt many other leaders throughout history in different contexts (Hughes, 2018; Macqueen, 2018; Mezrich, 2016). Importantly, this attribution error is associated with psychological well-being. It has benefits to envision a moral balance in the world. Our assumption of such a balance is *not* based on objective facts (Sutton, Stoeber & Kamble, 2017; Wenzel, Schindler & Reinhard, 2017).

Occasionally also negative illusions, or misbeliefs, might be beneficial to us. A misbelief, Ryan McKay and Daniel Dennet (2009) suggest, is a belief that to some degree departs from our own subjective reality, but its function is to endorse something that is objectively untrue, such as a person telling something untrue because the objective truth is too hurtful. We tend to keep hopes up and stay positive, even if confronted with bad news or catastrophic facts that are undeniably true. This insistence on hope, even with little or no prospect of a positive outcome, is anything but trivial. Like our belief in a just world, it constitutes an evolutionary function increasing our chances for survival as a species. We refuse to give up, thus becoming quite resourceful in trying to find solutions to a threatening problem. By holding on to a positive frame of mind we keep active and alert to possible solutions even if there are none to be found. Following the same line of reasoning, a clinical depression could be thought of as an adaptive response to a threatening situation. The experience of depression could prompt us more urgently to resolve complex problems just to be able to restore the all-important psychological equilibrium (Andrews & Thomson, 2009; Nettle, 2004).

Illusion as reality

All human behaviour, especially when we are unaware of what we do has a function designed by evolutionary algorithms to further our species in relation to our social and physical environment (Ackermann Shapiro & Maner, 2009; Bertamini & Casati, 2009). It is therefore essential that we understand the *systems* in which we exist, large or small, be they either biological, physiological, ecological, psychological, social or all of them together, rather than remain on a level where we only study single aspects of such systems. Had we known years ago what researchers of ecology and environment know of natural systems now, and how easily such systems can be thrown out of balance, we would probably not have embraced and used plastics, antibiotics and fossil fuels as indiscriminately as we have to date (cf. Wallace-Wells, 2019).

This scholarly myopia has also been an obstacle when different scientific disciplines have tried to make sense of how humans perceive and understand existence as well. David Sumpter (2010), a mathematician devoted to the study of biological systems, has pointed out that 'even researchers studying the most intricate details of the components of a particular system … [must also be] acutely aware of the need to understand how these components fit together to create whole systems' (p. 1).

I therefore propose that the most reasonable way of understanding reality, and by extension also illusion—or alternative subjective realities, which is the preferred term in this article—is to view the human mind and its consciousness as consistently *adaptive* in an evolutionary sense (Cloninger, 2009; Donald, 1995; Humphrey, 2011). As a result of this, the human mind exists in multiple subjective realities simultaneously, each with a different evolutionary function (cf. Haselton, Nettle & Murray, 2016). These realities, individually construed, are systems unto themselves and will appear 'imaginary' to others not sharing or being familiar with them. For this reason, illusion is a system also, but it is one constituted by a different subjective reality. Illusion should not be construed as an opposite to reality. They are two different sides of the same coin. Every individual moves between different subjective realities constantly and intentionally, but perhaps more often unintentionally, due to the adaptive nature of the human mind (Persson, 2016). Subjective realities also change for better fit depending on what it takes to uphold and strengthen the psychological equilibrium. They are at times also used strategically. Cognitive Behavioural Therapy (CBT) could be viewed as such a strategy customised to help a patient in the best possible way. CBT aims under the guidance of an experienced therapist at creating a new mindset by changing one subjective reality, troublesome for the patient, into another through well-considered learning of new thought patterns likely to be more beneficial for the patient, under the guidance of an experienced therapist (Beck, 2011; Field, Beeson & Jones, 2015).

Under normal circumstances individuals are able to move between different realities prompted by a need to uphold their psychological equilibrium, and they do so while remaining anchored in a communally shared subjective reality that always constituting the basis for group cohesion. This understanding of the human mind and its multiple reality-based consciousness is valid only if subjective realities are the result of normal functionality. A subjective reality may become dysfunctional if the ability to remain anchored in the communally shared reality is suspended. This may be the result of many psychotic episodes, brain lesions, poisonings and so on, whereby the ability to separate between different realities are clearly hampered or suspended. Given that this understanding of the human mind has validity, and much research into how the brain functions under different conditions would suggest that the notion of existing in multiple subjective realities simultaneously is not unreasonable, it is possible, perhaps even necessary, to propose a taxonomy based on the assumption of multiple subjective realities serving as framework for a better understanding of the significance of illusion as a positive force in the human species.

A function-dysfunction taxonomy of subjective realities

To map multiple subjective realities in kind rather than in numbers, it is first necessary to separate between that which is likely to be functional in an evolutionary sense and that which is demonstratively dysfunctional (see Figure 2). Functional in this context suggests behaviour always conducive to species fitness and survival, whereas dysfunctional is the opposite. However, the

proposed taxonomy needs to be thought of not as categorical, but as dimensional emphasising that realities under normal circumstances are dynamic, and that function and dysfunction are sometimes interchangeable. One can under certain circumstances become the other. Under normal conditions subjective realities can, depending on situation and context, to some extent also be exchanged at will. For example, anyone can expose themself to a different reality by seeking refuge from everyday life in music, art, literature or being creative. Some with more desperate needs, to phrase it like American social psychologist Roy F. Baumeister (1991) does, escape the burden of selfhood with the help of alcohol, spirituality, masochism and other means. Some choose psychoactive drugs which, when overdosed or used too long, affect the ability to choose and move between realities. Normal function is then hampered and at times even entirely suspended. When artificially affecting the physiology of the brain functional reality may become dysfunctional. Clinical depression and other mood disorders are ambiguous in this sense. While suffering from them is highly disruptive for the individual, who most likely will need professional assistance to cope but, as suggested by an increasing number of researchers (e.g., Andrews & Thomson, 2009; Badcock, Davey, Whittle, Allen *et al.*, 2017; Nettle, 2004; Nettle & Bateson, 2012), such a severe disruption to everyday life may have an evolutionary purpose. It could be that it prompts the individual to resolve complex problems just to be able to restore the all-important psychological equilibrium. If so, a dysfunctional reality actually becomes a functional one even though to suffer a mood disorder is a considerable ordeal.

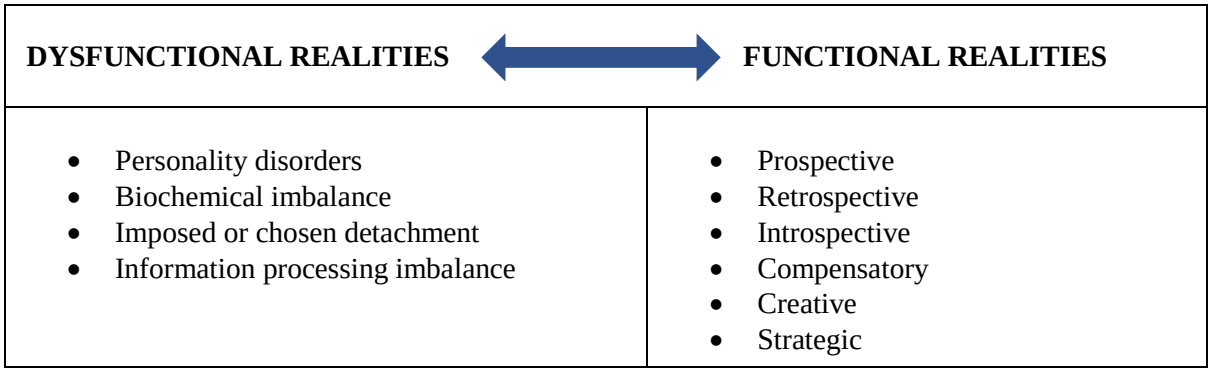

Figure 2: A function-dysfunction taxonomy of subjective realities.

In addition, our normal handling of subjective realities may suddenly come to a halt, not because of psychoses or mind-altering drugs but, for example, because we find ourselves in a situation where status is required and we may decide, perhaps unaware of doing so , that we should seek dominance by leadership. This decision affects our physiology, more for some than others, but it tends to confine us largely to one subjective reality with a narrow focus on achieving that objective. We progressively develop an increasingly self-centered attitude at the expense of others. We become more competitive, shed empathy for the sake of 'the greater good' and reconstrue others around us as instruments for the sole purpose of reaching our own objectives (e.g., Owen & Davidson, 2009; Prinstein, 2018; Robertson, 2013; Van Vugt & Tybur, 2016). In the process, we are likely to develop a more dogmatic mindset inaccessible to good advice and suggestions from others. Over time this continued process renders the normal functioning of subjective realities moot. Instead we end up in one which is entirely detached from the surrounding social world and its shared reality. It is known, for example, that seeking wealth and fortune successfully often has this effect. The exceedingly wealthy and famous tend to have little or no understanding for anyone else not sharing their exclusive existence (Zitelmann, 2017). This dogmatic mindset is dysfunctional for group cohesion but, in a sense, it is also functional. The ultimate purpose of seeking status and leadership is often to create another group with another shared reality but with the new leader in charge (cf., van Vugt, 2006).

Hence,subjective realities, their causes and uses as they relate to human behaviour cannot categorically be defined as either functional or dysfunctional. Our perception of existence and its multiple realities are best thought of as dimensional, dynamic and their function or dysfunction is determined by a number of different factors. In outlining the proposed taxonomy, it is prudent to first deal with an already well-charted terrain and focus on dysfunction and its four aspects, namely as the

result of personality disorders, biochemical imbalance, imposed or chosen detachment and information processing imbalance.

Dysfunctional realities

Hallucinations are phenomena tied to several psychiatric illnesses such as affective and personality disorders but also to post-traumatic stress (see Delespaul, de Vries & van Os, 2002; Healthline, 2018). A hallucination is a sensory perception in the absence of external stimuli and may involve olfactory, tactile, visual or auditory sensations (DSM-5). The occurrence of 'hearing voices', contrary to belief, is fairly common and not necessarily tied to a psychosis; that is, being unable to, as phrased following the logic of this paper, differentiate between different realities. About 15% of the general population have experienced it at one time or another. Among psychotic patients, incidence rises sharply to 70% or higher (Toh, Thomas & Rossell, 2015). For these patients to experience visual hallucinations is less common. It varies between 25% to 50%, with an over-representation among individuals diagnosed with schizophrenia (Delespaul, de Vries & van Os, 2002; Oorschot, Lataster, Thewissen, Bentall *et al.*, 2012). Note also that also meditation may sometimes be conducive to developing a psychosis with ensuing hallucinations, although thi sis less serious and does not not necessarily constituting a need for professional help (Kuijpers, van der Heijden, Tuiner & Verhoeven, 2007).

Delusions, on the other hand, are defined as a rigid sense of remaining certain of something despite contradictory evidence. About 0.2% of the population suffers a delusional disorder at some point in their life. The most common delusion is to believe that you are being followed by someone, but there are also delusions of grandeur, jealousy or somatic symptom disorder, perhaps better known as hypochondria (DSM-5).

A biochemical imbalance may trigger both hallucinations and delusions too but without an underlying psychiatric diagnosis. Any disturbance to our physiological equilibrium, when severe enough and/or prolonged, may interfere with the normal functioning of the brain. The result is distorted perceptions, irrational and sometimes frightening and stressful experiences entirely unrepresentative of anything existing objectively outside of the mind. Alcohol, cannabis and methamphetamine are well-known recreational and psychoactive drugs in modern society which may trigger such delusions. According to research 26% to 46% of 'Meth-users' develop a psychosis with ensuing hallucinations, some of which may last for months or even longer (Greening, Notaras, Chen, Xu *et al*., 2019). There are also other medical conditions affecting physiological homeostasis by upsetting our biochemistry thereby also impacting our sense of realities. A few of these conditions are hormonal disorders, degenerative disorders, metabolic dysfunctions, nutritional deficiencies, sleep deprivation, poisoning, certain types of infection and so on (cf. Oyebode, 2018).

I have chosen to include detached realities here as well, although detachment in this context may at times be both functional and dysfunctional depending on context and vantage point. When detached and therefore no longer dynamic, but without an underlying pathological cause, an individual's detached subjective reality is likely to be perceived as dysfunctional by a number of people in the same social context as the individual so detached, at least to begin with. Someone disturbing a social order, for example, in both small and large contexts, is generally met by suspicion and seen not only as a troublemaker but in extreme cases also as somewhat delusional. Depending on what they represent, given enough time, they may gain increasing numbers of followers. Eventually the perceived dysfunction mightdevelop into an evolutionary function. It does take a certain rigid mindset, personality and social position to start a rebellion and gain a social momentum toward acceptance and recognition (Sulloway, 1996; Tudoroiu, 2019). In so doing, the individual's detachment breaks one social context but only to create another.

While detachment is often the result of a psychotic state, this is obviously not always the case. Dogmatism, as discussed previously, is one example of this. It can be both functional and dysfunctional. Conspiracy theories are another timely example. In a time of pandemic and the ravages of Covid-19, the search for a vaccine to cure the disease is on-going with an intensity never

before seen in medical history. But at the same time the so-called 'Anti-vaxxers'-- groups in society who, for one reason or another, are suspicious of any vaccine and consistently refuse vaccination -- aregaining momentum. Conspiracies surrounding a future vaccine for the virus are increasing in numbers (Attwell, Wiley, Waddington, Leask *et al.*, 2018; Megget, 2020; Sahsavari, Holur, Tangherlini & Roychowdhury, 2020; Wolfe & Sharp, 2002). Conspiracy theories are, as Brotherton (2017) suggests, always based on an unanswered question; they portray conspirators as uniquely competent but they are also consistently understood as malevolent. A conspiracy theory is always hunting things that do not make sense and, importantly, they are *always* beyond refutation, which is the ultimate criterion for making them delusional. Answering the question why conspiracy theories exist in the first place, no matter how far removed from everyday reality and a vast amount of solid evidence, Brotherton proposes it is simply 'because we are human' (p. 241). He is suggesting that such machinations provide an explanation for something we do not currently understand, but we have an urgent need to make sense of the world around us and we therefore accept the explanation that satisfies us the best. A conspiracy theory is delusional in one sense. The rigid beliefs that conspirators profess invariably constitute a dysfunctional subjective reality. There is no relationship between the conspiracy theory and well-proven readily available objective facts. But the conspiracy theory is also functional in a positive way as well. It provides a sense of understanding that is acceptable and yields comfort. We all have a fundamental need to understand our circumstances—almost by whatever means—and it matters little whether such an understanding is based on fact or fiction. Understanding, and being convinced that we do, is what counts (see also deHaven-Smith, 2013). If so, this also suggests that we are *all*, at one time or another, prone to flirt with conspiracy theories as the need arises. Some support for this assumption can be found in studies of cults. It has for long been assumed that there is a particular pattern characteristic of individualswho seek out such contexts and uncritically accept whatever cult leaders say and demand of them. After a lifetime of studying such behaviour, University of California psychologist Margaret Thaler-Singer (1995) felt a need to conclude that there is no particular pattern to be found. Anyone, irrespective of personality or walk of life, is equally likely to become a cult member. In other words, whatever subjective reality appeals to us, for whatever reason, we may embrace it even if it represents delusion. Cult or conspiracy appears to make little difference as long as it is experienced as meaningful.

The final aspects of dysfunctional realities in this taxonomy are the ones caused by sensory overload or sensory deprivation. The brain craves information and needs a constant flow to 'make sense' and function normally. If no or limited information is provided, after a period of time, perceptual distortions begin to appear and a sensory deprived or sensory overloaded individual may start hallucinating (Zubeck, 1964; Zuckerman & Cohen, 1964). This is a stressful experience if allowed to continue, which has raised considerable ethical concerns not only regarding its scientific study but also its alleged military use (American Psychological Association, 2005; McCoy, 2006). The same perceptual distortions occur when we are fed too much information as well. This phenomenon has attracted much less interest by the general scientific community (Ludwig, 2006), with one notable exception: the military and secret services appear to have a particular interest in sensory overload (cf. Ojeda, 2008).

Clearly, our perceived existence through multiple subjective realities craves a certain balance of physiological and psychological factors if we are to function normally. When equilibrium is disturbed our world falls apart and we may become trapped in one rigid reality separated from the shared reality of our social context. This is destructive. Equilibrium needs to be restored so that we can again exist in several dynamic subjective realities. Needless to say, this is the objective of psychiatrists, clinical psychologists and psychotherapists of various schools of thought.

Subjective realities of a more positive kind and function, however, have been neglected in research and, to my knowledge, there exists no attempt to bring the research efforts of several academic disciplines together into one framework. Yet, functional realities are probably the more important to understand since they are always conducive to psychological well-being and species survival. I suggest that subjective realities have six different functions of such subjective realities. They can be *prospective, retrospective, introspective, strategic, compensatory* and/or *creative*. These

functions are not necessarily mutually exclusive. There must reasonably exist an overlap between them because of the dynamic and adaptive nature of most subjective realities.

Functional realities

We all have dreams, hopes and plans for a future that does not yet exist. We develop an inner reality and envision what such a future could look like. We then work toward trying to manifest it externally. This is a *prospective* function. It looks to the future. It also includes wishful thinking as well as the placebo effect. In both cases we hope that something will happen that is not necessarily possible. Being convinced of something has an impact on how we behave, without our being aware of how we act, which can be both positive or negative to ourselves and/or our social context. How great an impact hopes and beliefs have, however, is disputed (e.g., Benedetti, 2014; Jussim & Harber, 2005; Kienle & Kiene, 1997).

We are also able to do the opposite. The function of subjective reality can be retrospective. We reconstrue our memories of past experiences as being more positive than they actually are. Recollection might not be accurate, but the positive bias we apply, without being aware of it is likely to make us feel better and possibly help us to negotiate our way more effectively in a social landscape (Mather & Carstensen, 2005; Newman & Lindsay, 2009; Todd, Cunningham, Anderson & Thompson, 2012). People generally prefer to hear about our victories and successes rather than our failures and problems.

The function of some subjective realities is also *introspective*. They never manifest themselves externally but remain an inner reality to which we relate for a number of reasons. These are religious, spiritual or philosophical realities that do not need objective physical evidence to persist, most likely because we are hardwired to ponderover existence beyond that which we can perceive with our senses (cf., Ammerman, 2013; Norenzayan, 2010). Being religious or somehow spiritual in a more contemporary nomenclature is positively correlated with psychological well-being (e.g., Ivtzan, Chan, Gardner & Prashar, 2013; Krok, 2015).

Most thoroughly researched among functional realities are the *compensatory* ones, which are comprised of some of the defence mechanisms; that is, unaware, psychological, mechanisms aimed at protecting our identity when we perceive a threat to it and become anxious that our self-understanding is in jeopardy. A few of these are denial, fantasy, rationalisation, regression, isolation, projection and displacement. Here, too, there is a function/dysfuncion ambiguity. Some defence mechanisms are generally seen as the result of normal — or mature — functioning, but others, to varying degrees, are seen as more dysfunctional; that is, they are the result of psychotic, immature or neurotic behaviour (cf., Cramer, 1998; MacAdams, 1998; Vaillant, 1994).

I also argue that also *creativity* is a type of subjective reality in its own right. Creativity has attracted a vast number of researchers over the years and an almost endless number of studies have been published. Yet, we seem not much closer to understanding what creativity actually is. At least there is no consensus among scholars on how to explain creativity either as a general human behaviour or a specific talented behaviour (Glavenau, 2014; Tardiff & Sternberg, 1988). Irrespective of how we explain why and how humans are creative, and to what degree, it has been established that creative processes tend to engage an individual in a 'different frame of mind'. This state of mind has been labelled in several ways depending on research tradition, but the most well-known of these is likely to be *flow*; a state of mind characterised by intensity, concentration, a merging of action and awareness, a loss of reflective self-consciousness, a sense of control and losing track of time, all of which are experienced by the individual as intrinsically rewarding (Nakamura & Csikszentmihalyi, 2005). It is not difficult to relate to flow. Anyone engaged in something they love doing tends to forget everything else around them; in addition, their perception of time begins to change. They are entirely immersed in pursuing that interest. Considering the fact that it is such a rewarding experience, it is hardly surprising that we also use it as an escape when everyday life becomes too harsh or stressful which, in a way, is how Sigmund Freud in his time understood creativity as well. He viewed creative efforts as '… a sublimatory process in which repressed affect associated with intrapsychic conflict could be

discharged' (in Suler, 1980; p. 146). Being creative to Freud was not an independent behaviour. It was a substitution for another behaviour, which could not as easily be pursued even if preferred. The more important aspect of the creative process in this context, however, is that all self-reported accounts of what it is like to be deeply engaged in a creative process, as far as I know, outlines the process as a different state of mind, or in line with the reasoning of this article, as existing in an alternative subjective reality (e.g., Doyle, 1998; Holmboe, 1991; Morgenstern, 1956; Sadler-Smith, 2015; Wallace & Gruber, 1989). There is some reluctance in cognitive psychology to view creativity—or problem solving, which is the preferred term—as 'different thinking'. It is rather viewed as a series of cognitive processes originating in everyday thought patterns which, when identified, could potentially be applied in practice to improve creativity in people in general (e.g., Finke, Ward & Smith, 1992; Weisberg, 1993). While often valuable research it is largely pursued without considering the significance of emotions in creativity. The intense experience of emotion is highly likely to be the basis of any creative state of mind and invariably constitutes the basis of the flow experience (cf., Russ, 1993); one which, historically, some artists have sought ardently by artificial means through psychoactive drugs (e.g., Wolf, 2005; 2010).

The last type of function in this taxonomy is a *strategic* function. We instinctively apply alternative realities in order to cope with a stressful situation. But there is also a strategic use of alternative realities as employed by others to make some individuals change their ways of thinking. For patients helped by CBT, this is a voluntary process guided by a licensed therapist or psychologist under strict ethical consideration. Ethics become more difficult to consider, however, when implementing, for example, Carol Dweck's (2004) model of changing someone from a fixed mindset to a growth mindset, which is tempting in any an educational setting (e.g., Seaton, 2017; Zhao, Niu, Hou, Zeng *et al.,* 2018). How far is it ethical to change someone's thinking for a specific purpose even if, as in this case, it is to convince pupils that they can and must feel 'empowered' for best achievement in school? This may seem benign and even commendable at first glance, but how does a teacher square implementing a growth mindset in a classroom with the normal distribution of abilities, especially if a minimum level of achievement is stipulated by the education system? Not everyone can achieve everything that a curriculum stipulates, no matter how knowledgeable and well-meaning the teacher (cf. Persson, 2018). Normal distribution effectively curtails any hopes for schools to teach all pupils everything and to the same level. Empowerment by a growth mindset in this case would mean to convey false hopes to low-achieving pupils with learning difficulties rather than accepting them and communicate their intrinsic value irrespective of level of achievement.

The strategic use of alternative subjective realities becomes entirely unacceptable from an ethical perspective, when an individual is forced to accept a certain reality which they cannot or will not relate to. While 'brainwashing' is the popular term for this, it is perhaps better to understand it broadly as the intention to strategically limit or eliminate someone's self-determination which is a criminal offence in Italy (cf. Introvigne, 2016). Social psychologist Philip Zimbardo (2002), then President of the American Psychological Association, described the strategy of mind control, as '… the process by which individual or collective freedom of choice and action is compromised by agents or agencies that modify or distort perception, motivation, affect, cognition, and/or behavioral outcomes' (no page number). This is generally considered a controversial issue in psychology and there is little agreement on whether it exists or not. But the practical effort of trying to change people's minds against their will, forcefully or deceptively, is by no means new (see Merloo, 1956). Mind control is in essence the nature of marketing when at its worse (e.g., Srivastava & Nandan, 2010). In recent times the issue of explicit mind control has surfaced again, at least in the media, now championed by China as a means to bring all its citizens, irrespective of faith and ethnic culture, into one politically condoned mindset with ensuing approved-of behaviour. For some minority groups this means a forced change of subjective reality by means of 're-education camps' (e.g., Dirks & Leibold, 2020; Ramadan, 2017; Raza, 2019).

Perhaps there is a case to be made for limiting any strategic use of retraining thought patterns to responsible therapy under strict ethical guidelines *only*. The purpose of bringing this to attention in the current context, however, is to demonstrate that there is indeed strategy involved too when

considering the potential function—and sometimes dysfunction—when making intentional use of the human proclivity to exist in a world of many possible subjective realities. Control is the tempting instrument of anyone seeking power and status, be they either individuals, cults or entire states. Consider rewording:

Strategy is indeed also involved if we consider the potential function and sometimes dysfunction—that results when we take deliberate advantage of the human tendency to favour life in a world of many possible subjective realities.

General discussion

The significance of illusion as a positive force in everyday life has been grossly underestimated in both societal discourse and in empirical science. There could be several reasons for this, one being that it might be considered 'too philosophical' by empirical scholars. Any exploration of reality, non-reality and its perception involves approaching famously elusive concepts such as consciousness, existence and truth, all three difficult to define and operationalise in any standardised way. Philosophers through the ages, on the other hand, have taken on this challenge. Assumptions on the nature of all three abound. In recent decades a need for understanding consciousness, existence and truth is becoming increasingly difficult to avoid. Mankind is now moving in and out of the artificial world of Cyberspace. Some individuals are so taken by existing elsewhere by technological proxy that they become addicted to it and need help to 'find their way back' (e.g., Müller, Janikian, Dreier, Wölfling et al., 2015; Spitzer, 2017). The traditional demarcation between real and non-real, existence and non-existence, conscious or non-conscious has become much more difficult to defend. No less important is the fact that the empirical sciences, too, are finding it increasingly difficult to keep different realities and traditional academic domains apart when seeking an understanding of human existence. This is a direct result of beginning to understand the Universe, its physics and underlying mathematics in addition to, or beyond, Newtonian physics. Quantum phenomena have opened an entirely new world of insight into the human mind as a quantum phenomenon, which means that, like subatomic particles, it is likely to be an entangled system. That is, one state or action cannot be understood or exist without another (Wendt, 2015; Zohar & Marshall, 1994). There is complete dependency between all aspects of the mind, its functions and its nature. In other words, understanding the nature of realities and the systems constituting them has become much more urgent. As proposed in this article, we need to construe the more traditional notion of reality versus illusion as multiple subjective realities in which we all exist and, under normal circumstances, seamlessly and unaware—or intentionally or strategically—move freely depending on need. We cannot categorically construe reality and illusion as opposites. They are separate *systems* of realities in their own right. We need these different systems to uphold psychological well-being in the short-term and for the survival of Homo sapiens in the long-term.

Another explanation for ignoring this field of study, I suspect, is that pursuing it in earnest would no doubt emphasise to what extent bias actually governs thinking and action; which would probably also reveal the extent to which scholars are dependent on illusions in research. We are as a species not entirely comfortable with knowledge that can potentially deprive us of a positive self-image, and perhaps even more so, deprive us of a good reputation and an influential social standing in the community (Baumeister, Vohs, DeWall & Zhang, 2007; Fong, Warner, Williams, Schallert *et al*., 2016; Gneezy, Gravert, Saccardo & Tausch, 2017), no-one more so than the pathological narcissist, who has an endless need for excessive admiration to nurture his or her grandiose sense of self (DSM-5; Malkin, 2017).

We are not as free to choose and think as we often believe we are. This is not to say that everything we do is always determined by physiological processes and inherited genetics---a hotly debated topic in recent years in the wake of trying to interpret unexpected findings of neurological research in recent years (see Heissenberg, 2009; Roskies, 2006; Smith 2011). There can be no doubt, however, that there are limits to how 'free' our will actually is. It must *by necessity* operate within the parameters provided by evolution and serve its purpose (cf. Persson, 2016). Interestingly though, the

illusion of having a completely free will has a positive effect on us. We achieve better in an academic setting if we are convinced that we are entirely free to think and act as we wish (Feldman, Prasad-Chandrashekar & Ellick-Wong, 2016). This only demonstrates yet another evolution-designed illusion—or subjective reality—aimed at sustaining our psychological well-being. But such a positive effect does *not* make the notion of an unfettered human free will true!

Conclusion

While understanding dysfunction is important, it can probably not be correctly understood until we also have a reasonable grasp of how illusions create our daily life in a positive fashion and make us cope with it. I offer the function-dysfunction taxonomy of subjective realities as a starting point. I cannot claim to have understood all the possible aspects of function and dysfunction. My objective with this study has not been to be exhaustive. Considering were we are in societal, technological and scientific development, however, it is essential to provide a first framework which includes *both* function and dysfunction, to create a heuristic platform for our quest to grasp existence in the Cyber Era where new aspects of reality have indeed been made available by increasing knowledge of quantum phenomena. Understanding the significance of illusion as an evolutionary tool for psychological well-being and human survival invariably has implications for all social science scholarship and potentially also for psychiatry and clinical psychology. In order to treat a dysfunction, we also need to understand normal function. It seems to me that this has been gravely underplayed. This was also the basis for initiating positive psychology as a new direction in understanding human behaviour. The aim of positive psychology American psychologist Martin Seligman proclaims (2005; p. 3),

> is to catalyse a change in psychology from a preoccupation only with repairing the worst things in life to also building the best qualities in life. To redress the previous imbalance, we must bring the building of strength to the forefront in the treatment and prevention of mental illness

As commendable as this intention is positive psychology as a phenomenon is also problematic. The monumental handbook of positive psychology (Snyder & Lopez, 2005), published to launch this new field, features 108 authors of whom 102 are American. A mere five represent other countries (i.e., two Canadians and three Germans). This is a problem of which all the involved authors appear unaware. Staying positive, is not only a cognitive bias intrinsic to the human species, it is also a peculiar trait of American culture. More specifically, it is part of the American Dream into which most Americans are inducted as children (cf. Duina, 2011; Dweck, 2006; Stewart, & Bennet, 1991). For this reason, I suggest that Positive Psychology is a largely American phenomenon promoting cultural values rather than more objectively based scholarship valid elsewhere in the world. It is not a coincidence that one of the most celebrated and bestsellers ever in the United States is theologian Norman Vincent Peal's (1952) influential book *The power of positive thinking: a guide to confident living*, predating the handbook of positive psychology by five decades. To be fair, Peale's ideas were partly criticised by Seligman (2002) in his own book—*Authentic happiness; using the new positive psychology to realize your potential for lasting fulfilment*—the content of which proves my point. It makes little difference that Peale's arguments are philosophic and Seligman's are empirical. Both authors are likely to be motivated by cultural bias. The observation that psychology is skewed toward disorders and dysfunctions, however, is undoubtedly correct, but to do something constructive to redress the balance sought by Seligman and other positive psychologists, we need understand *both* function and dysfunction as a result of human evolutionary adaptation, and how the human mind moves between subjective realities to uphold well-being. This also means knowing and accepting our biases and understanding the subjective realities that these generate.

It is perhaps not entirely unreasonable to conclude by also suggesting that Plato, surprisingly, was probably correct well over two millennia ago, without access to computers or even a calculator. As far as the human mind is concerned nothing, apparently, is quite what it seems as we move around in a social world of multiple subjective realities adapting to social environments; all interpreted by our not always precise cognitive system as we try to figure out not only our own existence but also to make sense of the existence of others (cf., Hoffman, 2019).

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An Analysis of a Conflict Between the Theories of Creationism and Science in the Experience of a Pre-service Physics Teacher

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Abstract

This paper explores a conflict a pre-service physics teacher experienced while completing a teaching practicum at a religious high school that supported creationism. As a result of the conflict, the pre-service teacher was scapegoated by the staff and students at the school. An analysis of the projective dynamics involved in this conflict are explored including scapegoating, psychic inflation, fanaticism for science, and what was constellated in the pre-service teacher's personal, familial, and cultural unconscious. In examining the pre-service teacher's unconscious, it will be suggested that religion is part of the pre-service teacher's repressed shadow and the cooperating/mentor teacher's religious projections helped to constellate this shadow element. By examining the conflicts that arise between pre-service teachers and their cooperating teachers as a result of psychodynamics and differing worldviews, educators can begin to understand how analytical psychology may be applied so that such conflicts may be depotentiated in the future.

Keywords: Analytical psychology; complexes; shadow; projection; psychological types; cultural unconscious; personal unconscious; familial unconscious; scapegoating; archetypal reflectivity; physics education; teacher education.

Introduction

The conflict central to this psychodynamic analysis centers upon my pre-service teaching practicum where my scientific view that the age of the Earth was very old was challenged by my cooperating teacher who believed that the age of the Earth was very young. By analyzing this conflict through the lens of analytical psychology, I am now better able to understand the ways my shadow and my complexes contributed to the problem. I wondered what "fragment of involuntary psychic activity" (Jung, 1960/2014j, p. 282) the conflict revealed about my unconscious and how the analysis of this conflict may reveal insights into myself that may not otherwise have been possible. This paper provides a creative application of Carl Jung's analytical psychology to education and may potentially provide educators with the opportunity to enrich their talent development through understanding the psychodynamics of teaching and learning. Using a Jungian lens to interpret and analyze the psychodynamics of teaching and learning introduces creative new ideas that may enrich the understanding of complex teaching and learning processes.

In sharing this conflict, my hope is to highlight its significance, more precisely Jung's theories of complexes and psychological types, and the role of archetypal reflectivity (Mayes, 1999, 2003, 2005, 2007; Dobson, 2008, 2009; Moore, 1991; Moore & Gillette, 1992) to teacher education so that they might inform pre-service teacher education programs. Fidyk (2016a, 2016b, 2017a, 2017b) makes the case for the significance of studying the unconscious dynamics at play in the classroom and Dobson (2008) suggests that the dominant approaches to educational psychology have long overlooked the unconscious dimensions of the mind. Indeed, Fidyk (2017a) stresses that it is unlikely that teachers will turn to analytical psychology as a way to understand their pupils or themselves, so it is important that teacher education programs include Jung, Jungian, and post-Jungian scholars in their education programs. By examining such conflicts through the particularities of this one case, other

pre-service teachers may begin to understand the psychodynamics of such conflicts and the ways they may be depotentiated in the future thereby transforming their pedagogy. Since some readers may not be familiar with some of the terminology presented in this paper, a glossary of terms has been provided.

Vasudhara Mandala dated to 1777 (Samvat 897) - Metropolitan Museum of Art
https://commons.wikimedia.org/wiki/File:Vasudhara_Mandala_MET_DP-17356-001.jpg

To investigate the art of Carl Jung, see: https://speakingofjung.com/blog/?offset=1549112445076

The conflict

The conflict I had with my physics cooperating teacher was about the age of the Earth, I contended that the Earth was very old while my cooperating teacher contended it was very young. In Winnipeg, Manitoba, Canada, as part of Bachelor of Education programs, pre-service teachers are assigned to a particular high school and teach a six-week practicum under the guidance and supervision of a cooperating teacher. For my practicum, I was assigned to teach grade twelve physics at a religious high school[2] where students took Bible study courses and time was allotted for daily prayer.

The conflict arose at the end of one of my physics lessons when I discussed paleoclimatology, the study of Earth's ancient climate (Bradley, 1999). The discussion about paleoclimatology provided the physics class with a real-world context about how physicists use ice cores to study the Earth's ancient climate. By studying ice cores obtained from Antarctica, I explained that physicists were able to obtain detailed information about the Earth's ancient air temperature and CO_2 levels going back many hundreds of thousands of years (Lüthi et al., 2008; Barnola et al., 1987; Petit et al., 1999).

I explained to my students that oxygen has two isotopes, oxygen 16 and oxygen 18, and that by comparing the ratios of these two isotopes in ice cores, physicists could determine changes in the Earth's ancient climate (Jouzel et al., 1994). Despite my excitement about paleoclimatology, I was not able to elicit any discussion from my physics students about an ancient Earth climate, and I felt concerned that none of the students seemed willing to engage in a conversation with me. The discussion that I attempted to have with my students only lasted about five minutes, and I remember attributing their trepidation in talking with me to the fact that it was the last class of the day. After the students had left, my cooperating teacher invited me to discuss my physics lesson, but I could already sense that he seemed agitated. The N (intuition) of my personality typology (INFJ)[3], which identifies my type of personality or my type of consciousness, was already at work.

My cooperating teacher, in good pedagogical form, began with constructive criticism about my physics lesson and then said he had some words of caution for me. He said that I should not have suggested an ancient age of the Earth. He tried to explain in a very diplomatic way that teachers and students at the school believe in creationism and a young age of the Earth. He further explained that many faculty and students at the religious school take the Bible literally, placing the Earth's age after the time of Noah and the great flood or 6000 years old. By my suggesting that the Earth was older than 6000 years, I was promoting an antagonistic point of view, contrary to the views of the students, teachers, and the school. I was told by my cooperating teacher that students who attend the school hold the view that the Earth is 6000 years old, and I should not engage in discussions that challenge their views. I was instructed to strictly follow the curriculum and not to engage in any more improvised discussions with the students without first discussing these topics with him before my physics lessons.

I found my cooperating teacher's point of view and advice highly disturbing. I asked my cooperating teacher if he believed the Earth was 6000 years old, and he answered that he believed in the literal word of the Bible. I was mystified as to how someone who was teaching physics could hold such a view, and I could not comprehend his answer. I argued with him suggesting that scientists have

[2] According to the Manitoba Education and Advanced Learning website: http://www.edu.gov.mb.ca/k12/schools/ind/non_fund_ind.html
In Manitoba, there are two kinds of independent schools: Funded Independent Schools and Non-Funded Independent Schools. Funded Independent Schools implement provincially mandated curriculum, hire Manitoba certified teachers, and meet other provincial requirements. Non-Funded Independent Schools are not required to meet these conditions (Manitoba Education and Advanced Learning, 2015).

[3] INFJ: Introverted Intuitive Feeling Judging. According to Jung's theory of psychological types, INFJs direct their energy inward, and decisions are made with feeling. INFJs are independent, highly intuitive deep thinkers, empathetic, warm, and caring.

discovered trees that are much older than 6000 years. It has been reported by Öberg and Kullman (2011) that the world's oldest recorded tree is a 9550 year old spruce in the Dalarna province of Sweden "dating back to the early Holocene (9500 cal. yr BP)" (p. 183).

I debated with my cooperating teacher about the light year or the time it takes light to travel in one year. I explained that the speed of light is well known to physicists, where the speed of light in a vacuum equals "299 792 458 ms^{-1}" (Mohr & Taylor, 2005, p. 7), and that astronomers have discovered planetary objects whose light has taken more than 6000 light years to reach Earth (van den Heuvel, 2016). In fact, I further argued that based upon the speed of light, scientists have discovered galaxies billions of light years away from the Earth, and that the universe is approximately 13.8 billion years old (Jarosik et al., 2011). The National Aeronautics and Space Administration (NASA) launched a satellite called The **Wilkinson Microwave Anisotropy Probe** (**WMAP**) in June 2001, which was designed to map the cosmic microwave background (CMB) radiation over the entire sky in five frequency bands (Jarosik et al., 2011). The data obtained from the WMAP revealed that the age of the universe is approximately "13.75±0.13 Gyr" (Jarosik et al., 2011, p. 14) or 13.75 billion years old.

I remember finally giving up on my attempt with scientific reasoning. I stated to my cooperating teacher that I would stick to 'the plan' and would not deviate from the prescribed lessons we agreed upon. In this way, I was being directed by my cooperating teacher to teach the 'curriculum-as-plan' (Aoki, 2005) rather than teaching from the indwelling between zone with 'curriculum-as-lived' (Aoki, 2005) that unfolds in the moment among the particularities of students and place in relation to the planned lesson. Aoki (2005) suggests that teaching in the 'Zone of Between' is "an extraordinarily unique and precious place, a hopeful place, a trustful place, a careful place" (p. 164) that leads to an authentic curriculum and new curricular possibilities. To that point, I had been seeking to balance curriculum-as-plan with curriculum-as-lived.

The conflict finally ended when I asked my cooperating teacher if I should apologize for stating views contrary to the status quo, but he said the students understood well 'my kind of position' and an apology would not be necessary. I immediately felt marginalized and, for the rest of my teaching practicum, was worried that I may be transferred to another school based upon this incident. The remaining classes of my practicum went well, but I constantly felt that I was being closely monitored and that I was being subjected to a form of censorship. I had never encountered a group in education with such a radically different worldview than mine. I came to my views about the world based upon critical thinking and a reasoned scientific analysis, whereas the students and cooperating teacher came to their views about the world based upon faith in the literal translation of the Bible.

Complexes

Singer (2014) suggests that differentiating complexes can become an immensely liberating and deeply meaningful psychological task. The conflict with my cooperating teacher activated several complexes striking through the levels of my personal, familial, and cultural unconscious. Jung (1960/2014h) describes a complex as "the image of a certain psychic situation which is strongly accentuated emotionally and is, moreover, incompatible with the habitual attitude of consciousness" (p. 96). In the classroom, Fidyk (2017a) suggests that complexes thrive, as the relationships among teachers and students are often patterned upon parent/guardian-child dynamics. In addition, teachers' complexes can be activated when acting out of their splinter psyches due to a lack of ego strength, due to a lack of a differentiated consciousness, and through stress, fatigue, or overwhelm (Fidyk, 2017a).

In differentiating my personal complexes, I can share that my mother and father were both Ukrainian Catholic and raised me as Ukrainian Catholic. However, religion was not so strongly emphasized in the household as to censor scientific knowledge. Since my father was a science teacher and my mother was a resource teacher, what was emphasized in my household was critical thinking. I was an altar boy throughout my childhood and when I was 13, our Ukrainian Catholic family priest asked me if I would ever consider becoming a priest. Therefore, in my conflict with the cooperating teacher, religion was part of my shadow.

My shadow contents contained my reservation for religion, and its adherence to doctrine and lack of scientific reasoning. Since I was raised to cautiously think about the role of religion in terms of science, I was troubled by what religion appeared to be doing to my young students. My students were not being educated to think critically but were being educated to follow religious doctrine and its condoned truths. Recall that I was asked to become a priest, and I rejected this option. This rejection lay dormant; in other words, my shadow priest was repressed in my unconscious and I projected my doubt about priesthood, faith in literal readings of the Bible, and religious indoctrination upon the cooperating teacher. By extension, the way in which the cooperating teacher expressed his belief in creationism suggests that he carried part of my shadow contents that I had long repressed for religion. Jung (1935/2014b) writes that "the general psychological reason for projection is always an activated unconscious that seeks expression" (p. 152). Therefore, my unconscious repressed religious shadow was activated and sought expression precisely by my cooperating teacher for whom I was expressing his shadow contents, those contents that included a validation of the scientific method and critical thinking. Jung (1960/2014i) aptly writes, "we always see our own unavowed mistakes in our opponent…[and] an excellent example of this are to be found in personal quarrels" (p. 264-265). At the time of the conflict, I was not "possessed with an unusual degree of self-awareness" (Jung, 1960/2014i, p. 265); therefore, I could not see through the projection but succumbed to it. The hook in the conflict, or the 'object' for me was religion and as Jung explains "the object offers a hook to the projection, and even lures it out" (Jung, 1960/2014i, p. 273).

In differentiating my familial complexes, many of my maternal and paternal relatives became teachers while some became priests. Since both of my parents became teachers, my career choice of becoming a priest was repressed into my unconscious shadow. In my conflict with the cooperating teacher, my shadow contents were constellated by his religious creationist views because I was projecting the contents of my shadow that repressed the priest as a career choice. The cooperating teacher projected a pious or priest-like character and this projection stuck to me. Since the cooperating teacher's projections were part of my repressed shadow, they helped to constellate my complex for religion. In analyzing this conflict, it appears that religion became the perfect hook for us to gain consciousness of our respective shadows.

In differentiating my cultural complexes, it is important to identify that contemporary Canadian culture seems to emphasize scientism or what Bonnett (2013) refers to as the belief that the natural sciences should be employed in investigating all aspects of human behaviour and condition. Canadians seem to have a deference to the authority of science when seeking the solution to a problem, and there is little reliance on religion[4] to solve our collective problems. Historically, there is a clear differentiation between government, education, and religion. Therefore, the contemporary Canadian cultural unconscious includes the repressed view that religion can solve humanity's problems. Scientism may be one reason why Canadians continue to engage in consumerist habits with little ecological consideration because we assume science will solve problems such as global warming, and we can therefore continue consuming and polluting the environment. In my conflict with the cooperating teacher, I was projecting the shadow elements of my cultural upbringing, shadow elements that might employ religion to address our social and cultural problems.

Contemporary Canadian culture views science and technology as the means to solutions regarding global warming and ecological degradation wherein scientists continue to propose many technologically based solutions (Jacobson, 2009; Jacobson & Delucchi, 2009). When the cooperating teacher criticized me for engaging in a discussion about the ways physicists can learn about the Earth's ancient climate, he might have been expressing in his religious affirmations the contents of my

[4] Although there is little reliance on religion to solve Canadian collective problems, Canadian culture does have a tolerance and respect for religion as our taxes pay for Catholic and non-religious public schooling that is unique to Canadian culture (Zinga, 2008; Treff & Ort, 2013).

culturally repressed religious shadow. I may have repressed and denied any possibility that religion can help solve critical issues such as global warming because of my familial structure and habits, as well as belonging to a culture that has promoted science and technology as providing solutions to such problems.

Gordon (2009) writes that the ultimate goal of a teacher is to help students with their own individuation in such a way that examines "deep issues while refraining from imposing their values onto young people who need to develop their own belief systems" (p. 40). If I am supposed to offer educational curricula from multiple perspectives so that students can develop their own points of view, then how can I do this in an environment where religion has already pre-determined the framework by which other views are considered by imposing a dogmatic belief system upon them?

The imposition of a dogmatic belief system is a form of fundamentalism and Riedel (2009) suggests that the fundamentalist's attitude is intolerant and kills soulfulness and interiority. However, I was not yet able to see that my very approach might also have been considered dogmatic because I was caught in a rigid binary position. Both the cooperating teacher and I held fundamentalist positions, and we similarly defended our truth claims: "every fundamentalist system claims to have dug down to the roots, to a theoretical beginning, which it then holds to be absolute" (Riedel, 2009, p. 464). Even though I sensed that it was futile to try and persuade the students to consider a scientific worldview, since they were already predisposed towards a religious worldview that they appeared to hold absolutely, I tried. At that time, I too held my scientific views absolutely.

The constellated conflict

During the conflict, I knew that I was constellated because the "active complex puts us momentarily under a state of duress, of compulsive thinking and acting" (Jung, 1960/2014h, p. 96), although I did not have the language or theory for it. I was immediately distressed and disturbed by my cooperating teacher's assertion that the Earth is 6000 years old. As soon as the cooperating teacher asserted his creationist view, I immediately became compulsive in my thoughts and actions and my conscious thought processes became very rigid.

As Riedel (2009) suggests, my fundamentalist complex composed of personal, cultural, and archetypal layers was activated. When this happens, the complex eradicates the capacity for both imagination and curiosity (Riedel, 2009). I was therefore intolerant of other points of view, especially the cooperating teacher's religious point of view. I compulsively attempted to refute the cooperating teacher's claim by stating a number of scientific arguments. I can recall feeling that the cooperating teacher's claim was irrational and that my rational claim required a vigorous defense. I did not yet understand that these 'rational' attempts were indeed an intellectual defense that defended against shadow projection. Furthermore, as an INFJ personality type, I slipped into a shadow function of 'thinking' rather than using my more dominant 'feeling' function because I was constellated.

As the conflict progressed, my physiological characteristics changed as my heart rate increased, and I could not consciously respond to the cooperating teacher as I had normally been accustomed to. Jung explains that "every constellation of a complex postulates a disturbed state of consciousness" (Jung, 1960/2014h, p. 96). My complex was a "feeling-toned complex…strongly accentuated emotionally" (Jung, 1960/2014h, p. 96), and my actions were incompatible with the habitual attitude of consciousness. I typically would not have challenged another person about their views, but because the conflict constellated my complexes, I was acting in a manner well out of my habitual conscious character. I usually would have been able to hold the other person's view in my consciousness; however, because creationism was antithetical to what I perceived to be the truth, I 'had to take' a stand with the cooperating teacher.

It is interesting that after the lesson, when the cooperating teacher asked to speak to me, I immediately had a feeling that something was wrong, but I did not know what it could be – again my intuition and feeling function were working to bring me to greater consciousness, but I had not yet

learned to track or identify such hunches and physiological changes. Until the cooperating teacher indicated that the problem with my conversation with the students was my claim for an old age of the Earth, did I realize that what I had said may have gone against my students' religious views.

I realize that my constellation took time to be fully activated, and again much more time and learning to understand it. My constellation intensified when I realized the cooperating teacher's disapproval with the conversation I had with my students, as well as his acceptance for only creationist views. The constellation of the complex was not an instant reaction, but I recall it taking some time to reach a pinnacle. When it was fully activated, I did not feel like myself. Jung's (1960/2014k) description fits well here: "complexes interfere with the intentions of the will and disturb the conscious performance: they produce disturbances of memory and blockages in the flow of associations" (p. 121).

Looking back at the conflict, I now realize that I did not address the complex well. I did not think through the consequences of my actions, nor could I because complexes are autonomous and "behave like independent beings" (Jung, 1960/2014k, p. 121). In hindsight, it was impossible to consciously reflect on the ramifications of my actions as when a complex 'has you,' it "can temporarily obsess consciousness, or influence speech and action in an unconscious way" (Jung, 1960/2014k, p. 121). Rather than accepting the cooperating teacher's view for a young age of the Earth, I ironically took it upon myself to try to convert him using what scientific evidence I had at my disposal. I simply could not accept an opposing view that was diametrically opposed to my own nor could I hold both views in my conscious mind because I had not yet developed adequate ego strength to hold the tension of two opposing yet complimentary views. Jung (1959/2014g) offers:

> To confront a person with his shadow is to show him his own light. Once one has experienced a few times what it is like to stand judgingly between the opposites, one begins to understand what is meant by the self. Anyone who perceives his shadow and his light simultaneously sees himself from two sides and thus gets in the middle (p. 463).

Until the conflict with the cooperating teacher occurred, I had not been in a conflict where I was faced with confronting my religious shadow; indeed, I was not yet even conscious of this shadow! In addition, I had not yet developed the capacity to hold the middle ground 'between' two opposing views nor had I acquired the analytic psychological tools to see myself from two different points of view.

Scapegoating

Montero & Colman (1995) refer to scapegoating as one of the major ways that groups remove unworkable and dissident parts (the scapegoat). Colman (1995) differentiates the scapegoat from the individual shadow because it is a matter of case (one). Scapegoating within families, schools, and cultures is a case of many individuals' negative projections onto an 'other' (singular or plural case) that then becomes the scapegoat and are identified with the ills or problems of the collective.

The basis of the scapegoat myth contends that in the process of scapegoating or rejecting the part that does not fit with the unity of the group, the group is not to blame for its problems, its bad feelings, its pains, or its defeats (Colman, 1995; Perera, 1986). The responsibility for the problem, the scapegoat, "is perceived as being fundamentally different from the rest of the group and must be excluded or sacrificed in order for the group to survive and remain whole" (Colman, 1995, p. 81). Colman (1995) contends that scapegoating is used by the group to detoxify and reject negative elements from its consciousness, adding that there is no group development without facing the problem of the group's scapegoats.

I initially became aware that I was being scapegoated when none of the physics students would engage in a conversation about paleoclimatology with me. Shaker (1982) writes that "student's behaviour could be better understood, and their erratic inclinations harnessed to educational aims if their behavioural excesses could be read for meaning rather than scorned" (p. 247). I was seeing the students' behaviour as disinterest towards the topic rather than understanding that their behaviour was

the result of a differing worldview from mine and maybe even a lack of respect or tolerance for my different point of view. The students may not have wanted to respond to me because my claim that scientists could determine the Earth's climate going back hundreds of thousands of years by using paleoclimatology was contrary to their worldview for a young age of the Earth. The students might have interpreted my view as a threat to their belief in a young age of the Earth and they understandably did not want to engage in any conversation that could have been deemed confrontational. Even if one of the students had wanted to discuss paleoclimatology, none of them would admit to this in front of their teacher because the teacher represented the religious establishment/authority and they felt obligated to remain part of that group. By extension, any student(s) who had engaged with me about paleoclimatology would have been infected with my 'contagion' (Girard, 1989), as a heretic, and no student(s) were willing to risk the scorn of their peers and especially their teacher.

I was scapegoated through the process of negative shadow projection by the students and the cooperating teacher. The projected material held their fanaticized doubt (Alschuler, 2009) about their faith-based views, and were thereby focused and projected upon me. As Colman (1995) suggests, the group of students scapegoated me because my scientific views were perceived as fundamentally different than, even heretical to their own, and by not engaging with me they excluded my ideas for an old age of the Earth. The students were able to immediately reject the negative elements from their psyche, for example, any doubt or questioning about their faith-based views, in order to remain members of the school community, thus they remained whole with no challenge to their views.

When I teach physics, I try to bring in the concept of multiple realities because these additional realities grant curriculum its fullest dimensionality (Shaker, 1982). In discussing paleoclimatology with my physics students, I sought to demonstrate that physicists study a wide range of scientific topics and not just the narrow view of topics as presented in their school's curriculum. The problem with teaching at the religious high school was that I was not allowed to bring in multiple realities, and any additional information I sought to discuss with students had to be first censored to determine if it conformed to the one religious reality of the school. In this way, I consciously and unconsciously viewed myself as different from the other teachers, which held me apart from the school community, the students, and my cooperating teacher, and thus contributed to my position as scapegoat.

In the exploration of a curricular event, Shaker (1982) writes that in order to provide full dimensionality within the lesson, "historical meaning, disciplinary meaning, personal meaning, utilitarian application, and associations with fantasy" (p. 248) should all have status in the lesson. Paleoclimatology provided a potential discussion topic about history, the utilitarian function of physics; it provided an avenue to discuss the age of the Earth; it provided a context for some of the physics topics students were studying; and, it could have provided a fantasy component where creation myths about the origins about the Earth could have been further explored.

Fanaticism & psychic inflation

Alschuler (2009) writes that Jung associates fanaticism with repressed doubt and that extreme beliefs, strongly held and defended, characterize fanaticism. In the conflict, the cooperating teacher and I each held fanatical views. He held strong views about creationism, while I held strong views about science. Since I defended my views about science during the conflict by compulsively bombarding the cooperating teacher with 'facts' that claimed to disprove a young age of the Earth, I must have been harboring some repressed doubt about my scientific views. I possessed some 'truth' about the age of the Earth and because I strongly identified with this view, I fell victim to psychic inflation (Alschuler, 2009). This psychic inflation resulted in the puffing up of my ego and the dissociation (splitting off) and repression of any thought that was incompatible with my view. The thought that was incompatible with my view was that there may be some validity to the cooperating teacher's faith-based claim and that science may not have all the answers.

I could not understand how someone could base his truth on 'faith in religion' rather than basing it on scientific reasoning and critical thinking – which I now understand as 'faith in science' – an equal and opposite position. Nevertheless, it was still a split off binary position and did not reflect Aoki's (2005) urge to dwell in the zone in between where *both* positions *and* another may hold veracity. My ego held some repressed doubt about the scientific method, and I was harboring hidden doubt about science within my psyche, and it was this doubt that became dissociated from my ego. My ego became one-sided, and the resulting one-sidedness of my inflated ego activated a compensatory counteraction. Alschuler (2009) explains, that "the unconscious attempts to moderate the ego's one-sidedness by confronting it with an opposite image, a doubt (disbelief)" (p. 46).

In the conflict, I expressed my repressed doubts with a projection onto a non-believer and with a deep conviction that I had to convert my cooperating teacher in order to confirm my view for an old age of the Earth. Unknowingly, I was trapped in a vicious circle in which my fanaticism about the scientific truth for the age of the Earth continued as my repressed doubt was projected each time I provided an example disproving the cooperating teacher's creationist views. Alschuler (2009) contends that the vicious circle can be broken through a compensatory process where the extreme one-sidedness of the fanatic reaches a limit and it converts into its opposite, or an enantiodromia. As I engaged in the conflict, I can clearly recall wanting my cooperating teacher to show unquestioning adherence to science and convert to my worldview.

Upon reflection of the conflict, I can understand how the cooperating teacher's psyche also held splinter parts as he must have been projecting his repressed doubt about the validity of his faith-based creationist views. Since the cooperating teacher is a physics and science teacher, I suspect that it must have been difficult for him to constantly repress his hidden doubt about his faith – if it was at all conscious. However, I suspect that the degree of difficulty the cooperating teacher found in repressing science is directly proportional to his inculcation into religious dogma that he received from his family and community when growing up.

When the cooperating teacher studied science when training to be a physics teacher, he must have been bombarded with scientific facts that were contrary to his worldview. The cooperating teacher may have found it easier to repress his doubts about faith-based truths in the environment of the religious school since everyone at the school seemed to possess a split psyche that repressed their scientific worldview. I wonder how often we do this in argument rather than really hearing the other and holding that view as a possibility? Especially in the context of education, how often does this kind of dynamic take hold between cooperating teachers and pre-service teachers or between students and their teachers? The examination of the conflict may well serve to inform teacher education programs and further, the insights gained argue for the importance of bringing a depth psychological perspective to teacher education.

Archetypal relfectivity

Building upon Clifford Mayes' (1999, 2003, 2005, 2007) important work in depth psychology and teacher education, Dobson (2009) extends the theme of archetypal reflectivity through classroom application and states that teacher "reflectivity involves a meta-cognitive process through which educators increase their awareness of the implicit attitudes, beliefs, and knowledge that inform their practice-in order to transform their practice" (p. 149). Mayes (2005) rightly states that the student-teacher relationship is archetypal and a key component of teacher development is their reflectivity.

In examining the conflict with the cooperating teacher using archetypal reflectivity, I sought to understand the deeper layers of my teaching practice in psychological terms and to determine any unresolved prejudices and issues that may have stood in my way. In doing so, I contribute to my own psychological and pedagogical growth, and I offer it here as an example for others who share similar educational concerns. As Jung wisely explains, "the teacher should watch his own psychic condition, so that he can spot the source of trouble when anything goes wrong with the children entrusted to his care" (Jung, 1954/2014d, p. 120). Within the context of the conflict with the cooperating teacher, the

source of the trouble was our differing worldviews and our fanaticism and fundamentalism for these views – a common occurrence in teacher education and education in a larger context.

Four images of maturity outlined by Moore (1991) are applied and described by Dobson (2009) in the context of education: the Royal, Warrior, Magician, and Lover, and they may be used to inspire self-reflection on a teacher's practice, see Table 1. Each of the four images of maturity in Table 1 is possessed by a bi-polar immature shadow and is characterized by either an active or a passive stance (Dobson, 2009).

Table 1: Archetypal reflectivity and the images of maturity, (Dobson, 2009)

Royal		**Warrior**		**Magician**		**Lover**	
Bi-Polar Immature Shadow							
Active	Passive	Active	Passive	Active	Passive	Active	Passive
Tyrant	Weakling	Sadist	Masochist	Manipulator	Denying Innocent One	Addicted Lover	Absent Lover

For the 'Royal' the bi-polar shadow consists of the 'tyrant' and 'weakling', for the 'Warrior' the shadow consists of the 'sadist' and 'masochist', for the 'Magician' the shadow consists of the 'master of denial' and the 'trickster,' and for the 'Lover', the shadow consists of the 'addicted lover' and 'absent lover' (Dobson, 2009). Each of the maturity archetypes and their corresponding shadows, both active and passive, have specific characteristics when viewed within the context of teaching-and-learning.

First, the mature 'Royal' provides a fertile environment for student growth, while the immature active 'tyrant' is not authentically interested in students and the immature passive 'weakling' defers to the will of administration. Second, the mature 'Warrior' integrates social issues into the classroom, while the immature active 'sadist' does not deviate from school rules and the immature passive 'masochist' makes curriculum decisions based primarily on what is popular or easy with the students (Dobson, 2009). Third, the mature 'Magician' strives to put that content and methodological knowledge in service to the fullest possible individual and social development of the students in every lesson (Dobson, 2009).

On the other hand, the immature active 'master of denial' is focused on teaching to the test, while the immature passive 'trickster' does not effectively plan lessons and projects the blame for any unsatisfactory classroom experiences onto the students (Dobson, 2009). Finally, the mature 'Lover' values the emotional and spiritual realms of the educational experience, while the immature active 'addicted lover' desires student adoration and the immature passive 'absent lover' lacks interest, enthusiasm, and vitality (Dobson, 2009).

As a new pre-service teacher with little teaching experience, I had an idealized conception about the kind of teacher I wanted to be, and this conception included many of the positive maturity characteristics for the Royal, Warrior, Magician, and Lover archetypes. However, after the conflict with the cooperating teacher and because I had not yet developed adequate ego strength, my teaching characteristics unconsciously adopted many of the shadow characteristics for each of these archetypes.

For example, I initially valued the characteristics of the mature 'Lover' archetype, characteristics that included creativity, intuition, and emotion. However, after the conflict I found myself exhibiting the passive shadow characteristics of the 'Lover' archetype, characteristics such as a lack of enthusiasm and interest for both my students and the content of the course. I was overwhelmed by this passive shadow after the conflict because I felt increasingly alienated from others and I felt depressed. I was a teacher who was only 'going through the motions' of teaching the curriculum because I was afraid to deviate from the curriculum in creative and spontaneous ways (drawing upon my intuition).

Prior to the conflict, my teaching was characterized by the mature 'Magician' archetype since I tried to integrate the physics content into its fullest possible development in

every lesson. However, after the conflict, I adopted the passive shadow of the 'Magician' archetype because I did not effectively plan or organize my physics lessons to facilitate the fullest possible learning. The mature 'Magician' archetype attends to transformative learning, but after the conflict, I unknowingly and unconsciously adopted its shadow manipulator characteristics. These characteristics included conforming to the repressive structures of the school, which served to perpetuate a view for a young age of the Earth.

Dobson (2009) indicates that the 'Warrior' archetype is characterized by an alert presence of mind, uses strength and power, and defends social justice issues. Since I lacked the ego strength to negotiate consciously a position in-between the conflict, I felt that I could not hold my view with any strength or power. Instead, I adopted the active shadow of the 'Warrior' archetype, and I kept students 'in their place' by not deviating from school rules or classroom procedures and taught a narrowly prescribed curriculum.

Finally, the 'Royal' archetype is characterized by a teacher who provides a fertile environment for student growth (Dobson, 2009). The 'Royal' archetype has an active shadow, the 'tyrant', characterized by a teacher who is reluctant to disrupt hierarchy and a passive shadow, the 'weakling', who consistently defers to the will of the school administration. Thus, after the conflict, I unconsciously adopted the shadow aspects of the 'Warrior' archetype wherein I deferred to the will of the administration by not discussing an ancient age of the Earth.

Through an examination of the maturity archetypes, teachers can each learn to be scholars of their own consciousness (Diamond & Mullen, 1999) because an ego will oscillate between the poles of a given archetype's shadow unless the ego properly accesses an archetype (Moore & Gillette, 1992). Rather than oscillating between the poles of the shadow for a given maturity archetype in the conflict, I unconsciously adopted the shadow aspects of the archetype's poles. Prior to the conflict with the cooperating teacher, I drew upon maturity archetypes that were not yet fully formed and the conflict may have detrimentally affected my teaching development by pushing it into the shadow aspects for each of the archetypes.

In attempting to be a scholar of my own consciousness, I now recognize that my pre-service teaching assignment at the religious school provided me with the opportunity to develop my ego strength as a teacher. In addition, my pedagogical practice has been enhanced through the insights that I have gained through relevant Jungian psychological theories and my occasions for on-going reflection via such theoretical understanding.

The religious hook in this conflict is but one example that may inspire other pre-service teachers to examine their shadows and develop their own ego strength and psychological insight. It was important to recognize that I was not an innocent bystander in this conflict, but rather, I equally participated in the events that transpired.

Significance to education

Faculties of Education would be well served by integrating insights gleaned from Jungian psychology particularly regarding shadow projection, complexes, and archetypal influence, as well as making special topic courses available in their programs. Students returning to Faculties of Education seeking a second degree or teachers who return to graduate studies come with a greater capacity to reflect upon their practice and might be psychologically more ready to consider an inner life.

The conflict herein analyzed illustrates that pre-service teachers will be confronted by students, parents, and teachers who may not share their worldview, and to successfully navigate conflicts, pre-service teachers need the requisite tools that analytical psychology provides for addressing the complicated interpersonal and interpsychic interactions they will encounter when engaged with a diverse community of learners. As Shaker (1982) argues, analytical psychology supports the unconscious process throughout the teaching and learning process.

By including course work about analytical psychology in teacher education programs, education students may begin to understand the significance of the unconscious processes of learning and not just the conscious ones. For example, pre-service teachers could be provided an Interpsychic

Image, see Figure 1, where they can identify all of the interpsychic terms and processes that manifest themselves when two people have a conversation that may or may not lead to a conflict.

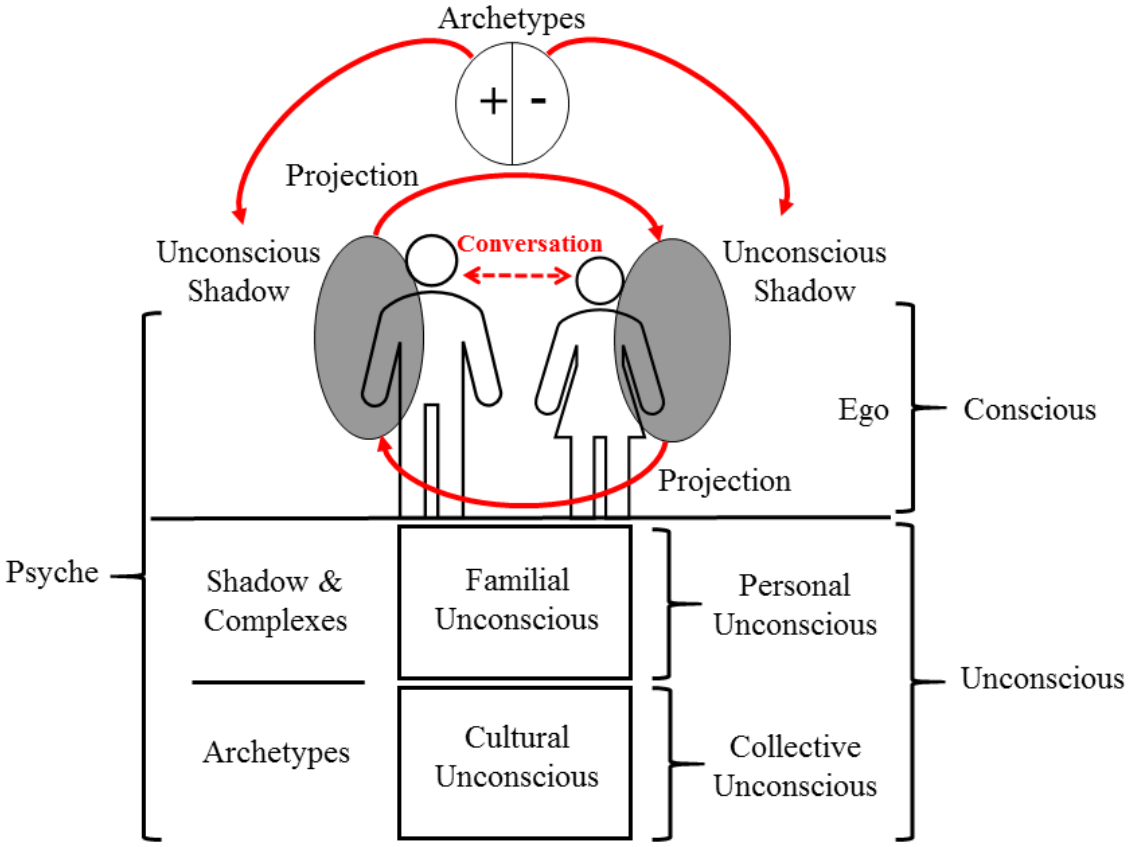

Figure 1: Interpsychic image.

Figure 1 illustrates a conversation between two people. When the people meet, both their conscious and unconscious are in communication with each other. The conscious consists of the ego, the unconscious consists of the personal unconscious and collective unconscious, while the psyche consists of both the unconscious and conscious elements of each person. The personal unconscious consists of the familial unconscious, complexes, and shadow elements, while the collective unconscious consists of the cultural unconscious, and contains archetypes or universal affect laden images that both people may be influenced by. Each of the people have complexes and repressed shadow elements that may be projected onto the other person if and when they become constellated during a conflict. Each person is influenced by archetypes and they manifest themselves in either a positive or negative way depending on the nature of what is in each person's collective unconscious.

As Dobson (2009) suggests, Jungian-based perspectives study the totality of psychic processes, both conscious and unconscious, and this holistic approach to the psyche would complement the educational psychology as well as curriculum theory presently being taught in current education programs. In addition, "without awareness of complexes, their underlying dynamics, and ways to depotentiate them, there is little opportunity for educators to unhook" (Fidyk, 2017a, p. 83) from similar conflicts when they find themselves caught. In fact, educators will continue to see the problem as one of other (scapegoating) rather than one where she/he is personally implicated.

Teacher education programs would also benefit from the inclusion of Jung's theory of psychological types (Jung, 1921/2014a) and the Myers-Briggs (Myers, 1962) personality types since these typologies provide a tool for better understanding learners and for communicating with them as

individuals (Shaker, 1982). Psychological typologies, while only briefly mentioned here, may provide educators with a different perspective on their pedagogy, their strengths, and limitations. In addition, teachers may be able to more deeply understand their students' behaviour if this behaviour is considered through the knowledge of their students' personality typologies.

Teacher education programs would also benefit from the inclusion of archetypal imagery since when teachers draw upon it, as demonstrated, teaching practice is enriched. The inclusion of Dobson's (2009) archetypes (Royal, Warrior, Magician, Lover) within a teacher education program may be used to inspire teacher self-reflection about their teaching practices and knowledge. This self-reflection may further assist new teachers in working through unsatisfactory pedagogy and allow them the opportunity to delve into their ontological commitments and constructs regarding their professional practice and knowledge. Something as simple as having pre-service teachers read and discuss Dobson's (2009) article, "*Royal, warrior, magician, lover: Archetypal reflectivity and the construction of professional knowledge*," and invite them to reflect upon their archetypes of maturity so as to identify their dominant teacher archetype, may be extremely valuable.

Conclusion

Through an examination of my personal experience as a pre-service physics teacher, this paper explored how I gained increasing critical understanding of a conflict that arose due to interpersonal and intrapsychic relations as well as differing worldviews within an educational setting. By examining such conflicts through the particularities of this one case, other pre-service teachers may begin to understand the psychodynamics of such conflicts and the ways they may be depotentiated in the future thereby transforming their pedagogy.

It is important for Faculties of Education to consider the placement of pre-service teachers in educational settings with dramatically differing worldviews than their cooperating teachers. It is also important that pre-service teachers understand archetypal reflectivity so that their teaching practice is not possessed by the immature bi-polar shadow of any of the four archetypes of maturity. Just as I was oppressed by my cooperating teacher into silence and conformity, pre-service teachers ought to be made aware that during their teaching practice, they may inadvertently oppress students in similar ways – and even do so with their mentors. Additionally, teachers are highly unlikely to be aware of their unconscious shadows and the ways transference and countertransference may affect the teacher-student relationship, including their assessment during their teaching practicum and daily teaching.

More inclusive teacher education programs would be wise to include insights gleaned from analytical psychology and integrate them into approaches to classroom management, curriculum theory, and professional development. The inclusion of analytical psychology within teacher education programs, in addition to the work of Mayes (1999, 2003, 2005, 2007), Dobson (2008, 2009), Moore (1991), and Moore and Gillette (1992) on archetypal reflectivity may invite education students to reflect on the totality of the psyche, both unconscious and conscious, further informing their professional knowledge and practice.

Glossary of analytical psychology terms

Analytical psychology	Psychotherapy in the tradition of C. G. Jung. [See Psychoanalysis]
Archetype	Primordial, structural elements of the human psyche. Primordial mental image inherited by all, such as recurrent symbols and motifs. "Another well-known expression of the archetype is myth and fairy tale…The term 'archetype' thus applies only indirectly to the 'representations collectives', since it designates only those psychic contents which have not yet been submitted to conscious elaboration and are therefore an immediate datum of psychic experience" (Jung, 1959/2014f, p. 5).

Collective unconscious	A structural layer of the human psyche containing inherited elements, distinct from the personal unconscious. "The collective unconscious contains the whole spiritual heritage of mankind's evolution, born anew in the brain structure of every individual" (Jung, 1960/2014l, p. 158). "I have chosen the term 'collective' because this part of the unconscious is not individual but universal" (Jung, 1959/2014f, p. 3).
Complex	An emotionally charged group of related ideas or images that are usually repressed and cause an abnormal behaviour or mental state. "It is the image of a certain psychic situation which is strongly accentuated emotionally and is, moreover, incompatible with the habitual attitude of consciousness" (Jung, 1960/2014h, p. 96).
Cultural complex	An emotionally charged aggregate of ideas and images that tend to cluster around an archetypal core and is shared by individuals within an identified collective (Kaplinsky & Singer, 2010).
Constellate	To activate, usually used with reference to a complex and an accompanying pattern of emotional reactions (Sharp, 20210). "This term simply expresses the fact that the outward situation releases a psychic process in which certain contents gather together and prepare for action. When we say that a person is 'constellated' we mean that he has taken up a position from which he can be expected to react in a quite definite way… the constellated contents are definite complexes possessing their own specific energy" (Jung, 1960/2014h, p. 94).
Dobson's archetypes	Royal, Warrior, Magician and Lover. Each of these archetypes contain positive and negative shadow elements (Dobson, 2009).
Ego strength	Strength of that part of the mind that reacts to reality and has a sense of individuality or self esteem.
Enantiodromia	When things get to their extreme, they turn into their opposite. The emergence of the unconscious opposite in the course of time. "A conversion of something into its opposite" (Jung, 1956/2014e, p. 375).
Fanaticism	Represents a repressed doubt where extreme beliefs are strongly held and defended (Alschuler, 2009).
Personal unconscious	The personal layer of the unconscious, distinct from the collective unconscious (Sharp, 2010). "The personal unconscious contains lost memories, painful ideas that are repressed (i.e., forgotten on purpose), subliminal perceptions, by which are meant sense-perceptions that were not strong enough to reach consciousness, and finally, contents that are not yet ripe for consciousness" (Jung, 1953/2014c, p. 66). "The personal psyche, it has contents and modes of behaviour that are more or less the same everywhere and in all individuals" (Jung, 1959/2014f, p. 4).
Projection	An automatic process whereby contents of one's own unconscious are perceived to be in others (Sharp, 2010).
Psychic inflation	The "puffing up of the ego, often resulting in the dissociation (splitting off) and repression of any thought" (Alschuler, 2009, p. 64) that is incompatible with one's beliefs.

Psychoanalysis	Therapeutic method investigating the interaction between conscious and unconscious elements in the mind and bringing the latter into consciousness.
Reflectivity	To reflect, to go back in thought, meditate or consult with oneself (on or upon something); remind oneself or consider, as in archetypal reflectivity.
Repression	The unconscious suppression of psychic contents that are incompatible with the attitude of consciousness (Sharp, 2010). To actively exclude unpleasant or unwanted thoughts from conscious awareness.
Scapegoat	A person bearing blame that should fall onto others (Perera, 1986). The scapegoat is a person, subgroup, collective, idea, object, etc. made to bear the anxious blame for others in their place (Colman, 2012).
Shadow	Hidden or unconscious aspects of oneself, both good and bad, which the ego has either repressed or never recognized (Sharp, 2010).
Unconscious	The totality of all psychic phenomena that lack the quality of consciousness (Sharp, 2010). Includes the personal, familial, collective, and cultural unconscious.

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Supporting Mindfulness for the Next Generation

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In a time of social and political unrest and challenge, teaching mindfulness skills to the next generation is a wise investment that will bring positive rewards to all of our futures as we become better able to meet life's challenges. Arnett (2011) said there is a growing awareness of the unique challenges faced by young people in "emerging adulthood." Arnett coined this term for young adults from ages 18 to 29. In this stage, there is a strong drive for identity development and a need to address possible life directions and careers. With so many choices this can be overwhelming, particularly for gifted young adults as they ponder what seems to be endless career choices. The emerging adult stage is a time of exploration and change along with considerable stress.

The *millennials* born between 1982 and 2005 experienced the 9/11 terrorist attacks, the pandemic of 2020, increasing systemic racism and incidents of police brutality. In addition, the parents of these young people pressure them to achieve, and they feel an obligation to succeed, but lack the inner resources to manage the competing pressures they face and to make wise choices (Rogers & Mayan, 2019). The *iGeneration* or *Generation Z* , is the first generation to grow up immersed in smart phones and tablets, and as a group they are multitaskers, skeptical, with limited attention spans, and greater levels of anxiety and depression than the *millennials* (Twenge, 2017).

Search for meaning and purpose

Mayseless and Kerin (2014) said there is an innate human drive to find purpose and meaning that is intensified in the emerging adulthood stage due to socio-cultural changes. Greater numbers of young people are going to colleges and universities, and these students live with demands from the universities and from their own internalized expectations, and they need tools to help them cope. Anxiety and stress are the two most common reasons college students seek help from counseling centers (LeViness, Bershad, & Gorman, 2017). Mindfulness practices have been shown to decrease feelings of stress and anxiety, and this article will examine successful programs.

Arnett (2004) listed the self-knowledge emerging adults need to help them navigate through this stage. Questions that the young people want and need to address include: What do I value? What will make me happy? What sort of work will be meaningful for me? What sort of person do I want to become? What sort of person will make a good partner for me? All of these questions take place in the students' culture which impacts their decision making and behavior.

Cultural context

Cultural differences affect the way young adults express themselves; for example, in most Asian cultures, emerging adults identify the importance of responsibility in taking care of their family (parents) as a characteristic of adulthood; whereas, young adults from the United States and Europe identify financial independence (Rogers & Maytan, 2010). Emerging adulthood also varies within a country, particularly across socioeconomic levels and racial and ethnic groups. African American young adults who have experienced oppression and racism need to overcome past and present negative assumptions held by others about young Black adults. In addition, emerging adults from immigrant families often experience conflicts between their family's culture and that of the United States, and the youth feel pulled between conflicting cultural values. The challenge for emerging adults is how to integrate and balance these differing values.

Why mindfulness helps emerging adults

The search for meaning is one of the major developmental tasks of emerging adulthood. Mayseless and Keren (2013) said socio- cultural change has pushed the behavioral markers of adulthood to later in life, and enhanced the importance of psychological markers, such as assuming responsibility for behavior. During the emerging adult stage there is an emphasis on creating a life that feels purposeful and meaningful. Mindfulness practices help young adults in their search for meaning and growth in self-understanding. Paying attention to moment- to- moment awareness with mindfulness practices helps young adults clarify authentic wishes, needs and values. This self-understanding is essential in seeking a sense of purpose.

Some emerging gifted adults do quite well in the rapid pace of change and the wide array of opportunities, while others find this uncertainty leads to feelings of stress, worry and anxiety. Eagan (2017) reported the results of an annual survey that showed first year students in colleges and universities are frequently depressed and over one third reported frequently feeling anxious. Twenge (2017) said the rising generation of college students in the IGen or GenZ have increasingly high rates of depression, anxiety and loneliness. Given the characteristics of this age group, mindfulness and meditation are especially suited for promoting growth and change. Mindfulness based skills help students to quiet their minds and decrease their distress. Mindfulness practices teach the skills of present moment awareness, and with self- knowledge and peace of mind, emerging adults are able to deal with the challenges and choices.

Mindfulness programs working with emerging adults

Feldman, Greeson and Senville (2010) focused on the negativity that emerging adults often report. Their participants, (190 undergraduates) in an all-women's college were divided into three groups to receive three different interventions: mindful breathing, loving kindness meditation and progressive muscle relaxation. The objective was to see if mindfulness training would help the students view their thoughts more objectively. After each intervention, the students completed measures of decentering (viewing their thoughts with objectivity). The students reported how often they had repetitive thoughts and how often they reacted negatively to these thoughts. Students in the mindful breathing group reported increased decentering compared to those in the loving kindness meditation and the progressive muscle relaxation.

Caldwell, Harrison, Adams, Quin and Greeson (2010) studied the effect of movement-based courses and their effect on self-regulation, self-efficacy, mood, stress and sleep quality in an effort to develop mindfulness in undergraduate college students. The participants were 166 undergraduate students enrolled in a 15-week program. At the beginning, middle and end of the semester, the students completed measures of mindfulness, self- regulation, self-efficacy, mood, perceived stress and sleep quality. The program included Pilates, and Taiji Quan. Results showed total mindfulness scores and mindfulness subscales increased overall. Greater changes in mindfulness were directly related to better sleep quality at the end of the semester. The researchers concluded that movement-based programs can increase mindfulness and increased mindfulness accounts for changes in mood and perceived stress.

Jain et al. (2007) examined the calming effects of mindfulness on emerging adults by comparing mindfulness meditation and relaxation training in college students. Eighty-three students who reported distress were divided into a control group, a relaxation group, and a mindfulness group. Jaine and his researchers measured psychological distress, positive states of mind, distractive and ruminative thoughts and behaviors, and spiritual experience. The study found that both interactions of mindfulness meditation and relaxation training reduced distress and improved positive mood status. They noted that mindfulness training seemed to have a specific positive effect on reducing ruminating and distracting behaviors.

Doctoral students were studied by Barry et al. (2018) noting the effects of mindfulness practices on their mental health. Using a randomized control design, they compared graduate students

to a control group. There were 38 students in the control and 34 in the intervention. The experimental group experienced a 30-minute guided practice audio CD asking them to focus on the sound of their breath going in and out. In addition, the students were asked to listen to the CD daily and the average number of times the students listened was 35. Students who practiced mindfulness in the intervention reported a statistically significant reduction in depression and increased self-efficacy, hope, and resilience.

Koru: Mindfulness program for emerging adults

Two Duke University Psychiatrists Holly Rogers and Margaret Maytan collaborated on developing a mindfulness program including meditation, yoga and loving kindness for emerging adults. They called it Koru, a Maori word meaning spiraled, referring to the spiral shape of the unfolding fern growing in New Zealand. Koru represents new life, growth, balance, and harmony. Rogers and Maytan conducted a pilot study of Koru in 2005 which was very successful. Over the years, the 4-week program and curriculum has expanded to include guided imagery, belly breathing, dynamic breathing, and the use of a gatha – a short Buddhist meditation poem. In 2014, a Center for Koru Mindfulness was established to provide training for teachers and hundreds of teachers have been trained. There are three components: Koru Basic, Koru retreat (1/2 day) and Koru.2 (Rogers & Maytan, 2019). Research reports improvement in physical and psychological health, and participants developed skills in meditation and mindfulness (Greeson, Juberg, Maytan, James, & Rogers (2014).

There is growing recognition that mindfulness can have a positive effect on all members of a university, and Carnegie Mellon University's Student Affairs Wellness initiative is one example of this recognition. Students, faculty and staff members receive a subscription to a program that includes a beginner's meditation course and hundreds of hours of content. The University also provides non-credit mindfulness courses and a mindfulness room for guided and drop-in meditation (Flaherty, 2019).

Mindfulness programs working with teens

The American Psychological Association (APA) reports that teens have higher levels of stress than emerging adults and adults. In addition, 50% of teens identify the two strategies they use to deal with stress as playing video games and surfing the internet. *Breathe*, a mindfulness magazine for teens published in the UK includes articles on the need to detox technology, since these devices contribute to stress and distract teens from direct experiences. They suggest taking frequent breaks, perhaps a minimum of 20 minutes with no technology, no phone, no TV, no computer and no iPod. This would allow teens to disconnect from technology and reconnect with real experiences.

Inner kids

Inner Kids, a teen program developed by Susan Kaiser Greenland focuses on attention, balance, and compassion. Inner Kids aims to develop awareness of inner experiences-thoughts, emotions, and physical sensations--together with awareness of outer experiences of other people, places, and things, and awareness of how these inner and outer experiences work together. *Inner Kids* is particularly helpful in working with the emotional issues gifted students have, such as the use of their intellectual power. Gifted students with speed of thought and higher-level thinking, questioning and comments often receive negative feedback or even rejection by classmates, and even teachers, and gifted students need help in understanding this rejection. *Inner Kids* provides time for students to reflect on the outer experiences of others and to reflect on their inner experiences as they reflect on their interaction (Sisk & Kane, 2018).

Learning to breathe

Patricia Broderick developed the *Learning to Breathe program* which is widely used in Canada and the United States. The program is based on six themes and follows the acronym BREATHE. **B** is for body awareness; **R** is for reflection, understanding, and working with one's thoughts; **E** is for understanding and working with feelings; **A** is for integrating awareness of thoughts,

feelings, and bodily sensations; **T** is for tenderness, taking it as it is, and reducing harmful self-judgment; **H** is for habits for a healthy mind, integrating mindful awareness into daily life; and **E** is for empowerment. Several studies found the program produces positive results. Metz, Frank, Reibel, Cantrell, Sanders, and Broderick (2013) worked with a group of high school students who experienced *Learning to Breathe* activities as compared to a control group. The experimental group reported lower levels of stress, negative affect, and psychosomatic complaints, as well as increased levels of efficacy and emotional regulation (Sisk & Kane, 2018).

Georgetown Behavioral Health Institute provides a five-week Mindfulness Program for teens to help reduce stress and improve the ability to control thoughts and actions. The program works with students ages 16-18 who report stress and stress-related symptoms. It is an adaptation of Jon Kabat-Zinn's MBSR program at the University of Massachusetts Medical School. The students take l.5-hour sessions once per week for 5 weeks experiencing guided instruction in mindfulness meditation practices and daily short home assignments that take about 10 minutes. They report benefits including: Improved focus and concentration, ability to deal with stress, better in taking tests at school, and dealing with parents.

Transformative life skills

Jennifer Frank, a professor at Pennsylvania State University collaborated with Niroga Institute to develop the *Transformative Life Skills* (TLS) mindfulness program. TLS combines mindful yoga, breathing techniques and meditation. There are three core practices action, breathing and centering. A research study of TLS found that the program reduced stress and improved the well-being of 49 high-risk high school students. On self-report assessment, the students were measured on stress, well-being, and hostility before and after the program. Pre/post comparisons found significant reduction in anxiety, depression, hostility, and general psychological distress. Frank, Bose and Schrobenhauser-Clonan (2014) found reduction in students' rumination of anxious thoughts, intrusive thoughts, and physical and emotional arousal associated with the fight, flight, or freeze response (Sisk & Kane, 2018).

Kripalu Yoga in schools

The *Kripalu Yoga in Schools* (KYSIS) program integrates yoga and mindfulness into regular high school programming to improve the well-being of teens as they learn social and emotional skills including stress management, self-regulation, self- confidence, and relationship skills. Noggle, Steiner, Minami and Khalsa (2002) worked with 51 junior and senior students registered for physical education. One group was assigned randomly to either KYSIS or regular physical education. The students in KYSIS and the regular physical education students completed self-report questionnaires before and at the end of the program. The KYSIS students showed improvement in mood disturbance and lessened anxiety in comparison to the students who attended regular physical education.

Mindfulness programs working with pre-k-8 students

MINDUP

The *MindUP* program was developed by the Hawn Foundation in 2011 and was first introduced in British Columbia when actress Goldie Hawn lived in Vancouver. The program is included in the curriculum of most elementary schools in the southern mainland of British Columbia, Canada and was adopted by the city of Newark, New Jersey. The *MindUP program increases* pro-social actions, decreases aggressive behaviors, and improves academic achievement especially in math and language arts. There are 15 lessons in four units in Pre-K-8. In Unit 1 students are introduced to brain physiology and the concept of mindful attention. In Unit 2 *Sharpening our Senses the* students experience the relationship between our senses, our moving bodies, and the way we think (Mindful listening, seeing, mindful smelling, tasting, and movement). In Unit 3 *It's All About Attitude,* the students focus on understanding the role of our mind-set in how we learn and progress. This includes perspective taking, choosing optimism, and appreciating happy experiences. In Unit 4 *Taking*

Action Mindfully, students apply mindful behaviors to interactions with the community, including expressing gratitude, performing acts of kindness, and taking mindful action in the world.

Mahoney (2015) conducted an exploratory study with MindUP students from eight classrooms across seven public elementary schools in western Canada, asking what aspects of the program they liked or disliked, and would they recommend the program to others. She found 96% reported the mindfulness activities as a positive aspect of the program and most said they would recommend the program to others. Schonert-Reichl and Roeser (2016) reported that 86% of the students experiencing mindfulness reported being able to boost their well-being by using MIndUP, and 88% after learning MindUP said they use it at home, and 83% indicated improvement in pro-social behaviors.

Roanoke mindfulness program

Hurt Park Elementary school conducted a mindfulness pilot program using the school intercom in which the nurse educator Laurie Seidel on every Thursday asked the students in the entire school to calmly, slowly, breathe in and out, relaxing their whole body. The pilot program on mindfulness was established through a partnership with Carilion Clinc where Seidel works and leads the initiative. Seidel uses the MindUP curriculum and said the purpose of the morning practice was to set the tone for the day, to be thoughtful and kind. The faculty had training on how to use mindfulness in the classroom and the program has had a positive impact on student behavior and the school as whole. Students use the mindfulness practice at any point to calm themselves, and teachers opt for a mindfulness session rather than sending a student to the principal's office. The positive nature of the program is resulting in an expansion of the mindfulness programs in Roanoke.

YogaKids for pre-school students

Rachel Raza and her colleagues at Stanford used YogaKids in a program that blends yoga and mindfulness practices in a kid-friendly program. At the beginning of the school year, pre-school children's self-regulation was tested in two classes in ethnically diverse schools and their parents were asked how well their children demonstrated self-regulation. The YogaKids curriculum was integrated with mindfulness activities throughout the school day. In the class designated as an experimental group, the children did *sun* salutations during morning meetings, and practiced breathing exercises counting in and out for 10-30 minutes a day for six months. The control group of children experienced business as usual activities. At the end of the school year, the mindfulness group was less impulsive and better able to wait for a potential reward, and better able to sustain attention on certain exercises. Raza reports that positive mindfulness tools help build self-regulating behaviors and emotional control that will set them on a better life trajectory (Sisk & Kane, 2018).

Healthy minds mindfulness-based kindness curriculum for pre-school

The Center for Healthy Minds and Healthy Minds Innovations, Inc. provides a Kindness curriculum with eight themes and twenty-four lessons for preschoolers. The themes include: Mindful bodies and planting seeds of kindness; I feel emotions on the inside; How I feel on the inside shows on the outside; Taking care of strong emotions on the inside and outside; Calming and working out problems; Gratitude; All people depend on each other and the Earth; and Gratitude and Caring for our World and Wrap-up. The curriculum is available from the Healthy Minds Innovations website at no cost, but they require full use of the curriculum with no modification.

Mindful pogis: A yoga and mindfulness program for pre-schoolers

Mindful Pogis: A Yoga and Mindfulness program for pre-school children (ages 3.5 to 5) includes activities with the goal of creating harmony with the 3 B's, the body, brain and breath. Rachael Gonzalez the founder and teacher wants students to be successful and joyful. The classroom is playful, full of opportunities to learn to be imaginative, the use of yoga poses and mindful breathing. The program also uses music, art, storytelling and cooperative games and mindful movement. The

themes for the program include compassion, kindness, caring, helping others, taking care of the environment, gratitude, connection and creating peace.

School-based mindfulness program with 2nd - 3rd grade

Flook, Smalley, Kitil, Galla, Kaiser-Greenland, Locke, Ishijima and Kasar (2010) reported a mindfulness program in which 2nd and 3rd grade (ages 7-9) were placed in an experimental or control group. The parents and teachers completed questionnaires on the children's ability in executive functioning. The mindfulness program was held for 30 minutes twice a week for eight weeks for the experimental group, and the control group had regular school activities. At the end of the eight weeks, both teachers and parents reported positive changes in behavioral regulation, metacognition, and overall positive global executive control. In addition, the improvements in the children's behavior generalized across settings including at home.

Tai Chi and mindfulness for middle school students

Tai Chi and mindfulness-based stress reduction was used in a 5-week clinical program with middle school students. The students reported experiencing well-being, calmness, relaxation, improved sleep, less reactivity, increased self-care, self-awareness and a sense of interconnected or interdependence with nature. The teachers, counselors and nurses involved in the project were pleased with the results and plan to replicate the project.

Mindfulness programs with four to twelve-year olds

Diamond and Lee (2010) conducted a meta-analysis of successful programs using mindfulness, yoga, aerobic, martial arts, games, and computerized training to improve the executive function of students. They reported that all of the successful programs provided repeated practice and progressively increased the challenge to executive functioning. Students with the least executive functions benefitted most in the programs. Diamond and Lee concluded that early training may avert widening achievement gaps later. The students were able to stay focused, gave considered rather than impulsive responses and had increased self- control.

Elementary student perspectives of learning mindfulness practices

Ager, Albrecht, and Cohen (2015) addressed the research question of what students' perspectives on learning mindfulness practices in school are. They used thematic analysis to understand and interpret 38 elementary school students' mindfulness journals. Findings suggest that mindfulness enhances student well-being and helps children develop a greater awareness of their body, mind and emotions. The implications of these findings include providing time for the students to reflect on their experiences.

Conclusion

The growth and interest in mindfulness since the early work of Jon Kabat-Zinn and the establishment of the MBSR clinic at the University of Massachusetts has been phenomenal. From one study on mindfulness reported in 1982 to hundreds published since that early initiative. Mindfulness is being implemented in the schools from Pre-K-12 and a myriad of programs for emerging adults are available. This article examined successful mindfulness programs and highlighted their individual approaches. What becomes apparent in reading about the various programs is the enthusiasm and vison of the individuals who planned and developed them, enriching the lives of their student participants as well as their own lives. The programs demonstrate that mindfulness practices encourage participants to experience the wonders of life in the here and now. To be aware mindfully is to open oneself to the activity of exploration and inquiry which is sorely needed by the emerging adults and all of us.

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Investigating the Success of Academically Talented Students with Financial Need: Pathways and Decisions of Jack Kent Cooke Scholars

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Abstracts

This study investigated the outcomes of financial aid, advising support, and other enrichment opportunities provided to academically talented high school and college students who have strong financial need. The Jack Kent Cooke Foundation provides funding to exceptionally promising young scholars from low-income families to enable them to attend and graduate from competitive universities and also complete graduate school. This research identified positive outcomes of this support for academically talented scholars who received financial support. All responding scholars attended and graduated from selective, competitive colleges, completing their undergraduate education at a much higher rate than their socioeconomic peers and the general population. Over half of the scholars also were enrolled in or completed graduate school.

Keywords: High ability; academically talented; financial need; poverty; college; financial aid.

Investigating the success of academically talented students with financial need: Pathways and decisions of Jack Kent Cooke scholars

The ideal often known as the "American Dream" suggests that a successful future can be created, with the right blend of effort, diligence and higher education. Unfortunately, the majority of American students from families of low socioeconomic status too often fail to attend college and complete degrees (Ratliffe, 2015). Too few academically talented students with financial need attend selective colleges or universities that would provide access to education, resources, and experiences that could propel them out of poverty (Chetty et al., 2017; Glynn, 2017; Hoxby & Avery, 2013; Jaschik, 2016; Ma et al., 2019).

In addition to numerous personal benefits resulting from a college education (including greater lifetime earnings, better health, and increased happiness), society also benefits. In the United States, for example, college graduates are more likely than high school graduates without college to volunteer, donate to charities, vote, engage in community work and activities, be involved parents, and enjoy positive relationships with their neighbors, and less likely to be incarcerated, unemployed, or to exit the labor force entirely (Ma et al., 2019; Trostel, 2015).

Additionally, the usually higher earnings of a college graduate lead directly to increased tax contributions and a reduced need for government assistance. Trostel (2015) estimated that the net lifetime fiscal impact (i.e., taxes contributed less costs of education, government assistance, and incarceration) of an individual who has earned a bachelor's degree is approximately $381,000, which is approximately $355,000 greater than that of an individual with only a high school diploma. An individual with a more advanced degree is estimated to contribute a net $548,000.

Only one foundation in the United States focuses exclusively on high-achieving students with significant financial need. Since 2000, the Jack Kent Cooke Foundation (JKCF) has supported more than 2,700 student scholars with financial aid, advising, and enrichment opportunities. These services

enable these academically talented students to successfully apply to, attend, and graduate from highly selective colleges. The JKCF also offers career advising and financial aid to encourage their awardees to pursue graduate education. The mission of the foundation is "advancing the education of exceptionally promising students who have financial need" (Jack Kent Cooke Foundation, 2020). This research study was conducted to investigate the college experiences, goals, and outcomes, and factors which may have influenced these, of academically talented students who have received support from the JKCF.

Review of related research

In this review of research, the postsecondary trajectories of students with financial need are reviewed, as is their need for financial aid, the decisions they make about which colleges to attend, their majors, and graduate school plans. We also provide a brief profile of the population of Jack Kent Cooke Foundation Scholars.

Postsecondary trajectories of young adults with financial need

Nearly 40% of children in the United States experience poverty for at least one year prior to age 18, and this poverty disproportionately affects children of color (Ratliffe, 2015). In 2017, 33% of Black children and 26% of Latinx children lived in poverty, as compared with 11% of White, non-Hispanic children (The Annie E. Casey Foundation, 2019). Only 78% of children who live at least one year in poverty graduate from high school, and 59% do not enroll in any form of postsecondary education. In contrast, 93% of children who never lived in poverty graduate from high school and 70% enroll in postsecondary education by age 25 (Ratliffe). In 2014, Only 33 % of Americans had earned at least a Bachelor's degree (DeNavas-Walt & Proctor, 2015), a figure which is also disproportionately influenced by poverty. Nearly three times as many children who never lived in poverty graduate from college as those who experienced poverty as children (37% vs. 13%) (Ratliffe). This lack of postsecondary education undoubtedly contributes to the continuation of intergenerational poverty, as 29% of people aged 25 or older without a high school diploma and 14% of those with a high school diploma but no college education live in poverty. These two groups represent approximately two-thirds of the 12% of all adults 25 or older who live in poverty (DeNavas-Walt & Proctor).

Many secondary students from high-poverty backgrounds demonstrate readiness for postsecondary academics (ACT [formerly, American College Testing], 2019; College Board, 2019). The gap between the percent of underserved[1] students who show readiness for college (up to 31%), however, and the percent who actually complete college (13%) suggests that many academically talented underserved students do not earn postsecondary degrees (ACT; College Board). Those who do attend college usually seek credentials below the bachelor's degree, usually at less selective colleges. According to McFarland and colleagues (2019), three years after exiting high school, only 40% of 2009 ninth-graders from families in the lowest income quintile were enrolled in any form of postsecondary education. An additional 18% had enrolled but left prior to completing their program or degree. Of those enrolled, 68% sought less than a bachelor's degree and only 7% attended a 4-year institution in the top 20% of selectivity (based on mean ACT or SAT [formerly, Scholastic Aptitude Test] scores of admitted students). Fewer than 1% of students from families in the bottom income quintile attend *most selective* colleges, but of that group, 68% had incomes in the top two quintiles by age 35 (Ma et al., 2019). Only half as many of their socioeconomic peers who attended nonselective, 2-year, or for-profit colleges reached the top two income quintiles by that age.

Among students in the top quartile of achievement in 10th grade, the JKCF recently reported that 48 percent from families in the top income quintiles apply to elite schools, as compared to only 23 percent of high-achieving students from low-income families (Giancola & Kahlenberg, 2016). However, the 8-year graduation rate for students from low-income families who attended a highly selective 4-year institution (79%) was much higher than their socioeconomic peers who attended any other type of 4-year institution (34-57%) and nearly as high as that of students without financial need (89%; McFarland et al, 2019). In fact, 92% of high-achieving students from low-income families who attend elite colleges graduate, suggesting that when schools represent a strong academic match, low-income, high-achieving students are usually successful (Giancola & Kahlenberg).

Financial need and college financing

According to the U.S. Department of Education (n.d.), the average yearly tuition at a four-year college ranges from $8,256 (at public colleges) to $27,298 (at private not-for-profit colleges), with an annual high of approximately $57,000 per year. Even after accounting for grants and scholarships, additional costs of attendance including housing, fees, books, and other expenses place the net annual cost of attendance at a four-year college between $12,523 (at public colleges) and $22,284 (at private not-for-profit colleges), with the highest net cost of over $52,451 per year.

Houle (2013) reported that students from families with incomes below $40,000 were more likely than other groups to assume more than $30,000 of debt to attend college, and students from families with incomes between $40,000 and $60,000 had the highest average debt for college. Only 8% of high-achieving students with financial need actually enroll in elite colleges when they are accepted, primarily due to financial concerns (Glynn, 2017; Kienzl et al, 2019). These concerns are likely exacerbated by an absence of understanding about the availability and expectations related to financial aid (Kienzl et al). For example, Hoxby and Avery (2013) found that for students in the lowest economic quintile, need-based grants and scholarships made the out-of-pocket cost to matriculate at the most selective institutions *less* expensive than any other option, including public 2-year colleges.

Decision-making about college majors and graduate school

Training in Science, Technology, Engineering, and Math (STEM) fields drives innovation and economic growth, and these fields are known to lead to careers with generally higher incomes than non-STEM fields (Bell et al., 2018; U.S. Department of Commerce). If one of the reasons an individual who has experienced low family income pursues higher education is to enter a career that might result in stronger financial stability, STEM majors might be a highly desirable path. However, only 17% of postsecondary students whose parents were ever in the first (lowest) or second income quintile during their secondary education pursued a STEM major in college, as compared to 30% of those whose parents were always in the highest income quintile[2]. Differences in the pursuit of a STEM major also appear across genders. In the United States, more women than men earn bachelor's degrees, but more men than women earn bachelor's degrees in STEM fields, by nearly a 2-to-1 margin, across all racial/ethnic groups (U.S. Department of Education, 2016).

Colleges and universities have structures that may affect undergraduates' persistence, choice of major, and graduate degree plans. Gender has also been shown to affect choice of major and graduate school decisions, and some earlier research has suggested that differences in preferences, labor market expectations, and gender-specific effects of the college experience all affect choice of major (Turner & Bowen, 1999). More recent research with students at a highly selective university has found that that male students care more about financial outcomes in the workplace than women and that gender differences exist mainly in student preferences, such as enjoying coursework, gaining approval of parents, and enjoying work at the jobs (Zafar, 2013).

Participation in undergraduate research and Honors program experiences may attract students to various fields, including STEM. These opportunities may also reduce students' likelihood of changing to non-STEM majors, and encourage students, including those from underrepresented minorities, to consider graduate education (Carpi et al., 2017; Craney et al., 2011; Hathaway et al., 2002; Hunter et al., 2007; Strayhorn, 2010). In a recent review of 52 empirical studies published during the past 15 years, Rinn and Plucker (2019) also identified various cognitive and psychosocial benefits gained from participating in Honors programs and honors opportunities that positively influence achievement among academically talented college students.

Faculty mentors also promote undergraduates' persistence and graduate degree aspirations, including among members of groups historically underrepresented in higher education and STEM fields (Brooms & Davis, 2017; Crisp & Cruz, 2009; Samayoa, 2018). Proactive, personal academic advising has also increased retention and graduation rates (Hadyn et al., 2013; Kuh, 2008) .

Jack Kent Cooke scholars

The JKCF awards *last dollar* scholarships to high-achieving students with financial need. As the name implies, last dollar scholarships cover the remainder of the net cost of attendance (including tuition, fees, and living expenses) after all other grants and scholarships are awarded. The JKCF also provides other supports to these Scholars, including college and career advising and financial assistance that can be used for college applications, internships, summer programs, and other college enrichment activities. One of its most highly-attended advising activities is Scholars Weekend, where JKCF Scholars network with their fellow awardees and receive intensive advising related to career selection and graduate school. The JKCF provides scholarships to three groups of students: University Transfer Scholars, Young Scholars, and College Scholars.

University transfer scholars

Jack Kent Cooke University Transfer Scholars (hereafter "Transfer Scholars") are some of the highest achieving community college students in the United States, and have significant financial need (mean community college GPA: 3.84; median family income: $19,369). This JKCF Scholarship Program began in 2002 and has enabled nearly a thousand community college students to matriculate at highly competitive four-year colleges or universities to complete their bachelor's degrees. Each JKCF Transfer Scholar receives financial support (median 2017-2018 award: $19,424) for two to three years, college planning support, ongoing advising, and the opportunity to connect with other Transfer Scholars. This highly competitive scholarship includes personalized advising about selecting, transitioning to, and accessing opportunities in competitive colleges to maximize the student experience.

Young scholars

The JKCF Young Scholars Program began in 2001 and is a five-year, pre-college scholarship for high-performing 7th grade students with financial need (modal 6th grade GPA: 4.0; median family income: $36,882; median 2017-2018 award: $9,765). The JKCF provides comprehensive academic and college advising, as well as financial support for attending private secondary schools, summer programs, internships, and other enrichment opportunities. Advisers support Young Scholars through middle and high school to support their matriculation at top-performing colleges and universities. This support includes helping scholars to set goals, plan their high school experience, attend appropriately rigorous high schools, and participate in challenging academic and extracurricular opportunities. Young Scholars are also offered year-round JKCF community programming where they can build a network of high-achieving peers.

College scholars

The Cooke College Scholarship Program began in 2006 and is available to high-achieving high school seniors with financial need who intend to graduate from top four-year colleges and universities. This highly competitive scholarship (mean high school GPA: 3.86; mean 12th grade ACT score: 32; median family income: $32,837; median 2017-2018 award: $6,493) includes advising for topics such as selecting a college, navigating financial aid, transitioning to college, and maximizing the student experience.

Research questions

This study investigated the following research questions:

1. What is the postsecondary experience of JKCF Scholars with regard to how many attend and complete college and graduate school, the college's competitiveness, and the majors and careers they pursue?
2. What alterable factors do JKCF Scholars believe contributed to their college, graduate school, and career decisions?
3. Do differences due to gender, family poverty, or racial/ethnic background exist in the experiences and factors examined in RQ1 and 2?
4. Do JKCF scholars believe that advising was important to their academic decisions?

Method

Instrument

A survey was developed with questions about the JKCF Scholars' high school and undergraduate experiences, graduate school and career plans, and demographic information. Response logic was used to direct scholars to sets of Likert-scaled items that asked the participants to indicate the importance of various possible reasons for their decisions and plans, such as receiving advice from professors, experiencing discrimination, or following their academic interests. The content for these items was developed from a comprehensive literature review that included research on college and career decision-making in the general population, as well as in populations of academically talented students from low socio-economic backgrounds (Crisp & Cruz, 2009; Giancola & Kahlenberg, 2016; Glynn, 2017; Hathaway et al, 2002; Wyner, Bridgeland, & Diiulio, 2009).

Scholars were asked a series of questions about decisions they made during college, such as whether they changed their major or their plans regarding graduate school. Following their response, they were presented with Likert-scaled items (1: not at all to 5: extremely) regarding the importance of various factors in their decision-making process. The decision tree that led to these items had many possible branches, resulting in widely varied response rates for the various filtered items. For example, 353 Scholars indicated they had graduated college and received the question "Are you currently in graduate school?", to which 117 answered "yes", 218 answered "No" and 18 did not respond. Additional filtered questions followed both "Yes" and "No" responses. Parallel item construction made it possible to create new variables in order to examine the factors that were important to the scholars' decision-making processes.

We recoded the responses to several short-response and dropdown-select items. We used a list of specific supports that JKC made available to each group of scholars for relevant questions. We also used Barron's Profiles of American Colleges (2019) to manually recode the college or university the Scholar indicated they were attending or had attended for their undergraduate degree. Colleges were coded 1-6 in order of least to most competitive, or 7 if they were in Barron's "special" category. Because almost all of the JKCF Scholars attended highly ranked colleges, we also created a binary variable (1 = most competitive, 0 = not most competitive). We classified majors as STEM if they involved science, technology, engineering, or mathematics as a primary part of the major, and as Professional if they typically would lead directly to a specific career, such as accounting or teaching. Some majors (e.g., nursing) were coded as both Professional and STEM. This coding was completed independently by two coders with knowledge of university majors, who then met to compare and resolve differences until 100% agreement was achieved. All scholars were asked their current and/or intended occupation, which were classified according to the minimum required degree listed in the Occupational Outlook Handbook from the United States' Bureau of Labor Statistics (BLS). The race/ethnicity item was recoded from 10 options (including multiracial and "other") to White/Asian or Underrepresented for the 503 non-blank responses. For gender comparisons, we examined responses from the 489 participants who indicated male or female (18 indicated a gender other than male or female).

Data collection

The JKCF sent an invitation email with a link to the Qualtrics-hosted digital survey to 202 College Scholars, 487 Young Scholars, and 675 Transfer Scholars in March of 2019, which was the total population of JKCF Scholars with known email addresses. Reminders were distributed after one and six weeks following the initial invitation. The survey was completed in May 2019. The response

rate for College Scholars was 42% (*n* = 85), for Young Scholars was 38% (*n* = 184), and for Transfer Scholars was 48% (*n* = 322). Demographics are summarized in Table 1.

Table 1: Sample demographics (within-group percentages).

Category	Detail	TS (n = 322)		YS (n = 184)		CS (n = 85)	
Gender	Female	60		62		57	
	Male	38		33		41	
	Other	3		5		3	
Race/ Ethnicity	White/Caucasian	41		42		40	
	African American/Black	11		12		1	
	American Indian/Alaska Native	0		1		1	
	Asian American/Asian	13		24		32	
	Native Hawaiian/Pacific Islander	0		0		0	
	Mexican American/Chicano(a)	9		6		9	
	Puerto Rican	1		1		1	
	Other Latino	13		4		7	
	Other	7		4		1	
	Multiracial	7		7		7	
High School Graduation Year	1990-1993	9		-		-	
	1994-1998	8		-		-	
	1999-2003	13		-		-	
	2004-2008	19		18		-	
	2009-2013	37		38		-	
	2014-2018	14		44		100	
Family Poverty	Did Receive Free/Reduced-Price Lunch	44		63		66	
		n	**%**	***n***	**%**	***n***	**%**
Family History of Post-Secondary Schooling*	First in Family to Attend College	139	51	52	33	25	33
	First in Family to Graduate College	108	57	37	34	6	35
	First in Family to Attend Graduate School	85	70	29	42	4	50
	First in Family to Complete Graduate School	36	67	12	39	0	n/a

* Percent of those who responded to the filtered item (e.g., 85 Transfer Scholars indicated they were the first in their family to attend graduate school. This is 70% of the 122 Transfer Scholars who had attended or were currently attending graduate school).

Results

College completion and graduate school goals

JKCF Scholars completed their undergraduate education at a much higher rate than their socioeconomic peers and the general population[3] and on par with their academic peers, and most decided to pursue graduate school (Table 2). Every responding Scholar was either currently in college or had graduated from college. Of the 357 responding Scholars who were college graduates, 207 (58%) were or had been enrolled in graduate school, and only 4 individuals left graduate school early. Out of 232 Scholars who were undergraduates at the time of the survey, 97% believed they had been successful in college, indicating that they were on track to graduate. In comparison, in 2017, fewer than 60% of U.S. students completed a bachelor's degree within 6 years, and only 36% of 2008 college graduates had completed or were currently enrolled in graduate degree programs four years after completing college (National Center for Education Statistics [NCES]). Among Ivy League schools, which 20% of the sample attended as undergraduates, the highest 2019 4-year graduation rate was

88% (U.S. News and World Report, 2019), with an average of 96% of students graduating within 6 years across the Ivy League (Univstats, 2020).

Table 2: Highest degree attained in the United States.

Education	Age 25+[a]	Age 25-29 [a]	JKCF Scholars [b]	JKCF Scholars (College Graduates) [b]
Bachelor's degree	34.16%	35.66%	21%	18%
Master's and/or doctorate and/or professional degree	12.83%	9.17%	88.4%	88.4%
Doctorate and/or professional degree	3.34%	1.81%	50.7%	48.1%
Doctorate	1.88%	0.94%	34.1%	32.4%

a. Actual figures; Retrieved from: https://www.census.gov/data/tables/2014/demo/educational-attainment/cps-detailed-tables.html
b. Aspirations; Data from the current study

Success at highly competitive colleges

The majority of students in all JKCF Scholarship programs attended competitive colleges and universities. Across all three JKCF groups, students who attended the most competitive colleges, as classified by Barron's, reported feeling less successful in college ($\overline{x}$ = 3.91) than those who attended other colleges ($\overline{x}$ = 4.28; d = .50). Despite this perception, these Scholars persisted and graduated from these institutions.

Honors programs

Transfer Scholars were enrolled in an Honors program at significantly higher rates (49%) than College Scholars (27%) and Young Scholars (18%). Two potential explanations for this difference seem plausible. First, it is possible that Transfer Scholars answered "yes" to this question if they participated in an Honors program at their community college, regardless of whether or not they participated in an Honors program at the 4-year university to which they transferred. Second, Transfer Scholars were more likely to attend public universities than other Scholars (X^2 = 76.14, p<.0001) and less likely to attend most competitive private schools than other Scholars (X^2 = 26.53, p<.0001). Honors programs are more common in large public schools and less competitive private schools than they are at the most competitive private schools. College type, therefore, may also explain why Transfer Scholars indicated participation in Honors programs at a much higher rate than the other two groups.

Graduate school aspirations and professional goals

The type of college attended did not seem to relate to students' plans to attend graduate school. Type of college also did not predict reported occupational level of their chosen career: 27.7% of students from most competitive private schools and 28.6% of those from most competitive public schools reported they plan a career that requires a doctoral or terminal degree. Similar proportions of students from private, not-most-competitive schools (30.9%) and public not-most-competitive schools (38.2%) had career plans that required a doctoral or terminal degree. JKCF Scholars who attended public schools were more likely to have STEM majors (X^2 = 17.75; p<.0001) or majors that typically lead directly to a specific profession (e.g., nursing; X^2 = 6.88; p = .009) than those who attended

private schools. School competitiveness was not related to having a STEM major, but Scholars who attended a most competitive school were less likely to have a professional major than Scholars who attended a not-most-competitive school (X^2 = 4.47; p = .04).

Decision-Making about college majors and graduate school

Table 3: Importance of reasons for changing majors and graduate school decisions, in order of descending means for all responses.

	All Responses		**Yes Grad School**		**No Grad School**		**Changed Major and/or Grad Plan**	
Summary Variables	$\bar{x}$	*N*	$\bar{x}$	*n*	$\bar{x}$	*n*	$\bar{x}$	*n*
benefitting others	4.42	395	4.42	395				
personal fulfilment*	3.99	486	4.22	395	3.04	50	3.73	244
positive reasons	3.78	467	4.12	395			2.55	199
financial reasons	3.67	470	4.07	393	3.16	45	2.88	104
family reasons	3.40	441	3.94	392	1.85	42	2.11	128
academics	2.27	153			1.89	44	2.41	117
negative reasons	2.16	261			2.31	49	2.13	234
reasons related to time	2.15	241			2.49	47	2.08	215
influence of others	2.02	153			1.56	39	2.17	122
discrimination	1.75	204			1.64	38	1.76	183
others discouraged	1.71	130			1.52	37	1.80	101
Individual Items								
make a positive difference	4.58	395	4.58	395				
help others	4.51	394	4.51	394				
following career goal	4.30	479	4.53	391	3.21	48	4.07	234
fulfil my potential	4.30	388	4.30	388				
support my family	4.16	384	4.16	384				
following interests	4.13	469	4.47	391	2.39	31	3.79	232
financial success	4.00	392	4.00	392				
make family proud	3.71	388	3.71	388				
prestige	3.56	392	3.56	392				
high enough aptitude	2.96	103					2.96	103
financial challenges	2.95	142			3.16	45	2.88	104
new work opportunity	2.95	113			2.78	36	3.02	82
influence of professors	2.26	128			1.48	25	2.40	108
family obligations	2.24	124			2.29	41	2.19	90
requires too much time	2.21	229			2.79	47	2.10	202
mental health/health	2.03	105			1.87	38	2.14	75
too difficult	1.99	226			1.69	45	2.05	201
influence of family	1.94	128			1.39	33	2.11	101
too many years in school	1.90	207			2.03	32	1.87	191
grades	1.88	125			2.18	34	1.80	97
no one like me	1.84	187			1.61	28	1.91	171
competition	1.80	212			1.85	33	1.80	194
wanted to start a family	1.77	127			1.84	37	1.77	95
aptitude too low	1.77	126			1.74	42	1.84	92
SES discrimination	1.64	189			1.74	38	1.59	166
influence of partner	1.58	112			1.21	33	1.73	84
gender discrimination	1.47	173			1.43	37	1.50	153
race/ethnic discrimination	1.41	166			1.41	34	1.41	146
romantic relationship	1.33	107			1.47	34	1.32	79
influence of friends	1.20	101			1.17	30	1.21	75

* Computed from mean of available variables for each group, selected from: fulfil my potential, prestigious career, career goal, interest, new work opportunity, and high aptitude.

Table 3 summarizes the importance that Scholars ranked as reasons for their choices regarding their college major and graduate school. Scholars strongly endorsed positive reasons for deciding to attend graduate school, particularly those related to benefitting others (helping others, making a positive difference, and supporting their family) and to personal fulfilment (pursuing their academic interests, attaining their career goals, fulfilling their potential, and entering prestigious careers). The three strongest and most common reasons for not attending graduate school were related to career goals that didn't require graduate school, financial challenges, and concerns about the amount of time required for graduate school.

Half of the Scholars who were undergraduates at the time of the survey reported that they had changed their plans regarding graduate school since entering college. The most common reasons for change were positive, as Scholars chose to follow their changing academic interests and career goals. Nearly half changed their goals because they realized that they had a high enough aptitude for a more challenging graduate school option. For those who had planned to attend graduate school but ultimately decided against it, financial challenges were the most important reason (n = 33, $\bar{x}$ = 3.18; SD = 1.55). Scholars generally rated discrimination as unimportant to their decisions to change their plans, but many Scholars rated feeling alone ("No one like me") as somewhat important to their change of plans.

These JKCF Scholars were also very involved in experiences associated with persistence in STEM fields and into graduate school (Brooms & Davis, 2017; Carpi et al., 2017; Craney et al., 2011; Crisp & Cruz, 2009; Hathaway et al., 2002; Hunter et al., 2007; Strayhorn, 2010; Samayoa, 2018): 60% (78% of STEM majors) participated in undergraduate research, and 48% (50% in STEM) indicated they had a faculty mentor.

Reflecting prior research, participation in some college enrichment experiences was positively associated with doctoral degree aspirations. JKCF Scholars who participated in summer or academic year undergraduate research or had a faculty mentor were more likely to pursue a doctoral-level goal degree and less likely to pursue a master's-level goal degree than those who did not (Summer X^2 = 29.80, p<.0001; Academic Year X^2 = 13.87, p = .001; Mentorship X^2 = 12.88, p = .002). No other college enrichment experiences were statistically significantly related to master's or doctoral degree aspirations.

Few differences related to gender, race, and family poverty

Prior research suggests that women and members of racial/ethnic minority groups pursue degrees and careers in STEM fields at lower rates than their white, male peers (Bell et al., 2018; U.S. Department of Commerce, U.S. Department of Education, 2016). We examined the data for differences related to gender, family poverty, and racial/ethnic background in the Scholar's choice of majors, participation in enrichment experiences, and goals. In contrast to the general population, these high-achieving students with financial need were remarkably consistent across groups in terms of their academic experiences, goals, and achievements, with few significant differences (Table 4). Women were more likely than men to pursue a non-professional degree (X^2 = 8.61, p = .003), and also more likely to aspire to a doctorate (X^2 = 6.82, p = .03).

JKCF Supports

JKCF provides a variety of supports to its Scholars in addition to financial aid. The survey included Likert-scaled questions (1: Not at all to 5: Extremely) about how helpful the supports were in

college and how important the Scholars perceived the supports to be to their graduate school and career choices (Table 5). For example, nearly all Scholars indicated that they participated in Scholars Weekend, an intensive advising and networking retreat. Although up to half of Scholars did not take advantage of the other JKCF advising activities, those who did rated the advising as important to their decision-making about both graduate school and careers. This contributes to literature suggesting the importance of academic advising for undergraduates (Hadyn et al., 2013; Kuh, 2008).

Table 4: Categorical relationships related to gender, race, and family poverty (full sample).

	Gender				Race[a]				Ever Free/Reduced Lunch			
	n				n				n			
	M	F	X^2	*p*	W	U	X^2	*p*	Yes	No	X^2	*p*
Undergraduate College Rank												
Noncompetitive	0	1			1	0			0	1		
Less Competitive	2	3			4	1			2	2		
Competitive	11	20			20	11			12	18		
Very Competitive	18	34			36	21			37	19		
Highly Competitive	29	35			39	26			40	25		
Most Competitive	114	188			180	130			201	108		
Special	2	5	2.68	.85	6	1	4.41	.62	3	3	10.01	.12
Undergraduate Major[b]												
STEM Field	116	168			166	120			174	109		
Not STEM Field	70	133	2.03	.15	134	81	.94	.33	139	74	.74	.39
Professional Degree	95	113			132	82			125	87		
Not Professional Degree	91	188	8.61	.003	168	119	.51	.48	188	96	2.73	.10
Goal Degree												
Bachelor's Degree	18	18			24	15			29	10		
Master's Degree	69	92			105	61			100	62		
Any Doctorate	96	191	6.82	.03	170	123	1.56	.46	183	110	2.70	.26
College Enrichment Experiences[b]												
Any Enrichment	167	277	.37	.54	271	187	1.61	.20	284	170	.55	.46
Honors Program*	60	106	.24	.62	102	69	.03	.87	92	79	8.98	.003
Academic Year Undergraduate Research	86	132	.62	.43	139	86	1.25	.27	138	87	.28	.59
Summer Undergraduate Research	70	114	.03	.88	109	78	.10	.75	114	71	.12	.73
Academic Year Internship or Co-op	41	55	1.36	.24	63	37	.78	.38	66	33	.91	.34
Summer Internship or Co-op	82	121	1.23	.27	125	82	.23	.63	137	68	2.92	.09
Study Abroad	47	98	2.48	.12	96	56	1.50	.22	100	51	1.30	.25
Field Study	12	14	.86	.35	15	12	.16	.69	16	11	.13	.72
Fellowship	23	36	.05	.82	32	31	2.12	.15	45	18	2.46	.12
Mentorship with Faculty	75	138	1.01	.32	130	93	.14	.71	142	81	.24	.63
Individualized Major	5	19	3.04	.08	13	13	.96	.33	16	10	.01	.91
Professional Conference	60	110	.63	.43	93	77	2.23	.14	99	71	2.17	.14

[a] White/Asian (W) or Historically Underrepresented Group (U)

* See discussion of honors programs and university type. Transfer Scholars were less likely to report participating in federal free/reduced lunch program than other groups.

Table 5: Use, Importance, and Helpfulness of JKCF Supports.

				Importance to Choices	
	Did Take Advantage		Helpful in College	Attend Graduate School	Occupation
	n	%			
Supports for Transfer Scholars					
Financial Support for College Expenses	299	93	4.9	4.7	4.34
JKCF Scholars Weekend Programming	280	87	4.47	4.01	3.71
Support from Other JKCF Scholars	246	76	4.35	3.98	3.59
Academic Advising	176	55	4.09	3.7	3.21
Other Adviser Support	165	51	4.26	3.87	3.48
Career Guidance	78	24	3.66	3.58	3.47
Supplemental Internship Stipend	58	18	4.53	3.59	3.42
Supports for Young Scholars					
JKCF Scholars Weekend and/or Senior Summit Programming	180	98	4.01	3.51	3.27
Summer Programs	171	93	3.61	3.05	3.65
Financial Support for Interests and Extracurricular Activities	156	85	4	3.4	3.55
Academic Advising	150	82	3.41	3.18	3.06
College Advising	150	82	3.5	3.1	3
Support from Other JKCF Scholars	134	73	3.74	3.32	3.21
Other Adviser Support	118	64	3.53	3.1	3.06
Interest/Career Exploration	109	59	3.27	3.68	3.61
Financial Support for Private School Tuition	96	52	4.8	4.15	3.68
Supports for College Scholars					
Financial Support for College Expenses	80	94	4.88	4.28	3.97
JKCF Scholars Weekend Programming	66	78	4.19	3.15	2.98
Academic Advising	55	65	3.77	2.89	2.75
Support from Other JKCF Scholars	52	61	3.9	2.67	2.76
Other Adviser Support	40	47	3.85	2.68	2.54
Career Guidance	24	28	3.57	2.92	2.74
Supplemental Internship Stipend	16	19	4.73	3.21	2.92

Discussion

The JKCF's investment in these scholars made a difference. Each of the JKCF Scholars, who by definition are from low socio-economic family backgrounds, who responded to the survey either graduated or was on track to graduate from a four-year university. Nationally, only 54% of high-achieving high school students from low-income families complete a bachelor's degree (Wyner et al, 2009). In the general U.S. population, only 29% of college graduates from lower-income families complete graduate degrees (Wyner et al, 2009), but 89% of these JKCF Scholars aspired to graduate degrees, and only 4 (1%) of the Scholars who started graduate school left without completing. In addition to the personal benefits to these Scholars and their immediate families, our society benefits from this type of investment in higher education (c.f., Trostel, 2015), especially as many Scholars have completed graduate school in medicine, sciences, and engineering.

Financial difficulties are a concern for most college-bound students, and the complexities of federal financial aid are also usually perplexing (Kienzl, Croft, & Moore, 2019). This research

demonstrated that additional financial aid enabled some highly able students who otherwise might not have persisted to attend and graduate from challenging and highly ranked four-year colleges and universities. Most also attended graduate schools and pursued challenging careers, and 79% of respondents who had attended or were planning to attend graduate school indicated that the availability of JKCF funding for graduate school affected their decision to attend.

Limitations and future directions

This was a retrospective, self-report survey study, with limitations due to its format as well as its content. Although approximately 40% or more of each group of Scholars responded to the survey, we do not have information about any systematic difference that may have existed between respondents and non-respondents. It is possible that unsuccessful Scholars did not respond to the survey, and that the exceptionally high perceived success, graduation rates, and graduate school aspirations and attendance in our sample are not representative of the entire group of JKCF Scholars. Our survey primarily used Likert-scaled response options, and it is possible that participants' responses were influenced by their perceptions of social desirability, as opposed to representing their true feelings or accurately recounting their participation in various activities. We attempted to address this possibility by making the survey anonymous and clearly stating that their status and funding as a JKCF Scholar would not be affected by their responses. As a retrospective study, it is also possible that memories of participation in various activities or the importance of different factors in their decisions were lost or diminished with time. Future prospective research might follow JKCF Scholars during college, collecting data during advising opportunities in order to track their real-time participation in activities, their perceptions of discrimination, and their decision-making processes.

This research investigated high-achieving young people from low-income families who received foundation support to complete a bachelor's degree or if desired, to attend graduate school. The respondents were exceptionally successful and aspired to advanced degrees at rates far beyond the rates shown by the general population. However, the total population of Jack Kent Cooke Scholars (approximately 2,200 individuals), represents only a tiny fraction of the hundreds of thousands of young people with financial need who graduate from U.S. high schools *each year* with academic records that suggest they could complete at least a four-year degree (ACT, 2016a; 2016b; 2019; Hoxby & Avery, 2013; NCES, 2019; Wyner et al, 2009). Additional attention should be directed to understanding the needs and experiences of high-achieving youth with financial need, both to enable them to achieve their own dreams and so that their talents might benefit society.

Conclusion

Based on the awards provided by JKCF and the responding Scholars' consistently high ratings of the importance of financial aid in college, the main obstacle that stands between high-achieving students with financial need and a four-year degree seems to be money-- specifically, approximately $20-$40,000 more than is currently provided by grants and scholarships in order to fully fund their attendance. These results suggest that closing that gap for more students could provide a significant benefit to society at large, in addition to changing the lives of the individual students (Trostel, 2015).

This study complements and supports previous research demonstrating that high-potential students with financial need are very successful in competitive colleges and universities and can achieve financial security through educational opportunities (Glynn, 2017; Giancola & Kahlenberg, 2016; Wyner, Bridgeland, & Diiulio, 2009). The Scholars who responded to this survey were motivated to pursue advanced degrees and challenging careers to make a positive difference, help others, and pursue their academic interests. They are capable of successfully pursuing graduate degrees in many challenging and important fields. However, most capable students with financial need do not complete these types of postsecondary education because of the significant financial burden they anticipate (Kienzl, Croft, & Moore, 2019). More effort should be made to make all types of college accessible to high-potential students from families of all income levels. In addition to working to reduce the overall cost of college, educators and advisors need to advise more academically capable students from low-income families to learn about the scholarships and the advising support that does

exist in competitive colleges; in addition, these students need help in navigating the financial aid application and college selection process with these indicators in mind.

Notes:

[1] *Underserved* includes students who self-report a family income below $36,000 per year, parental education at or below high school, or a race/ethnicity of African American, American Indian, Hispanic, or Pacific Islander (ACT, 2019)

[2] High School Longitudinal Study 2016 Student data file, author's calculation. Crosstab with percentages using X4RFDGMJSTEM and a variable computed to identify the lowest parent income quartile from X1SESQ5 (2008) and X2SESQ5 (2011). Data accessed 5/7/2020 from https://nces.ed.gov/OnlineCodebook/Session/Codebook

[3] The authors recognize that neither of these comparison groups are ideal, given that JKCF Scholars are selected for the award based on their high achievement.

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Global Principles for Professional Learning in Gifted Education and Italian Primary Teachers

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Abstract

Aligned with the 10 Global Principles for Professional Learning in Gifted Education (WCGTC, 2021), this exploratory study investigated the co-construction of inclusive differentiated instruction for a fourth grade gifted student with three general education teachers in a North Italy public education primary school using learning menus and learning contract strategies. The research questions examined responses of general education teachers toward (a) an identified gifted student, (b) inclusion practices in the primary classroom, and (c) co-constructed interdisciplinary curricula for a gifted student. Conducted during a six-week timeframe, the primary researcher conducted Pre- and Post-Intervention Focus Groups, established an instructional baseline, planned interdisciplinary activities in five academic subjects, suggested lesson extensions, and concluded with a Parent Interview. The primary researcher provided professional learning experiences in accordance with the Italian Ministry of Education ministerial law n. 562 (2019) that mandated inclusion of children with giftedness in the category of special education needs. Analysis of Pre- and Post-Intervention Focus Groups results indicated improved dispositions of teachers toward a gifted student in general education primary classrooms, development of inclusive classroom practices with guidance from a gifted education specialist, and documented competencies co-constructing interdisciplinary curricula integrated with 10 Global Principles for Professional Learning in Gifted Education.

Keywords: Professional learning; gifted education; Italian primary teachers.

Introduction

Despite its legendary support of the arts and sciences, Italy lacks formalized educational services for children and adolescents with giftedness, talents, and creativity. The roots of teacher training in Italy replicated Napoleonic educational reform in France with the "normalized" pedagogy of the Paris Ecole Normale Supérieure. Established in 1810, the Scuola Normale Superiore in Pisa similarly trained promising high school students under a centralized and uniform system embracing the ideals of the Enlightenment. Although these highly selective schools graduated eminent scholars, they excelled in their respective fields of study than as pedagogues (Phelps & Miller, 2019, Chapter 1, p. 18).

In 1905, Alfred Binet assessed intellectual ability of Parisian school children with an intelligence quotient as the ratio of "mental age" and chronological age with 100 as normal or average. Since Binet viewed intelligence as a flexible rather than hereditary construct, schools could ameliorate the academic performance intellectually disadvantaged children with instruction designed to enhance their intelligence. In the United States, the normal school movement evolved into educational systems based on democratic principles known as "Common Schools" in the United States through the reforms of Horace Mann. Under the leadership of Lewis Terman, the Binet-Simon Intelligence Test expanded into the Stanford-Binet Intelligence Test with the capacity to assess superior potential in children and adapt school instruction to address their cognitive abilities (Phelps & Miller, 2019, Chapter 1, pp. 20-21). This convergence of trends in teacher education reforms, compulsory primary and secondary schools, and standardized intelligence testing changed the political, societal, and academic landscape to advance specialized educational programs for high ability children and adolescents in the 20th century.

In response to the Soviet launching of Sputnik in 1957 and the subsequent government sponsored Marland Report in 1972, the United States initiated specialized educational programs for

children and adolescents with giftedness, talent, and creativity. Scholarly journals in the United States, Australia, New Zealand, and Korea emerged to support the fledgling field. In Europe, Arthur Cropley founded the *European Journal of High Ability* in 1990, and several Turkish journals began publishing since 2010. Professional organizations including the European Council for High Ability (ECHA) and the World Council for Gifted and Talented Children (WCGTC) sponsor biannual professional conferences for its constituents.

The WCGTC recently published *Global Principles for Professional Learning in Gifted Education* (2021) as guidance for educators, policymakers and teacher education programs at local and national levels. These 10 Global Principles affirm legislative action, practitioner organizations, and advocacy initiatives during the past 10 years that serve as the Zeitgeist for the present study. Specific examples of these advances include the 2019 enactment of Italian Ministry of Education ministerial law n. 562; founding of professional organizations such as Talent Point in Florence and TalentInclusivi National Schools Network, legislative advocacy including testimonials to the Italian Parliament (Pfeiffer & Henson, 2021), international partnership of SEM Italy (Milan & Reis, 2020), and independent consultative training programs and enrichment camps.

The 10 *Global Principles for Professional Learning in Gifted Education* (WCGTC, 2021) provide a foundation to collectively guide legislation, professional organizations, partnerships, and consultative activities. These 10 principles provide descriptions, dispositions, and documentation relative to high quality outcomes in professional learning in gifted education: (1) **tiered content**, (2) **evidence-based**, (3) **holistic**, (4) **broad**, (5) **equitable**, (6) **comprehensive**, (7) **integral**, (8) **ongoing**, (9) **sustainable**, and (10) **empowering**. Accordingly, we aligned our three research questions with these Global Principles, noted in bold font:

1. How does **ongoing** and **integral** professional learning in gifted education help primary school general education teacher form **holistic** and **equitable** dispositions toward students identified with giftedness?
2. How does **broad** professional learning in gifted education equip primary school teachers to practice inclusion as an **evidence-based** rationale in their general education classrooms?
3. How does **sustainable** and **empowering** professional learning in gifted education develop competencies as co-creators of **comprehensive** and **tiered content** for students identified with giftedness?

Teacher education and professional learning

Teacher training in Italy

Candidates in teacher preparation programs in Italy select a primary, middle, or high school grade level focus. For example, primary school teachers meet university requirements in a five year Primary Teaching Education program. University teacher training programs lack specialization in Gifted Education coursework to qualify as gifted facilitators. Once credentialed, professional teachers find many professional learning opportunities through associations and universities that offer short training courses. Once again, these courses need specialized content, skills, and dispositions appropriate for gifted education. In 2018, LUMSA University in Rome provided an innovative six month hybrid Master School program in Gifted Education for professionals with graduate degrees.

In Italy, most practicing teachers in Italy seem unaware of — or unwilling to acknowledge the existence of gifted children. To address the need to teach all students, the Italian Minister of Education convened a technical committee to convene gifted education experts in Italy with the charge to write national guidelines in 2018. However, once completed, the ministry failed to publish the guidelines. Consequently, general education teachers in Italy need comprehensive guidelines or professional standards available in other countries such as the United States. The two national regulations that provide guidance categorize gifted children with special education needs for personalized education plan (n. 562, 2019) and a formalized process for grade acceleration (n. 5, 2021). The *Global Principles of Professional Learning in Gifted Education* (WCGTC, 2021) support **comprehensive**, **sustainable** and **ongoing** in-service training for primary, middle, and high school teachers as they adopt an

empowering broad program of **tiered content** and **evidence-based** practices that **equitably** and **integrally** address the **holistic** needs of gifted children and adolescents.

Teacher training in gifted education

A research study in Australia reported only 51% of teachers attended a training course on gifted education during their careers (Fraser-Seeto et al., 2015). They also found teachers often lacked the knowledge, skills and strategies to recognize and accommodate the needs of gifted students. This documented deficit provides strong rationale for inclusion of gifted education during initial teacher training programs (Fraser-Seeto et al., 2013) and motivation to offer professional learning on topics such as how to differentiate teaching for high ability students. The WCGTC Global Principles could guide these types of inclusive efforts.

Teacher training plays an essential role expanding teachers' content knowledge, pedagogical skills, and professional dispositions in gifted education. However, the "myths" about individuals with giftedness persist through time (Treffinger, 2009). Changing teacher beliefs and perspectives about gifted children and adolescents remains a formidable challenge. Teachers' prejudices and fears hinder didactic differentiation, especially towards gifted students (Brigandi et al., 2019). Emphasizing the WCGTC Global Principles of **evidence-based** and **equitable** practices during initial teacher training could **empower** teacher training programs. Desimone and Garet (2015) advocated for a professional learning conceptual framework characterized by a focus on content, active learning, coherent, sustained, and collective participation. Preparation for professional learning that explores teacher attitudes and beliefs toward gifted students may uncover persistent myths that hinder inclusive teaching and learning in P-12 schools. When Lassig (2009) found a significant relationship between primary school teachers' attitudes toward intellectually gifted in Australia and their education, she recommended additional teacher training and school-wide participation in gifted education. Unrealized teacher attitudes about the gifted such as elitism, self-sufficiency, and difficulty forming relationships with peers hinder teachers' implementation of best practices offered during professional learning experiences. Miller (2009) suggested examining underlying teacher perceptions to determine how they may fail to recognize cognitive characteristics of giftedness: broad knowledge, finding new uses for things, advanced vocabulary, enjoyment of experimentation and discovery, drawing conclusions, perceiving patterns, generating imaginative and original ideas, and boredom when unchallenged (p. 94). Moreover, teachers need understanding of the social and emotional characteristics of giftedness: preference of older students or adults' company, balancing academic and social activities, quietness, social adeptness, respectful of traditions, volunteerism in local communities, streetwise, good school behavior, respect for the elderly, difficulty accepting less capable persons, and willingly helping others (p. 94).

Coleman et al. (2012) advocated for improved teacher training in gifted education through their engagement in national support networks. Legislation such as the American TALENT Act of 2017 and the 2019 Italian ministerial note n. 562 promote **integral, broad, and sustainable** professional learning in Gifted Education. Dissemination of the WCGTC Global Principles through national associations such as the American Council for Exceptional Children (CEC), Association for the Gifted (TAG), National Association for Gifted Children (NAGC) could lead to **empowering** and **comprehensive** change in professional learning in Gifted Education. In Italy, the Italian Gifted and Talented Education (GATE-Italy), EuroTalent, STEP-Net, Italian Association for the Development of Talent and Giftedness (AISTAP) could provide similar impetus toward **evidence-based** and **ongoing** professional learning in Gifted Education. With increasingly heterogeneous classes, teachers need **integral** and **equitable** networks and teams to manage complexity. Coleman et al. (2012) recommended professionals such as psychologists, educators, staff, and administration who work within school settings exchange information and understanding to support a new paradigm of professionalism in Gifted Education.

According to Darling-Hammond et al. (2017), effective professional teacher training focuses on content related to a discipline or pedagogical/didactic type with active learning by teachers who

collaborate and support each other and feedback from an external expert with sustained duration. Peters and Jolly (2018) recognized the importance of starting with beliefs, and Desimone and Garet (2015) recommended an ideal duration of quality training at 20 hours or more. Sayi (2018) found an external supervisor knowledgeable and skills in **evidence-based** practiced in gifted education possessed the essential ability to address problems for training that exceeded 40 hours. Rowley (2012) acknowledged willingness of teachers to consider unusual ideas and reflect on different educational needs important for education that includes gifted children and adolescents. According to the European Agency (2012), teacher beliefs should include respect for all forms of diversity and the promotion of academic success for each student as indicators of **equitable** and **empowering** professional education. Reid and Horváthová (2016) embraced **sustainable** teacher training in terms of educational policies, purposes and practices that develop human potential on the basis of **holistic** individual needs. Desimone and Garet (2015) found **broad** teacher training with strong connections between practice and lesson planning and the actual classroom **integral** to professional learning. Watters and Diezmann (2013) reported teacher training with teacher project requirements related to the reality of the classroom. Coleman et al. realized teaching practices that consolidated over time created bridges toward flexibility, innovative, and inclusive practices (Coleman et al., 2012).

Global principles for professional learning

The World Council for Gifted and Talented Children formed a committee of 24 educators from 19 countries to effect change for gifted children and adolescents at local and national levels through 10 *Global Principles for Professional Learning in Gifted Education* (2021). Recent world events underscored the need for creative and innovative approaches to complex problems. Universal teacher training in Gifted Education promotes inclusive learning for all students. The 10 Global Principles created an infrastructure from the collective expertise of committee members to guide all educators as they provide appropriate teaching and learning for all students. Since all educators work with gifted students in some capacity, **tiered content** calls for a range of short programs, in-service, and part- or full-time education with a sample framework for three tiers of professional learning in regular classrooms, specialized programs, and gifted education classrooms. The gold standard of **evidence-based** practice ensures quality research on the nature of gifted students and effective professional learning in teacher training programs that include specialized content, pedagogical skills, and professional dispositions appropriate for gifted learners. **Holistic** professional learning addresses the whole child with consideration of a whole child perspective, whole school approach, whole life view, and whole community endeavor. Given the diversity of gifted learners, **broad** professional learning represents various levels and forms of giftedness, various assessments for identification, different gifted program models, and a range of service delivery options. **Equitable** professional learning in Gifted Education considers the wide heterogeneity of students by ameliorating underrepresented groups of gifted students, retaining diverse gifted learners in gifted programs, and recruiting teachers from diverse backgrounds. **Comprehensive** professional learning includes the whole school community of psychologists, educators, and special education teachers, acknowledges the responsibility of school administrators for all school programs, supports the social and emotional needs of gifted students, and understands the connection between advanced ability and special learning needs as learning differences. Professional learning that engages the whole school community forms an **integral** continuum of services with specialty areas including special education, career and technical education, and the arts. **Ongoing** professional learning relies on a base of current and seminal research, results in changed practice, aligns with the Zeitgeist of change in school communities, and sets achievable goals that rewards expertise in the field. When professional learning forms a component within larger policies, it gains a **sustainable** presence with clear requirements, specialized standards and goals, current evaluation programs, and adequate funding. With the first nine Global Principles in place, professional learning creates an **empowering** environment with evidence-based information, advocacy messages about gifted education, communication through social media, networking opportunities, and coordinated efforts of leadership to advance Gifted Education.

Inclusive practices in gifted education

Classified as "exceptional," gifted children need access to inclusive education (Sutherland & Stack, 2014) that addresses their special needs. For example, gifted children often experience problems in social relationships and emotional management (Neihart et al., 2015). Socialization difficulties may result from teaching focused on a standard learning level and boredom from learning experiences lacking new and advanced content (Wiley, 2018).

The Salamanca Statement (UNESCO, 1994) sanctions valuing all students and staff, reducing barriers to learning and participation in the classroom, interpreting the difference between students as a learning resource and not as a problem to overcome, recognizing school inclusion reflects the process of inclusion in society. Adopting inclusive teaching practices means offering learning opportunities to gifted students as well (Stack & Sutherland, 2017). At the beginning of the 21st century, USA encouraged pull-out program services for gifted student (Gallagher, 2000) as a suitable and exclusive environment. However, since 2015, American gifted students remain primarily in the regular classroom (NAGC, 2015) in order to experience as much differentiated teaching as possible.

Personalized learning that places the student at the center of teaching forms an inclusive mode. This practice recognizes the unique and individual nature of students with their own palette of emotions and preferred learning modalities. Fisher (2009) reported dialogic teaching promoted personalized learning through the Socratic method with student reflection on their beliefs in different contexts. This type of dialogue includes all students and differentiates instruction based on student interests, curiosities, and talents.

Differentiated education aligns with the principles of inclusive teaching when instruction develops specific potential ability of individuals within a classroom. Tomlinson (2018) defined "differentiated instruction" as "an instructional model that provides guidance for teachers in addressing student differences in readiness, interest, and learning profile with the goal of maximizing the capacity of each learner" (p. 279). This didactic concerns the content, processes, product, and learning environment, and it varies according to the specific needs of the students. According to Roberts and Inman (2015), four good reasons to differentiate teaching for gifted students include promoting continuous learning, using time productively, stimulating brain activity, and ensuring equity for all students. Differentiation then becomes the "equalizer," based on the readiness of the students (Tomlinson, 2018). Teachers can avoid extremes teaching gifted students when they calibrate constructs of concrete-abstract, simple-complex, structured-open tasks, less independent-more independent, and slower-faster.

Montgomery (2015) distinguished two methods of developmental differentiation that contribute to inclusive learning environments. Structural methods with acceleration and pull-out programs focus on products, whereas integral methods with differentiation, enrichment, and mentoring concern cognitive processes. Inclusiveness of gifted children increases using integral methods that place the student with their individual needs at the center of learning.

Pfeiffer (2013) reported the Schoolwide Enrichment Model (SEM, Renzulli, 1977) one of the most inclusive models, oriented towards the development of all students. The SEM promotes the participation of all pupils based on their individual interests and talents with three types of enrichment activities. In Type I enrichment, all students explore a topic. Some students investigate a topic in Type II enrichment, whereas a few students with sufficient ability, interest, and task commitment study a topic in depth. Collectively, the SEM promotes authentic learning by putting knowledge into practice with real world learning (Renzulli & Reis, 2014).

The Young Scholars Model (Horn et al., 2021) goes beyond the label of giftedness and enhances the strengths of students from kindergarten to high school. This model provides a comprehensive approach for inclusiveness of underserved populations as a schoolwide effort. Horn et al. (2021) addresses issues of identification and retention of historically underrepresented students in advanced academic programs. The model suggests four levels of inclusion through (a) critical and creative

thinking in the regular education classroom, (b) consultation between the general education teachers and gifted education specialist to develop activities for students who demonstrate ability in specific subjects, (c) a gifted education specialist arranges advanced activities for those students who excel in several areas; and (d) ad hoc groups formed for students who demonstrate exceptional skills in academic subjects such as mathematics, language, arts, social studies, and science.

The Extension Menu or Learning Menu (Winebrenner & Brulles, 2012) offers students choices among eight activities. The teacher creates the learning menu based on contents, interests, multiple intelligences and differentiates tasks by cognitive level, i.e., Bloom's Taxonomy. Winebrenner and Brulles promote positive and inclusive classroom climates through a "Learning Contract." The Learning Contract consists of objectives the student plans to achieve, learning extensions the student chooses, and logistics managing the project that both student and teacher sign. The contract help students develop self-understanding, self-efficacy, and self-regulation as they manage and achieve goals and projects.

Methodology

This study explored *Global Principles of Professional Learning in Gifted Education* (WCGTC, 2021) implemented with three primary teachers in a North Italy school. The research questions concerned teacher dispositions toward a fourth grade student identified as gifted, inclusion practices in general education primary classrooms, and teacher competencies as co-creators of differentiated curriculum. A challenge providing professional learning in gifted education concerns motivating general education teachers to differentiate instruction for students with giftedness. The study recognized the need to reach beyond traditional lecture-based teacher education practices (Brazzolotto, 2018) by integrating evidence-based practices (Asquini, 2018) and promoting co-construction of knowledge and skills through qualitative research (Silverman, 2011). The research design analyzed *Global Principles of Professional Learning in Gifted Education* based on evidence during Pre-Intervention and Post-Intervention Focus Groups and a concluding Parent Interview.

After receiving school and parental permission to conduct the study, the primary researcher hosted a one-hour online Pre-Intervention Focus Group to identify previous didactic strategies used with the student, teacher perceptions of the student, roadblocks encountered, and shared instructional goals. After transcribing and analyzing the Pre-Intervention Focus Group responses comments, the researcher met with teachers to develop inclusive goals to improve behavior of all fourth grade students, modify instruction for nine-year old "Marco" identified with giftedness in the regular education classroom, and provide ongoing professional development to improve teaching children with giftedness. The teachers established instructional goals for Marco to understand his potential, engage in enrichment activities that enhanced his academic potential, and redirect affective behaviors when necessary.

The co-constructed didactic strategies included learning menus and learning contracts for Marco using data collected during the Pre-Intervention Focus Group. The study based learning menus and learning contracts on Winebrenner and Brulles practices (2012) that encourage inclusion in the regular education classroom and tracks accountability through goal setting and work accomplished. The learning menus for Marco used existing course syllabi in Geography (see Appendix A), Mathematics (see Appendix B), and Italian (see Appendix C). Although the research proposed menus for Science and History, teacher time constraints precluded them during this intervention.

After the teachers used the learning menus and learning contracts for approximately four weeks, the primary researcher conducted a Post-Intervention Focus Group with the teachers to reflect on the four-week intervention with Marco. After the Post-Intervention Focus Group, the primary researcher and teachers revised the learning menus based on recommendations to improve future interventions for Marco. The study concluded with a parent interview after the Post-Intervention Focus Group

Participants

Participants in the study included three primary school teachers who requested professional development to improve their instructional practices with all fourth grade students, and specifically for "Marco," a gifted student. All three teachers were female. One teacher with 10 years of experience as a primary teacher in the same school taught Italian. A second teacher who taught math and science began her second year at the school, and the third teacher of history and geography joined the school faculty that year. All three teachers experienced the intervention as on-the-job professional learning in gifted education. A psychologist identified "Marco" as gifted through clinical assessment, and the teachers received information about his identification on a need to know basis. Marco received instruction in a mixed ability fourth grade classroom with 25 students. Marco lived at home with his parents and his 24-year-old stepsister.

Results

Pre-intervention focus group

The Pre-Intervention Focus Group responses indicated the teachers distinguished characteristics of gifted exceptionality from non-exceptional fourth grade students: "[Marco] is very good at drawing, and he has shown deep insight, unlike other children." The teachers also observed challenges in the affective domain related to peer interpersonal relationships: "[Marco] cannot control his movements ... he gets up and teases other children ... this behavior is lessening somewhat now, especially with children in with disabilities."

Teachers reported results from previous interventions intended to improve interpersonal relationships between the gifted student and age-peer classmates: "We made him a tutor, and he took on this on responsibility. There was improvement, but after a while, we decided to eliminate the tutoring." Their previous intervention attempts seemed directed toward reducing Marco's inappropriate behavior in their classrooms rather than an effort to support his academic strengths. Teachers noticed improvement when they implemented a contingency schedule to reward academic performance with additional recreational time: "Then the time bank ... every time students performed well in a scholastic activity, we added an extra minute of break time they used for drawing."

Four-week intervention

Teachers adapted regular education classroom materials based on the instructional goals written that addressed Marco's cognitive and affective needs. These modifications resulted in four-week learning menus for core subject areas (see Table 1). Examples of Geography Learning Menus included choices for Marco to advance his learning potential. For example, in the "city and hill" geography activity, the teacher adjusted the instructional pace by changing "city" to "mountain" and asking, "What at the common aspects? Differences?" (see Appendix A). However, in the Mathematics Learning Menu, the teacher increased practice of repetitive transformation of fractions into decimal numbers exercises to find the solution. The teacher also reduced eight instructional sessions into five sessions by removing the more complex concepts and operations (see Appendix B).

Table 1: Co-constructed curriculum intervention.

Academic Subject	Learning Menu
Mathematics	Decimals and fractions
Italian	Subjective and objective description
Geography	City and hill
History	Egyptians
Science	Ecosystems

Due to long-held views, the teachers decreased—rather than increased—complexity in some proposed learning menu activities. They seemed to equate traditional special education practices of reducing complexity with Marco's exceptional status, despite his advanced cognitive ability. For example, the Italian teacher replaced the proposed, "describe of Haute-Savoie region in southeastern

France" with a subjective description to "describe the face of a child" in the Italian Learning Menu. She also changed the more abstract Mandala image to the more concrete traditional image of a fish (see Figure 1).

Figure 1: Co-constructed Italian learning menu.

Post-intervention focus group

After the four-week learning menu intervention, the researcher conducted a one-hour onsite Post-Intervention Focus Group with the three teachers to review student progress, assess instructional goals, and revise learning menu contracts. Teacher responses provided support for Research Question 1: Primary teachers formed more positive **holistic** and **equitable** dispositions toward Marco after **ongoing** and **integral** professional learning in Gifted Education. The Italian teacher reported Marco achieved cognitive and affective objectives during both individual assignments and small group activities. She specifically appreciated progress Marco made socially by asking to work with a classmate experiencing academic difficulties. Marco's interactions with small group members demonstrated less conflict prior to the co-constructed curriculum changes.

Results from the Post-Intervention Focus Group provided support for Research Question 2. Teacher responses indicated primary teachers reflected on **broad** professional learning to practice inclusion as **evidence-based** rational in the general education classrooms. The geography teacher

found Marco appropriately accomplished Geography Learning Menu activities. He respected the modified instructional delivery, and he responded positively to available book selections. However, the geography teacher noted Marco required teacher intervention when he engaged in particularly energetic behavior and several competitive incidents with a classmate during drawing activities. The mathematics teacher stated Marco completed very little work, despite the Mathematics Learning Menu and signed learning contract. Instead, Marco chose a simple mathematics activity that he miscalculated (see Figure 2). The teacher reported Marco seemed very distracted and that he calculated incorrectly because he skipped the verifying resolution step. Although initially planned for history and science classes, teachers lacked time to implement those learning menus.

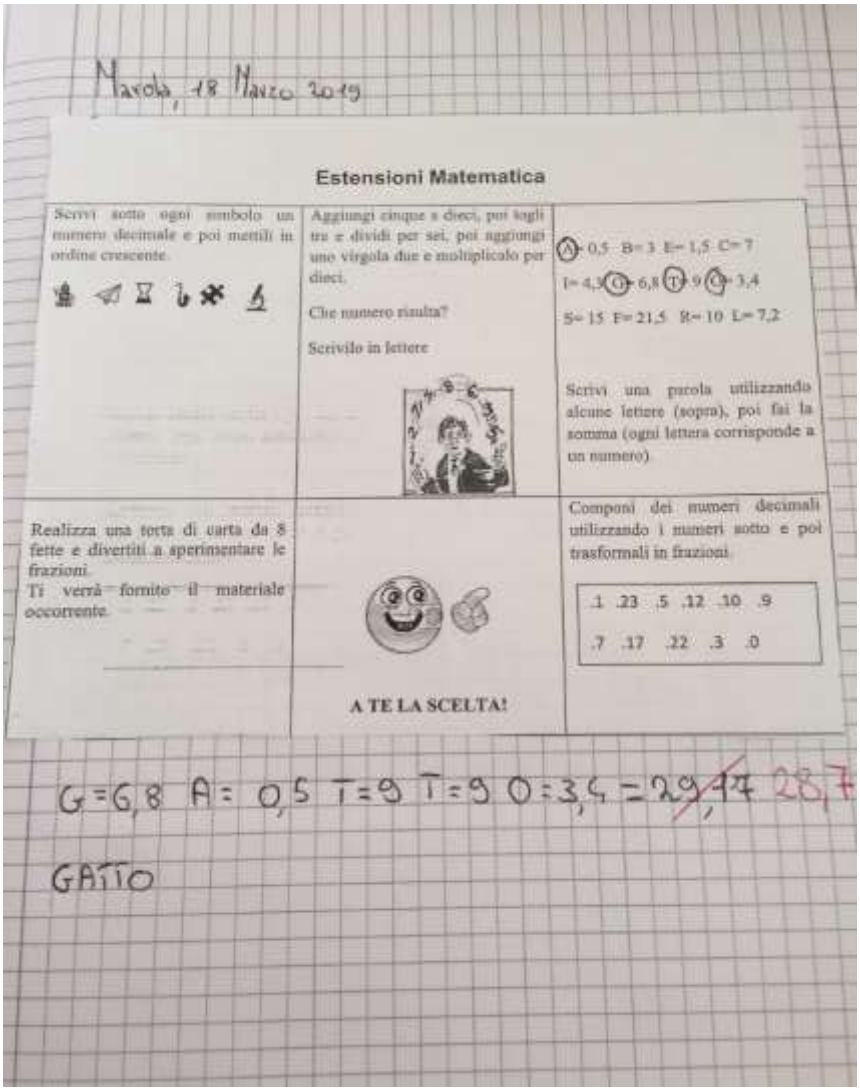

Figure 2: Co-constructed mathematics learning menu.

Evidence for Research Question 3 from the Post-Intervention Focus Group responses indicated teachers increased competencies co-creating **comprehensive** and **tiered content** learning menus and learning contracts as **sustainable** and **empowering** professional learning experiences in Gifted Education. Overall, teachers found the learning menus and student contracts provided student choice in proposed tasks, excellent background resource material, in-depth individualized enrichment, and an offering of creative ideas in teaching and learning. One teacher realized the learning menu approach permitted flexibility with instructional pacing. For example, if Marco completed work early, he remained engaged in the learning process by moving onto additional activities. Another teacher suggested a web links list resource to provide Marco more autonomy during independent enrichment activities.

Parent interview

The study included parent feedback after the four-week intervention. The primary researcher interviewed Marco's parents to determine if they noted some improvements at home, i.e., doing his homework. When Marco told his family he received new activities at school, he expressed enthusiasm about the change. He also explained the learning contract to his older sister as an "absolute commitment" because he gave his word to complete the work when he signed the learning contract. Parents said they had never seen their son so inclusive and happy at school. The Parent Interview indicated overall support for Research Questions 1, 2, 3 examining teacher dispositions, classroom inclusion, and co-construction competencies.

In summary, following the Post-Intervention Focus Group, the primary researcher and three primary teachers reflected on the **broad** co-construction experience. They revised the learning menus with structured enrichment projects as **evidence-based practices** and more precise instructional guidance to reduce guesswork yet maintain complexity in the academic **tiered content** (see Appendices A-C). One teacher requested further clarification on this **sustainable** enrichment protocol, as she wished **ongoing** use of learning menus and **equitable** student learning contracts. Teachers reported overall positive **holistic** student receptiveness and enhanced academic potential of all fourth grade students, especially **empowering** for Marco. Thus, the primary researcher found **integral** and increased ability of general education primary teachers in co-constructing **comprehensive** inclusive learning activities for Marco while also addressing the academic potential and behavioral concerns of his chronological age peers. Marco's parents reported his invested effort academically and joy encountering differentiated instruction based on his interests, choices, and abilities.

Discussion

The enactment of Italian Education ministerial law n. 562 (2019) that mandated inclusion of children with giftedness in the category of special education needs increased interest for professional learning in gifted education. However, without published guidelines, teachers need assistance from trained professionals in Gifted Education. This study documents the implementation of the ministerial law by exploring teacher dispositions toward gifted students (Research Question 1), inclusion practices in the general education classroom (Research Question 2), and teacher competencies co-constructing differentiated curricula for a gifted student (Research Question 3). When examining responses between the Pre-Intervention and Post-Intervention Focus Groups, teachers demonstrated positive responses aligned with 10 *Global Principles for Professional Learning in Gifted Education* (WCGTC, 2021).

According to Fraser-Seeto et al. (2015), general education teachers often lack knowledge, skills, and dispositions needed to recognize and accommodate the cognitive, affective, and academic needs of gifted students. When the primary school in North Italy requested assistance for support co-constructing differentiated curricula for gifted students, they responded out of frustration based on their lack of success with identified gifted students. They needed guidance from a trained professional in Gifted Education to address their deficits in **tiered content** in the general education classroom, **evidence-based** practices for inclusion of gifted students, and **empowering** support to co-create differentiated curricula. The three teachers in this study appreciated **sustainable** and **ongoing** professional learning needed for **broad** learning experiences in a general education with mixed abilities. Coleman et al. (2012) reported enriched in-service training with a support network. The teachers gained **empowering** competencies guided by feedback from an onsite external professional with training in Gifted Education. This feedback encouraged **holistic** learning experiences for the gifted student, and the collaboration of teachers, student, parent and school administration supported a **comprehensive** network of active learning that combined content and practice (Darling-Hammond et al., 2017). The Parent Interview reported Marco's cognitive, affective, and academic well-being improved during intervention because the learning contracts and learning menus favored his interests, choices, and abilities as **evidence-based** practices in Gifted Education (Desimone & Garet, 2015). **Integral** professional learning directly involved the teachers co-creating learning contracts and learning menu activities based on Marco's strengths, interests, and choices as **equitable** and inclusive practice (Watters & Diezmann, 2013).

Global Principles of Professional Learning in Gifted Education (WCGTC, 2021) aligned with Research Question 1 showed distinct improvement in teacher dispositions toward Marco as teachers gained **holistic** knowledge about his cognitive, affective, and academic needs. They expressed less frustration about the student and their lack of progress providing appropriate instruction during the Post-Intervention Focus Group than the Pre-Intervention Focus Group. During the Four-Week Intervention, the teachers experienced **evidence-based** practices with the learning contract and learning menu that promoted inclusion for Marco in the fourth grade classroom. The Pre-Intervention Focus Group indicated the teachers primarily focused on Marco's classroom behavior. However, his increased classroom inclusion supported Research Question 2 as teachers discarded previous behavior management strategies and focused on Marco's specialized interests, abilities, and choices as an exceptional child, as defined in ministerial law n. 562 (2019). According to the Parent Interview, Marco cooperated willingly with the learning contracts and learning menus, and he seemed happier at school that prior to the Four-Week Intervention. By addressing his cognitive and academic needs, the teachers reported fewer behavior issues with Marco's classmates (Winebrenner & Brulles, 2021). Wiley (2018) reported difficulties socializing gifted children often relate to teaching toward the average student or standard level of learning. When teachers reported a positive response co-creating the "Extension Menu" during the Post-Intervention Focus Group, they provided support for Research Question 3 regarding their competencies developing curricular supports for gifted children. Moreover, the Extension Menu supported Research Question 2 as an inclusive instructional strategy for all students in the classroom (Winebrenner & Brulles, 2012). Aligning the study with the 10 Global Principles underscored changes in teacher dispositions, skills, and products expressed during the Pre- and Post-Intervention Focus Groups. As educators, administrators, support staff, and parents gain awareness of the 10 Global Principles as guides for local and national professional development in Gifted Education, children and adolescents with giftedness can experience appropriate teaching and learning experiences designed to support their unique strengths, interests, and choices in P-12 schools.

Conclusion

This exploratory study demonstrated how national legislation, professional learning, and Global Principles work together to effect positive change for Gifted Education in P-12 schools and classrooms in Italy. However, its significance shows general educators, specialists in gifted education, and the Global Principles working together can promote quality services for gifted children and adolescents in all schools around the world. Promoting inclusiveness in the general education classroom requires teachers engage with both specific ad hoc strategies and appropriate instructional materials. Moreover, this study underscores the need for ongoing professional development to implement new governmental regulations effectively. With little if any training, general education teachers need professional learning based on Global Principles to co-construct academic content and deliver inclusive learning experiences that benefit all students. General education teachers need multiple levels of planning instruction followed by intentional reflection to ensure teaching engages the cognitive and affective domains of students with giftedness. When the primary teachers in this study depended on instructional material connected with existing curricula and syllabi, they provided minimal instructional guidance to complete activities. However, as their attitudes, skills, and productivity changed, they improved the teaching/learning experience for all students.

Conventional teacher training programs in Italy and other countries that acknowledge the distinct cognitive and affective characteristics of individuals with gifts and talents improve inclusive practices. Teachers who encounter curriculum models designed to increase complexity gain competencies in providing student choice. Well-prepared teachers offer a variety of quality resource materials to enhance the teaching and learning process. Most importantly, educators who co-construct interdisciplinary experiences that extend beyond traditional classroom walls and school programs.

This study demonstrated the importance of co-construction between regular education and specialists in Gifted Education, guided by *Global Principles* (WCGTC, 2021), to reform traditional curricula and implement instructional interventions for children and adolescents with giftedness. General education teachers need guided practice modifying, adapting, and implementing strategies for

children and adolescents with giftedness. Teachers who co-construct instructional decisions during this reforming process gain confidence and assurance of success when permitted to select methods well suited to their teaching style and academic content. Teachers who combine their own professionalism with evidence-based practices gain competence selecting effective instructional practices. When permitted to reflect on their own practice, general education teachers participate in the change process by focusing on their own strengths and learning to improve inclusivity that develops potential in all children.

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About the Authors

Martina Brazzolotto, *Ph.D.* provides professional learning experiences on giftedness, talent development, and creativity for P-12 teachers throughout Italy. She served on the Italian Ministry of Education Committee on Giftedness and is a delegate from Italy to the World Council for Gifted and Talented Children. She completed PhD studies at the University of Bologna with specialization in special education and dissertation research on giftedness in the regular education classroom. She co-founded the TalentInclusivi national network of school in Italy, teaches primary school in Campodarsego, and published two professional books, *Teaching for Talent Development* (2019) and *Gifted Education Through Talent Development* (2020). Martina conducts international collaborative research through post-doctoral studies at Emporia State University in Kansas, USA.

Connie Phelps, *Ed.D.* directs the Gifted, Talented, and Creative program at Emporia State University where she received the inaugural Dr. John E. King Endowed Professor award that recognized her impact on students. She previously taught middle school gifted students; provided consultation services for high school gifted students; and identified elementary gifted students in the Wichita Public Schools. She completed doctoral studies in Elementary Education at the University of Arkansas and earned graduate degrees in Elementary Education at East Texas State University and Gifted Special Education at Emporia State University. She directs the Great Plains Center for Gifted Studies where she researches giftedness, talent development, and creativity. She leads Gifted Program accreditation reviews and serves as a lead site visitor for the Council for the Accreditation of Educator Preparation. She served on the Global Principles for Professional Learning in Gifted Education Committee of the World Council for Gifted and Talented Children.

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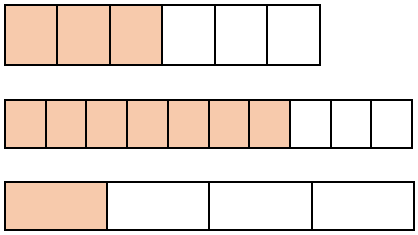
Appendix A

Geography Learning Menu

School Trip Have you ever taken a hill trip? On the hills? Describe the landscape you saw. 	**Pollution** What could man do to decrease pollution in the hills? 	**Farmhouse** Create a plan (with legend) of a farmhouse in the hills. Also include animals and plants. 
Crossword Puzzle Create a crossword puzzle with clues with these words: -agriculture - terraces - companies - slope - summit - vegetables - anthropization	 **THE CHOICE IS YOURS!**	How did the hills form? 
Flora Draw at least 5 plants that are born in the hills. 	**Mountain and Hill** What are aspects in common? What are differences? 	**Test** Create 5 multiple choice questions to help the teacher write a test on the hills. 

Appendix B

Mathematics Learning Menu

Write a decimal number under each symbol and then put them in ascending order. 	 Turn the fractions (above) into decimal numbers.	Write a word using a few letters (above), then add up (each letter corresponds to a number). A= 0,5 B= 3 E= 1,5 C= 7 I= 4,3 G= 6,8 T= 9 O= 3,4 S= 15 F= 21,5 R= 10 L= 7,2
Turn each fraction into a decimal number.  10/3 14/5 21/4	 **THE CHOICE IS YOURS!**	Dial decimal numbers using the numbers below and then turn them into fractions. .1 .23 .5 .12 .10 .9 .7 .17 .22 .3 .0
Add five to ten, then remove three and divide by six, then add one comma two and multiply it by ten. What number is it? Write it in letters. 	Complete the sequence of numbers: 7; 10,2; …..16,6; ….. 23; ….. How much is the sum of the integers? And how much is the sum of the decimal numbers?	Make up a problem with decimal numbers and solve it. 

Appendix C

Learning Menu of Italian

Guessing Game *My life can last a few hours. What I produce devours me. Thin, I'm fast. Big, I'm slow, and the wind scares me a lot. Who I am?* When you find out what it is, describe it in detail.	**Mandala** Describe the image. Highlight objective and subjective elements. 	**Your Kitchen** Write a descriptive text. Make a drawing of your kitchen. 
Nursery Rhyme Describe one of the highlighted words. *Long live the carnival confetti, paper bombs that don't hurt!* *Van on the streets in good company, the warriors of joy: laughter is shot in the face* *Jew's harp, they take prisoners with colored streamers.* by Gianni Rodari	 **THE CHOICE IS YOURS!**	**Energy** Describe following the ladder: • what is that? • how is it produced? • how is it transferred? • the different types.

Haute Savoie  Describe the landscape of Haute Savoie in southeastern France.	**Flowers** Describe first a violet and then a primrose. In the end, highlight the differences.  	**Crossword Puzzle** Create a crossword puzzle with 5 horizontal words and 5 vertical words. Then describe the word number 4 verticle.

Two Centers for the Gifted, One Moon - The Program

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Abstract

This article addresses a unique program involving international collaboration between gifted students from Israel and Croatia. The COVID-19 pandemic opened an opportunity for effective synchronous communication that enabled an unmediated connection between the participants. During the program the children researched the moon from various aspects: scientific, emotional-behavioral and artistic, via theater and creative writing. There were 35 gifted students, 20 from Israel and 15 from Croatia. Five teachers of gifted students, an educational counselor, an educational psychologist and the writers of this article participated in the program and provided the students with academic accompaniment in giftedness and creativity.

Keywords: Gifted students; international educational partnership; Covid-19 pandemic; international collaboration; effective communication.

Introduction

This article addresses a unique program involving international collaboration between gifted students from the "Hofim" center in Emek Heffer in Israel and gifted students from the "Wind at the Back" center in Croatia.

The working relations between Israel and Croatia were created following a request from the directors of the center in Croatia asking the writers of this article to provide academic accompaniment. This accompaniment yielded the development of a unique education program for the center's teachers which combined mediated learning experience with creativity.

Following the program, the directors of the gifted program in Croatia came to Israel for a study tour during which they visited the Hofim Center. On their return to Croatia, several attempts were made to promote collaborative learning between the students and the teaching staff from the two countries.

This article reviews the curriculum with the children from both centers. Because of the COVID-19 pandemic, an opportunity arose for effective synchronous communication that enabled an unmediated connection between the participants.

The project began in 2019, when the students were researching and comparing the contents of water in Israel and in Croatia. In 2020 they researched the moon from various aspects: scientific, emotional-behavioral and artistic, via theater and creative writing. There were 35 gifted students, 20 from Israel and 15 from Croatia. Five teachers of gifted students, an educational counselor, an educational psychologist and the writers of this article participated in the program and provided the students with academic accompaniment in giftedness and creativity. The project applied models for

teaching the gifted, including Renzulli's (1978) *Enrichment Triad Model*, learning in conditions of uncertainty, and creative thinking in conjunction with the principles of mediated learning. This article focuses on describing the program in relation to teaching according to models for teaching the gifted and presenting the learning process and its products.

Review

Giftedness

The definition of giftedness has changed over the years. The research literature presents quantitative and qualitative approaches to this definition. The quantitative approach relates to the higher mental abilities of the gifted child – an IQ of 130 and Stanford-Binet IQ test (Ziv, 1990).

The qualitative approach to defining giftedness involves relating to above-average intellectual abilities and emotional, social and environmental components. The degree of interaction between these components determines the level of the individual's functioning and the quality of the realization of that individual's personal potential. Renzulli (1978), for example, gave giftedness an interactive definition known as the "ring model". He identified three clusters of qualities whose degree of overlap determines giftedness: Above-average ability, Creativity, and Task commitment, Furthermore, Tannenbaum (1983) proposed a psychosocial model according to which the gifted also have personality traits and special connections with their surroundings. He claimed that giftedness among students is the potential to reach rare achievements or create exceptional ideas pertaining to ethical, emotional, social and intellectual domains. Gifted children typically have abstract and divergent thinking skills; they are curious, thirsty for knowledge, have exceptional recall, process information rapidly and need to be intellectually challenged (Maddocks, 2020). Although some learners possess these skills, giftedness applies high levels of the abilities to simultaneously combine all the above skills while confronting a complex task or situation.

Tzuriel, Bengio & Kashy-Rosenbaum, (2011) claimed that gifted children have indices of behavior such as motivation to learn, impulse regulation, problem-solving skills and concentration. The combination of these abilities with openness to mediation allows them to realize their potential.

In Israel, gifted students are identified in stages through testing and screening conducted by the Szold Institute at the schools. Students compete the tests in groups. During the test intellectual capabilities predicting academic achievement are observed. This is followed by individual or group admission interviews. Students found to be gifted are then directed to one of two programs: either a class for the gifted in school or a one-day a week enrichment program. In these programs students receive enrichment in various disciplines according to which program they are in, where their particular characteristics are catered to. They are also able to form social ties that are not available in the regular education setting (Ministry of Education, 2019).

In Croatia, first parents or teachers recognize them as children with high cognitive abilities. Before they start the program, they are assessed individually by a psychologist. The test is usually the Naglieri nonverbal ability test or the WISC IV (Wechsler Intelligence Scale for Children). Following the assessment children can participate in the enrichment program for the gifted.

Participation in enrichment programs for gifted students is essential for their optimal and balanced development (Delcourt, Loyd, Cornel & Goldberg, 1994). This participation is an intellectual challenge and also answers emotional and social needs, since students form friendships on the basis of common fields of knowledge. Hence the importance of locating gifted students and providing a suitable intervention.

There are a number of models and educational approaches for teaching gifted students that suit their particular characteristics. These models enable creative and divergent thinking and encourage curiosity. The main models used are Renzulli's (1979) Schoolwide Enrichment Triad Model, learning in conditions of uncertainty, and developing creative thinking while applying the principles of

mediated learning. Renzulli's model (1978) based on the ability of gifted children to explore in depth areas of their interest effectively. The model includes three stages, the first and second stage is intended for all students and the third stage is designed and adapted be gifted students while performing unique thinking abilities.

In the introduction stage, students are introduced to the program and the processes in various fields that are not taught as part of the formal curriculum. This introduction is carried out in diverse ways through discussions and lectures from experts. At the end of this stage, the students each choose the general field they wish to focus their research on. The second, 'in-depth' stage, introduces activities that develop the research skills students will need to use. Usually during this stage thinking skills, creativity and social and emotional skills are developed. The research stage is carried out in small groups. They look into a topic that interests them according to the principles they learned in Stage 2. The production and presentation of a product is considered very important. In this process, students create an original product on the basis of the data they collected. Possible products are: A video, a talk, a dance, and the design of a unique product, etc.

In learning in conditions of uncertainty (Winebrenner, 2020), learners confront a complex problem that reflects a real situation that is not sharply or clearly defined. The work involves description and definition of the key issues, supporting the issues with relevant information, offering hypotheses, gathering different kinds of information, modifying the definition of the problem according to the new information, developing suitable solutions and assessing whether the solutions are acceptable, while relating to ethics and practicality.

Underlying both models are the principles of developing creative thinking which, in this program, is learned in conjunction with mediated learning. Creative thinking is part of the characteristics of gifted students and also part of the strategy for teaching them. Margaliot and Magid (2020) related to the contribution of creative thinking to the professional development of teachers. They mentioned its definitions and the components of creative thinking that can be enhanced through working with students and teachers. The following section is based on their article.

Yamin (2017) defines creativity as the ability to execute a task in a unique, original and relevant manner, taking into account the limitations of the task or the situation. Plucker and Dow (2010) include the importance of the interaction between different perspectives, and the processes and environment in which an individual or group produces an original, useful product in a social setting.

Lubart & Batton (2017) maintain that a lesson that encourages creativity must include both divergent and convergent thinking. The creative process includes detecting the problem, identifying the limitations of actions, being flexible, adapting, raising different ideas, comparing sources of information and exploring contradictory ideas.

Creative teaching must encourage playfulness, imagination, flexibility, openness and dynamism, and cultivate curiosity, investigation, and various mechanisms for developing new ideas (Craft, 2011; Grohman & Szmidt, 2013). Cheung and Leung (2013) maintain that teachers must create an atmosphere that encourages student collaboration and active involvement in learning. The creative teacher must encourage students to be self-directed and flexible thinkers, create varied opportunities for learning content, and use an assortment of tools, structures and concepts that will enable students to express themselves in a variety of ways (Craft, 2011).

In order for learning with the above models to be meaningful, it should incorporate experience of mediated learning, which is defined as the quality of the interaction between the learner and the environment (Rosemarin, 1999).

The learning is the outcome of the initiative and guidance of the mediator, who stands between the individual and the world of knowledge and its stimuli and mediates the knowledge, learning strategies and the conduct required for learning. Experience of mediated learning is considered to give the individual the propensity to change following direct interaction with the

stimulus – the knowledge being studied. Every act of mediation between the child and the environment will be characterized by the presence of 12 categories of interaction. The categories that are essential for interpersonal interaction to be considered mediated learning are: mediation for intent and reciprocity, mediation for transcendence and mediation for meaning. In addition, there are categories that do not all have to appear in every interaction, but are essential in the ensemble of contacts between the adult mediator and the child.

The use of these categories fosters the acquisition of tools that prepare the learner for independent learning, effective absorption of information and cognitive and emotional change. Mediation for intent and reciprocity relates to the conscious and intentional nature of the interactions between the mediator and the child. The mediator creates eye contact with the child, adjusts his or her tone of voice and rate of speech, carefully chooses the stimuli (their intensity, frequency, length and medium of presentation), and arranges them in accordance with the child's reactions, his or her alertness and level of motivation (Kozulin & Presseisen, 1995).

With regard to the teaching of gifted students, the mediator will choose content that interests them and has a high level of complexity and abstraction. Transcendence refers to the elements of the mediator's behavior that are not directed at a goal relating to immediate concrete needs, but rather to circumstances and situations that are further away from the 'here and now' in terms of space and time. This mediation acts to expose the mediate to the connection/continuum between events from the past, the present and the future. This ability to take into account prior knowledge and experiences together with the ability to observe and plan for more and for transfer to the immediate underlies the internal ability to change (Tzuriel, 1998; Rand, 1999). The emphasis is on the mediatees' ability to make idiosyncratic meaning of the studied material, anchored in their cultural background, specific to their set of values, aspirations and needs.

Project description

The project described in this article was conducted in an international setting with teachers and students from two centers for gifted students: the "Wind at the back" Center in Zagreb, Croatia, and the Hofim Center in Emek Haffer, Israel.

The "Wind at the back" Gifted Children's Center was founded in 2012 by a group of enthusiasts. The center is attended by 200 gifted children from kindergarten up to the end of high school (12th grade). The main goal is to help gifted children realize and manifest their potential. The leaders of the Center created a program called "Sparks" through which they enhance the creativity and socio-emotional and cognitive development of the gifted children through workshops.

The Hofim Center in Israel is part of the response provided by the Ministry of Education to gifted students who have passed the screening tests. The Center is attended by 670 students in Grades 3-9 who come for one day of enrichment a week. Learning is multidisciplinary and interdisciplinary with mentors and students. The Center seeks to cultivate students in accordance with the pedagogies suggested by the Ministry's Department for Gifted Students. They intend for the learning environments and conditions that allow for growth, encourage intrinsic motivation and creativity.

International educational programs for gifted students

Most international collaborations are conducted by researchers of giftedness in different countries who share knowledge and conduct joint studies. In the training of teachers of gifted students in Europe and the USA there are number of international collaborations, mainly dealing with research in areas related to giftedness. Research literature mentions a few international programs in which there was collaboration between gifted students from different countries (Smith, 2014). An international educational program for collaboration between young students in which the study of all the contents is fully collaborative is unique.

The international program conducted in the COVID-19 period and its products

This program began in 2019 and extended into 2020. In 2019 there was limited collaboration between 15 students from Israel and 10 students from Croatia. Water was chosen as the joint research topic. The students listened to lectures about it, formulated research questions and conducted research and experimentation on the contents of water in Croatia and in Israel, accompanied by their science teachers. Throughout the year there were two synchronous meetings of the students via computer. The difficulties encountered were to find both a suitable time and a suitable technological platform for these meetings.

The program continued in early 2020, with science and the arts as the chosen topics of joint study. The Hofim Center offered a course entitled "Contact with Croatia" studied within the timetable for arts and science. Children who were interested registered for the courses, which included international collaboration.

At the *Wind at the Back Center* two groups of students were chosen, who, in addition to their studies at the Center, took part in the international program.

The COVID-19 pandemic created a shared situation which actually enabled a breakthrough for the program emotionally, socially and technologically. During the lockdowns in Croatia and in Israel, there was no longer any problem finding times to meet, since the students and the teachers were all free at mutually convenient times. Moreover, Zoom turned out to be a very suitable platform, socially, emotionally and technologically. The students were very happy to strengthen the ties. From this point on the program took a turn and developed under conditions of uncertainty, like an island of sanity and calm that enabled a series of meetings that allowed the students to really get to know each other. This also advanced the learning and the shared preparation of the products we will show later on, as the students and the accompanying team underwent a significant learning process.

There were seven Zoom meetings from March to July 2020. Each meeting began with activities designed to foster a sense of familiarity, belonging and ease among the students, as they shared feelings, hobbies and jokes about the pandemic. After that, the topic of the moon was chosen as the learning focus. The reason for this choice was the sense that we need to create a colony on the moon as a backup option to preserve the human race if its existence should be in danger. (This, of course, was not said to the students, but the intention was to use the teachers' knowledge and the vacuum on the moon to allow students to imagine, dream and apply the knowledge acquired in the sessions.) In accordance with Renzulli's 'introduction` stage and mediating for transcendence according to mediated learning theory, the students were introduced to various experts and to peer learning. Introduction to the topic of the moon was provided from different perspectives – theater, science, emotion and behavior, music and computer games.

The process described above is shown in Figure 1. introductory

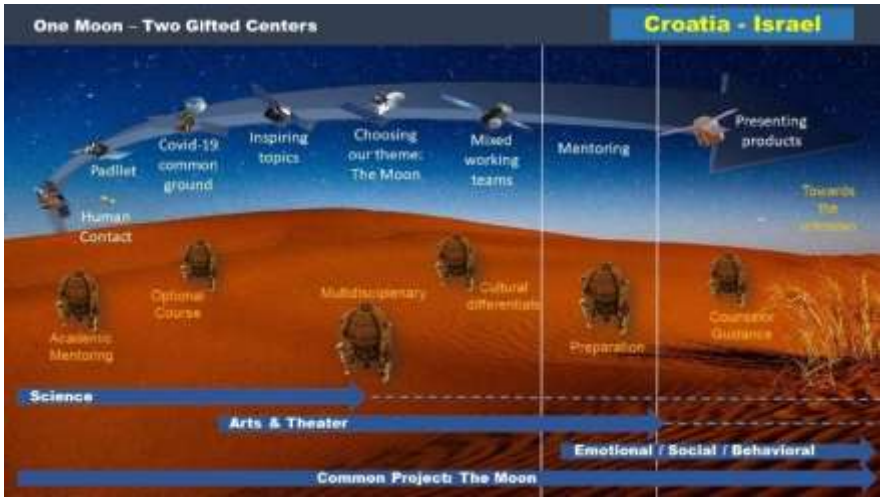

Figure 1: The process undergone by students and staff.

As shown in the figure students were exposed to several aspects of the moon as follows:

Science - illustrating the illusion of the moon, moon photography, how humans can reach the moon, the question of the existence of smells on the moon. Students watched several scientific experiments such as the conditions of the lack of oxygen on the moon, the boiling and swelling of marshmallows, and the telescope operation. Leading this group was Dr. Arie Melamed-Katz.

Acting, theater & creative writing - Led by Oded Guggenheim, students built a shadow theater and acted out issues related to the moon. Led by Bojan Branisavljević, the creative writing group wrote an imaginary story about the moon.

Emotional and social behavior - Learning various myths and stories related to the moon as well as exploring the moon's influences on human behavior and emotions. Leading the group were Ksjenia & Karen.

The entire project was conducted with the participation of experts in teaching gifted children, focusing on the aspect of developing emotional and social skills. One is a psychologist with expertise in giftedness and the other is an educational counselor for gifted children. Because they took an active part in the meetings, in each of the topics developed, emphasis was placed on aspects of social and emotional learning while being aware of the importance of closely accompanying students.

Movies - The moon in movies from 1902 and animated movies about a vacation on the moon (teacher: Droit Lupo-Kozak).

The children were introduced to films made about the moon as well as about making animated films whose theme was the moon.

Peer learning with Anima and the moon in music and games.

As part of the introduction phase, children who volunteered presented their knowledge about the moon. For example, one of the boys presented the moon in a games and music and another girl presented the moon in Anima.

After the introduction to various areas, the children planned to build a base for humankind living on the moon. They planned the journey to the moon, prepared a drawing of the base, took photos of the moon from earth, made a map of the moon to decide where the base should be located. They explored a trajectory for arriving on the moon. The children decided what energy source they should use; they planned and researched how to predict the physiological influences on people and animals. Finally, they planned activities for people on the moon via theater & creative writing. For this project they were divided into 4 main groups: Science; Acting & theater; Creative writing; Emotional & social behavior.

Science

The science group had six students - three from Israel and three from Croatia and their mentor was Dr. Arie Melamed-Katz. Each student made his or her own scientific contribution in order to respond to the various needs, from getting to the moon, settling and living there using existing resources. The students had ongoing contact with the mentor, who asked guiding questions while they were researching the topic in order to reach an outcome. Below are some examples of the students' outputs with the help of their mentor. We planned that in all groups there were teachers from both countries in order to help students to express themselves in English, and overcome language barriers.

The journey to the moon was planned after discussion with the mentor:

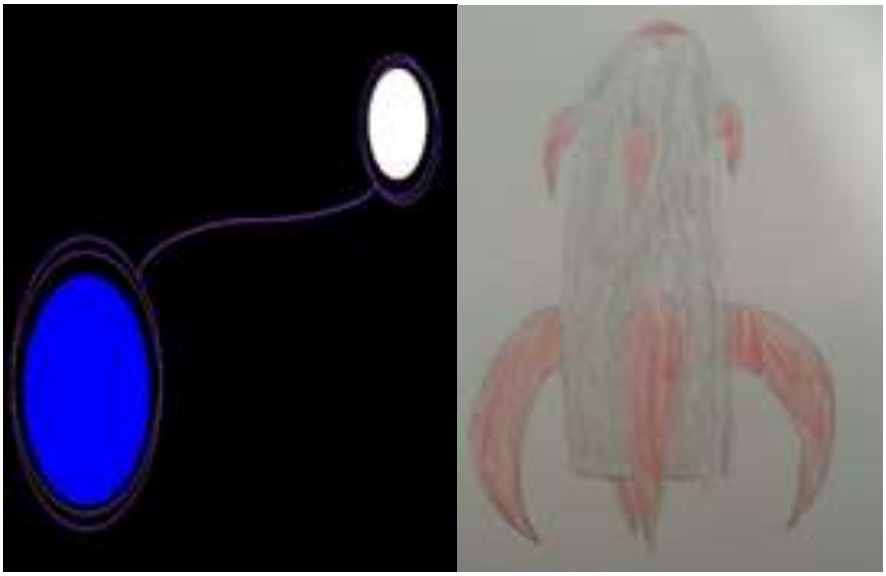

Figure 2: The journey to the moon.

Figure 3: Choosing the location.

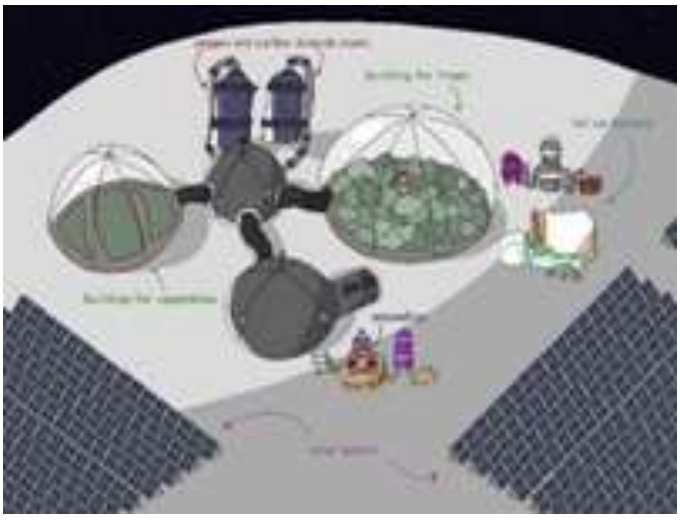

Figure 4: The base.

The students wrote the following:

"The energy sources will be Helium-3 (He-3) and solar panels. We will mine He-3 from the moon ground. A fusion reaction of He-3 and deuterium (from heavy water) produces a lot of energy. The solar panels can be produced on Earth and delivered by the moon spacecraft. The solar panels are going to have a tracking system that follows the sun".

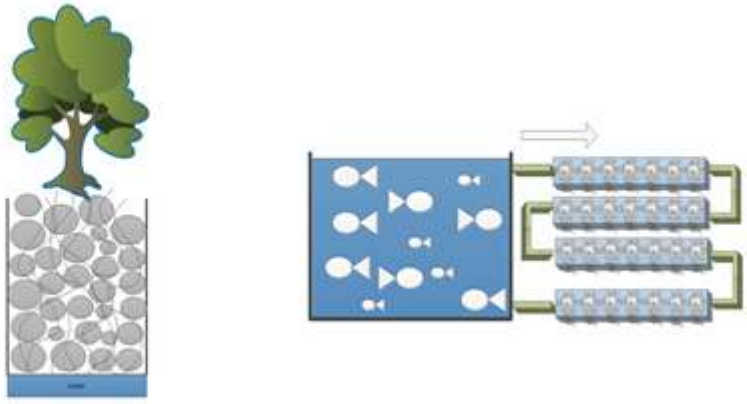

Figure 5: Slides from the presentation - Plants on the moon.

The students wrote the following:

"We will grow the following plants: kale, carrot, tomato, cucumber, pepper, lemon, apple, fig, pomegranate, rye, wheat, mint, and coriander. These plants were chosen because they are healthy, and they need less water than other plants. The trees will be grown in big boxes with stones and water at the bottom. The vegetables and herbs will be grown in an aquaponic system; in which they live with their roots in constantly flowing water. The water comes from a fishpond. The fish waste will fertilize the water and the plants will clean the water for the fish to live in. We will use the following fish types: trout, tilapia and bass. The cereals will be grown in the same way that we grow them on earth".

Acting, theater & creative writing

The acting and theater group consisted of eight students from Israel. The group was led by mentor, Oded Guggenheim. They filmed themselves creatively in various performances of their own choosing and then made a film on the topic. For example, there was a shadow theater and a role, play with a monologue on 'Being the prime minister of the moon'.

Figure 5 shows an example of the shadow theater.

Figure 6: Shadow theater.

Creative writing

Led by Bojan, the group, consisting of four students from Croatia and three from Israel, engaged in writing a story about the moon. They were given an opening paragraph for the story. The story was then passed around among the students from both countries, and each one added another paragraph until the story was completed.

> The opening paragraph was as follows:
> "It was in the year 2039 that a new era in space exploration began. The first humans have landed on Mars and the foundations of a future colony have started to take shape. But it is not the far reaches of Mars nor the gaseous expanses of the outer planets that have brought to humanity the most miraculous discoveries in the field of space explorations. The most fascinating and ground-breaking moments, one that could hardly have been imagined by the science fiction authors of the 20th century, happened in the Earth's own back yard – the Moon"....

Emotion and behavior

The group researching the emotional-behavioral aspect had two students from Croatia and one from Israel. The leaders of the group were Karen Goffman-Stukalsky, counselor at the Hofim center and Ksenija Benaković the director and psychologist of the "Wind at your back" center. The aim of the group was to research whether people think that the moon influences people's bodies and behavior.

In the first stage they read about the moon. After reading research on it they decided to focus on the influence of the moon on people's sleep. The purpose of this research was to explore how people sleep when there is a full moon. The children created a questionnaire that was sent via Google sheets to 40 participants, 40.5% male 59.5% female.

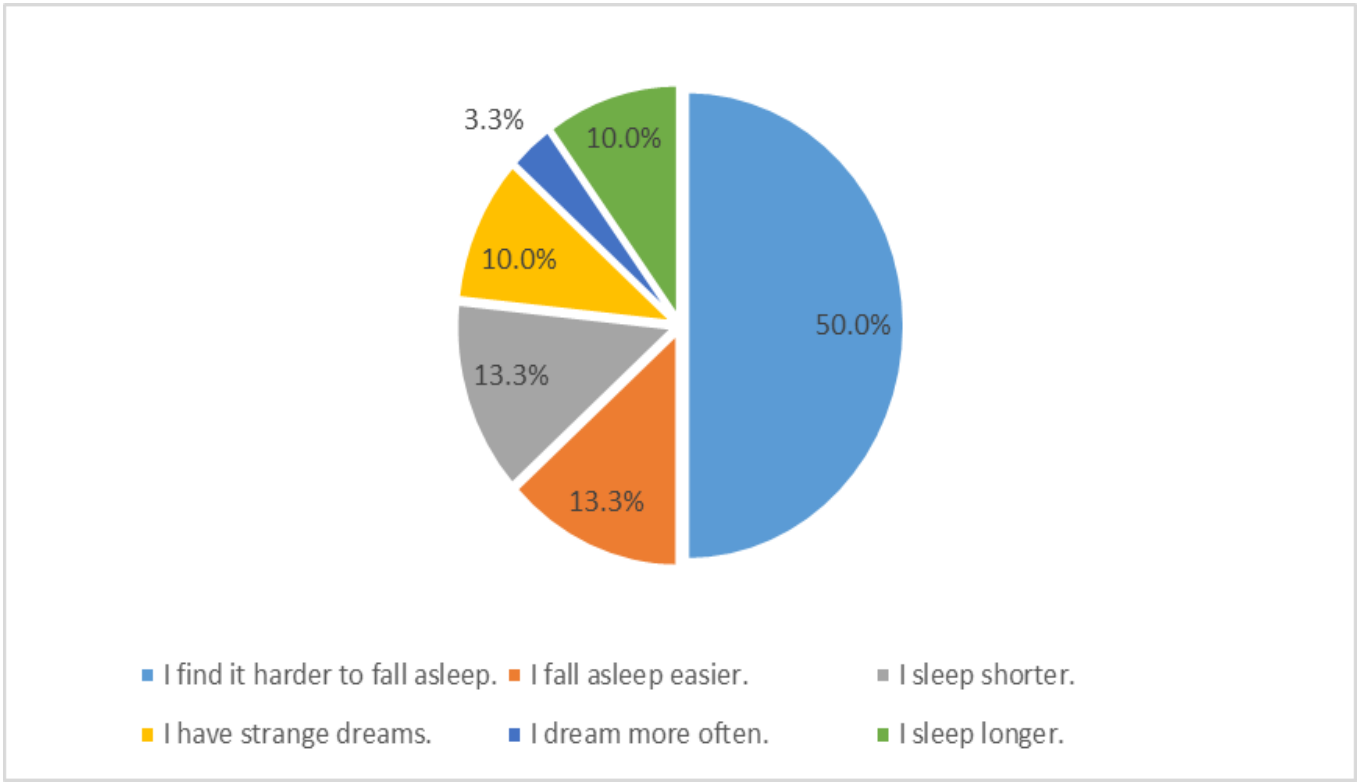

Figure 7: Expressions of the change in feelings during a full moon.

The results indicate the effect on sleeping, for example 50% of the participants find it harder to fall asleep and 13.3% sleep shorter and 10% have stronge dreams when there is a full moon.

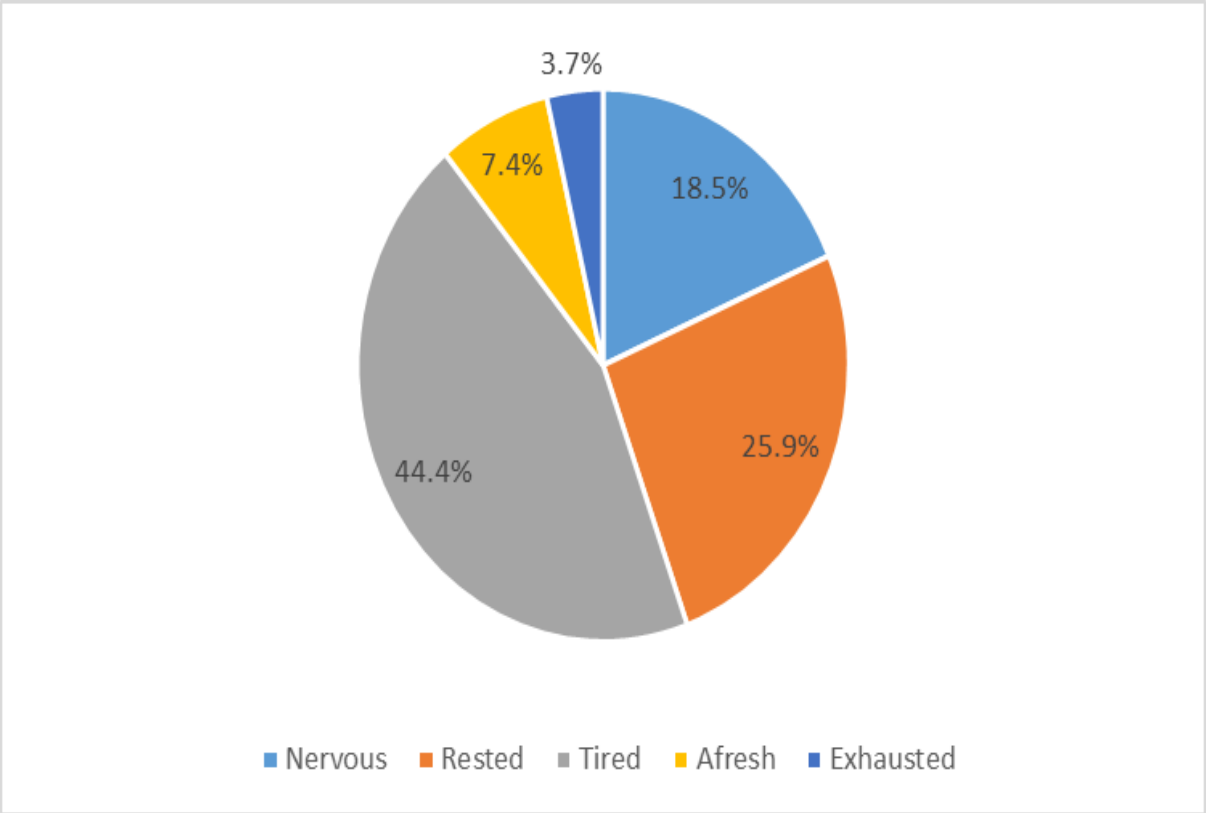

Figure 8: After a full moon night.

The children asked the participants why they think a full moon affects their behavior. 44.4% were tired, 25.9% Rested and 18.5 % were nerves. The answers indicate that people have a range of explanations, most of which are scientific and some are behavioral. For example, a scientific explanation: "because of the effect of the sea"; "because of the effects of the moon on Earth"; "because of special formation between earth, moon and the sun that creates special energy". Examples of a behavioral explanation: "I feel moor [more] energized and stay awake later than usual and I wake up tired"; "when there is less light I can sleep better, I don't really like darkness". The conclusion is that a full moon affects different people differently. Some feel tired and must rest and a minority are excited or awake.

The students were asked to continue the story from this point along the project.

Discussion

Studies show that learning in a multicultural environment helps develop fertile thinking, flexibility and creativity; exposes participants to different perceptions and ideas; and influences their ability to use ideas from different cultures and to retrieve unusual information and raise far-flung associations in order to come up with fruitful ideas (Chang et al., 2014; Dziedziewicz, Gadja, & Karwowski, 2014; Leung, Maddux, Galinsky, & Chiu, 2008).

The decision to undertake shared learning derived from the desire of the two staff teams at the centers in Israel and Croatia to enable students to bypass the boundaries of place and time for the learning done at the Centers themselves. The aim was to take advantage of these students' high level of abilities for authentic learning that would enable them to express their cognitive skills and satisfy their curiosity about getting to know students from a different culture and reality. Needless to say, everyone involved wanted this collaboration, but in the period before the outbreak of the COVID-19 virus, the objective difficulties such as coordinating joint online sessions for teachers and students and finding the right platform outweighed the motivation and thus the actual collaboration was limited in scope. It was, in fact, the lockdown imposed on everyone at the same time and the same unknown fate

that created the opportunity for collaboration. There was a desire to go beyond the physical boundaries, even if only virtually, taking advantage of the emotional and technological availability that enabled this.

During the year we met for seven Zoom sessions. The purpose of the sessions was to meet children in another country with common interests and to research the moon together from a number of perspectives. The final summative session, to which the parents were also invited, consisted of the presentation of the research products in the different areas. Between sessions, the teaching staff from both Centers held preparatory sessions in which they coordinated the contents and carefully planned the transitions and how each session would be conducted. The learning in conditions of uncertainty was part of the experience of daily life during the pandemic, in addition to being a teaching and learning strategy used in the program.

The challenges the staff leading the program had to cope with were: finding a topic of study that was broad and relevant enough, objective difficulties with language, culture and creating a sense of belonging and acquaintance in a virtual environment among the learners, the ability to lead and manage the learning so that all members would feel their work was meaningful and their contribution evident. Another challenge was to create a social and academic continuum between the sessions, since, due to personal constraints, not all the students were able to attend all the sessions. Nevertheless, it is important to mention that some friendships that were formed continued even after the sessions ended. One of the key challenges was giving the children a sense that the virtual space, the Zoom rooms in which they met, was theirs and that the time spent on learning was for them. The way to create a sense of belonging and even cultivate student friendships was through activities prepared by Ksenija, a psychologist and director of the program in Croatia, and Karen, the program counselor at the Hofim Center in Israel. They are both very well-versed in the students' psychological characteristics. They launched the initial part of each session sensitively and pleasantly, creating a safe and comfortable space for attention and discussion. In addition to the familiarity gained in the sessions, the students created a Padlet wall on which they introduced themselves to their new friends. This space enabled the first acquaintanceship and even allowed independent friendships to develop between students from both countries outside the group sessions on Zoom.

The choice of the moon as a topic of study and a place of refuge for the human race in a period of lockdown seemed like a safe alternative for people and turned out to be very suitable. Dr. Melamed-Katz presented experiments that enabled the students to get to know the moon as a physical environment with its own particular features. Oded provided the possibility of acting and having a shadow theater; the creative writing of a shared story led by Bojan connected the students and enabled them to enrich the descriptions of their peers. The choice of myths gave the students an opportunity to get to know different cultures and their attitudes toward the moon. The observation of emotions and behaviors led by Ksenija and Karen contributed to the understanding of the importance of the emotional aspect and an academic, emotional, social and cultural holistic view of phenomena in the world. Under the guidance of the counselor, at the beginning of each session the children participated in various games that allowed them to share emotions. In addition, various social games related to hobbies were played and each child introduced himself on a collaborative paddle board, which led to a deeper acquaintance and a sense of belonging.

The encounters with another culture and the curiosity as to 'what it's like on the other side' created a space for learning about the moon that was a connecting and sharing place. The understanding that we all share a common fate – not just because of the COVID-19 virus, but also because we are all subject to limitations of movement and freedom created learning options that illustrated the freedom of thought and the possibilities that connections between students from different countries can create. The humor that is typical of gifted children was found to cross borders and enhanced the sense of belonging.

Throughout the sessions the sense was of learning at a changing pace and in the spirit of the times. For the most part, curiosity and motivation were high. With the end of the lockdown and the

return to routine, the school year was coming to a close. At this stage the students chose in which group they wanted to do their research. With the help of the mentors, there was learning that integrated the various models of teaching the gifted. Renzulli's (1978) Enrichment Triad Model enabled to introduce in-depth study of the topic leading to the products of the study of the moon. Exploring the moon was in-depth and holistic and required both creative and divergent thinking, which were expressed in the different perspectives of science, art and emotional behavior. These components are part of the pedagogical approaches both in Israel and in Croatia. These complementary components are part of our daily lives. Including principles of mediating for meaning and transcendence led to meaningful learning involving the ability to use strategies for teaching gifted students and maintain their motivation, attention and impulse regulation (Tzuriel, Bengio & Kashy-Rosenbaum, 2011) It should be said that even in Zoom meetings that required patience, attentiveness, waiting for one's turn to speak student, this was evident.

Creative thinking was part of both the teaching-learning strategies and the learning outcomes. In science, it was solving problems related to reaching the moon and living there. In art, it was the creation of a shadow theater and a play, and in writing it was a story and there was also the planning of a study on the emotional-behavioral aspect.

Other challenges were linked to language and culture, starting with accepted forms of communication in each country, WhatsApp and emails, and studying in a language that is not the students' first language, as well as bridging the difference in time zones. All the sessions were all conducted in English. For most of the students this is a second language. It may be that this fact also brought the students together. It is interesting to note that there was hardly any language barrier. Many students were active in the sessions, they expressed themselves, contributing and creating. and they even continued their contacts with no mediation. A few students were afraid to speak, however, with the mediation and encouragement of the staff they were able to contribute. The work in small groups and the use of additional forms of expression such as drawings, video clips and music also made the students more confident about expressing themselves. In the final session the students presented their products. It seems that despite the challenges of language, time and motivation, meaningful learning did take place both for students and teachers alike.

In summation, this was a unique international program; a 'first' for all the staff and students and meaningful for everyone involved. Despite having to cope with challenges, what took place constitutes culturally, socially and academically meaningful learning. Looking forward to the future, we intend to expand the program, as it is suitable 21st-century learning that enables students to already experience learning as it takes place in the world of work that they will be joining in the future.

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Acknowledgements

Dr. Arie Melamed-Katz, Bojan Branisavljević, Droit Lupo-Kozak, Karen Goffman-Stukalsky and Oded Guggenheim, all teachers who taught and took part of this project.

Education for Meaning: What Is It and Why Do We Need It?

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Abstract
The central assertion of the article is that the most important mission in the field of education today is to design a new, comprehensive educational concept for schools, without with schools are consigned to an "educational-pedagogical vacuum" that advances extraneous and alienating purposes. The analysis delineates the theoretical foundations and practical consequences of such a new concept called "Education for Meaning." That concept addresses meaning in two senses: meaning as understanding the world and meaning as significance of and reason for living. The pattern of teaching and learning applied in the creative arts is presented as a pedagogical model upon which such an educational approach can be modeled. The article highlights the urgent educational need to initiate a dialogue that focuses on "big theories" of education in place of the prevailing educational discourse which has become superficial and crassly economy-focused.

Keywords: Teaching for understanding; arts education; comprehensive educational concept; meaning as significance.

This article aims to establish the basic outlines of a new comprehensive educational concept for schools in the 21st century. Initially, I will clarify the notion of a "comprehensive educational concept" and why the times demand that we formulate such a new concept. I maintain that since prevailing educational concepts for schools are of a different type, there is a room for undertaking such theoretical speculation. Further, I will introduce the underlying theoretical, social and ethical assumptions of the concept called "education for meaning," indicate its key practical implications, and present the pedagogical model on which it is based, namely, the pattern of teaching and learning applied in the creative arts. Finally, I will analyze the extent to which the concept outlined here conforms to the essential conditions of a new school concept for our times.

What Compels Design of a New, Comprehensive Educational Concept for Schools in the 21st Century?

A "comprehensive educational concept" is focused on the essential *educational* purposes and dimensions of school activity—pedagogy, curriculum, and the organization of knowledge—in contrast to concepts that focus on the administrative and structural aspects of schools and on extra-educational economic or social concerns. The concept's second characteristic is that it is *comprehensive*: it must present purposes and a theory that generate practical consequences affecting all educational dimensions of the school—pedagogy, curriculum, and the organization of knowledge—and not merely some of them. To be comprehensive, it also must address all dimensions of the learner, not simply his or her intellectual side.

Our central assertion is that the most important mission in the field of education today is to design a new, comprehensive educational concept for schools. Why? Because the existing school concept, which was formulated almost a century ago, no longer copes with the paramount needs and values of advanced 21st century societies and, therefore, is perceived as obsolete and irrelevant by the lion's share of educators and students alike. This state of affairs gives rise to an "educational-pedagogical vacuum" in schools—a vacuum that becomes absorbed with extra-educational matters. The dominant extra-educational concern of the past two decades that has hobbled the educational system is of an economic nature: training graduates to compete in the global knowledge economy. When a school's central objectives do not manifest an educational-pedagogical purpose that is meaningful to teachers and students, grievous harm is inflicted on both the school and society. In such

circumstances, learning and teaching are largely transformed into instrumentalities; they are not pursued for their own sake but, rather, to advance extraneous purposes that alienate educators. The consequence is subversion of the basic motivations essential for fertile educational activity.

Accordingly, an essential condition for coping with this state of affairs is to formulate a new comprehensive educational concept that can serve as the basis for fundamental change to existing schools and fill the prevailing educational vacuum; to revitalize school activity and provide both educators and the general public with a theoretical, ethical and practical base that will enable them to withstand the external pressures that impact the educational enterprise.

Essential conditions for a new, comprehensive educational concept

The analysis that follows incorporates important insights from current educational approaches in various spheres. The teaching for understanding movement is articulated in terms of performance-based concepts of understanding (Perkins, 1992; Wiske, 1998; Gardner, 1991); Understanding by Design (Wiggins & McTighe, 1998); teaching for understanding as initiation into "World 3" (Popper, 1972) the world of ideas and theories (Bereiter, 2002; Smith, 2002); a developmental concept of understanding (Egan, 1997); and frameworks based upon learning communities (Shulman, 1997; Harpaz, 2005, 2014). Other widely addressed school models include the democratic schools movement (Hecht, 2012; Neill, 1960; Sadofsky & Greenberg, 1994); Caring Education, which incorporates key concepts from feminist thought (Noddings, 2003, 2007; Gilligan, 1993; Alpert, 2008); and environmental education (UNESCO, 2014; Karmon et al., 2012; Sterling, 2010; Tilbury, 2011).

However, the contention here is that these theories and approaches, current in educational discourse, fail to offer a comprehensive educational concept. In some instances they do not deal with all dimensions of school or all the key aspects of the learner; in others they merely offer improvements on the prevailing school model rather than presenting an alternative. Introducing such a comprehensive educational concept is an essential educational task for our time.

To serve as a suitable alternative to existing schools, the proposed concept must satisfy four important conditions:

1. It must aim for **a broad common denominator**. Understandably, it is not possible to formulate an educational concept that will be accepted by everyone. After all, education at its core is an ideological enterprise, and society in our day is rife with ideological disagreements relating to education. Yet, a concept that aspires to serve as a comprehensive one for schools must aim to find broad common ground within society and not merely settle for appeal to a limited circle of "believers" or special interests. To be sure, it might be possible to sketch out several different models of educational structures to replace the single, prevailing educational model. However, even to realize this possibility, any concept that aspires to be a comprehensive alternative must, in the end, appeal to a broad swath of society or it will quickly be channeled to the status of "solution for special interests" ancillary to current schools. This is what has happened to the democratic schools movement.

2. It must **correspond to the basic motivations of educators.** Notwithstanding the importance of appealing to society as a whole, the key target population of a new educational concept is the community of teachers and educators in the field. It is difficult to exaggerate the importance of an exciting educational concept to the work of educators. In contrast to widely held "economic" attitudes, the fundamental motivations of educators grow out of the possibility to realize the inclinations and values that drew them to education in the first instance and on the existence of working conditions to facilitate their implementation. Material rewards play a lesser role[1]. Therefore, even if a new educational concept were widely acceptable to society as a whole, it is liable to falter if it doesn't capture the educational imagination of those on the front lines.

3. Existence in the field of **effective practices** that exemplify the concept. A comprehensive educational concept is basically analogous to Thomas Kuhn's widely known concept: the paradigm. A "scientific paradigm" according to Kuhn is a constellation of theoretical principles and assumptions that become associated with practice and procedures in the relevant scientific field (Kuhn, 1970). Education, like science, is a field with a prominent practical dimension, which is driven by practical examples of effective actions no less, and possibly more, than by theories or values. Accordingly, a new educational concept must have as its foundation a successful model of educational action or, otherwise, it likely will be perceived (at least by educators in the field) as no more than an educational fantasy.
4. It must **address key societal challenges**. Contrary to commonly accepted dogma, not every societal challenge demands an educational response. There are many societal challenges for which the most effective way of dealing with them is grounded in economic, social or health policy, for example, and education has little to contribute. Moreover, even when dealing with societal challenges in which education does play an important role, more likely than not the education system alone cannot provide an effective solution. Nevertheless, today there are key societal challenges that cannot be addressed without appropriate educational solutions. In these instances, education offers essential coping mechanisms even if, by themselves, they are far from sufficient. A new comprehensive educational concept must provide solutions to challenges of this nature.

Key societal challenges of our times demand educational solutions

What are these critical societal challenges of the day that cannot be addressed without a decisive educational change? I consider three to be preeminent.

Transition to a sustainable society

The term "sustainable" relates not only to the ecological-environmental threat inherent in our current conduct but also to related political, economic, social, and cultural dimensions of the problem. My reference, therefore, is to what is called "broad sustainability" (Karmon et al., 2012). Broad sustainability deals not only with the environmental crisis and the inherent threat to survival of mankind, but also with the question, "What is worthy human existence?" From the perspective of broad sustainability, the environmental crisis is at once a manifestation and one aspect of a much deeper crisis. This crisis is related to the enormous economic inequalities among and within countries: to the accumulation of massive capital by a meager few at a time when nearly a billion people suffer from malnutrition (Hacker & Pirson, 2010); to breakneck consumerism that is becoming critical to the global economy; to dominant values such as competitiveness, ratings, unlimited growth and profit; and to recognition that dominion over our commons is passing from citizens and elected governments to multinational corporations that are accountable only to their shareholders (Mounk, 2018). This last observation goes to the core of the "crisis of democracy" that characterizes a majority of Western states nowadays: widespread political ignorance (Somin, 2016) allied with loss of faith in the core democratic foundations of the nation state—the people's representatives, parliaments, political parties, media and communications, and others (Habermas, 2001; Bauman, 2013; Giddens, 2000). In these circumstances, continuation of "business as usual" is not merely a distinct threat to our physical survival but also to fundamental values of open, democratic societies: freedom, social justice, equal opportunity, the right to dignified work, solidarity of mankind, and others.

Granted that education alone cannot cope with a crisis of this magnitude. It demands from us all a fundamental change in our way of life and in patterns of thought and action. However, in equal measure it is apparent that there is no possibility of dealing with a crisis of this nature without vigorous educational effort (Ambrose & Sternberg, 2016). Coping with the enumerated conditions through education calls for developing teaching methods and materials that lead to in-depth understanding of extremely complicated processes, cultivating the capacity for systemic thinking, and active engagement in the process of change. Since solutions to the

challenges of broad sustainability are found mainly in the domain that lies beyond the borders of the nation state, in addition to the common education for national citizenship, transition to a sustainable society also calls for education for global citizenship (UNESCO, 2015). The pedagogy and content of existing schools are not integrally designed to promote such "world understanding" and, to a large extent, schools embody the same norms, values, and national ethos that are at the root of the multifaceted crisis in which we find ourselves.

Personal and collective identity formation

One of the central characteristics of modern society is expressed in the way that people develop their identities. By contrast to traditional societies, in modern society a person is not "born into his or her identity." Personal and collective identity is not fixed from birth by ties of blood, kinship, or social caste. While there is some merit to the claims of critical theories that equality of opportunity and freedom of choice in open, democratic societies is illusory, nonetheless, individuals do enjoy the actual potential to move among social groups and to choose their lifestyles.

To paraphrase Sartre, man in modern society is condemned to choosing his identity. Yet, in the earlier stages of the modern age, generally up to the 1960s, the process of identity formation unfolded in the context of a national narrative that was largely established and agreed upon by society, in an economy in which a majority of participants persevered in their careers for decades and, in a reality where in every society there were only a few dominant and acceptable lifestyles. Existing schools are a direct product of this earlier modern era, and they served those societies exceedingly well. Their pedagogy, curriculum and structure were all highly effective tools for formation of personal and collective identities of students in a society that shared an established national narrative with which they had to be endowed and in a stable work environment for which they had to be trained.

However, the same school becomes an ineffective tool for developing identity in late modernity that characterizes society in the recent decades. This "liquid" modernity, to use the apt terminology of Zygmunt Bauman (2000), is characterized by the multiplicity of competing narratives and lifestyles; undermining of national narratives; "risk" economies (Back, 2007) in which employment is by no means assured and workers are expected to change careers several times during their lifetime; and bombardment of information that assaults all our senses. In this liquid environment, the burden of developing identity (and of stumbling in the process) falls almost exclusively on the individual, while the social space is becoming devoid of stable meanings that might serve as an anchor (Bauman, 2000, 2013). Moreover, recent research clearly indicates the dramatic influence that digital technology has had on our identity formation. For example, our ability to concentrate on a single idea for a period of time is affected when our attention is distracted every few minutes; we tend to reduce phone conversations and face-to-face encounters to a minimum; there is a sweeping transition to interpersonal communications based on short text messages that are largely directed at groups not individuals; and the experience of being alone with our thoughts and feelings—so essential to developing personal identity—is constantly under threat (Carr, 2011; Turkle, 2011). Not for nothing, asserts Bauman, that in current circumstances "there is a wide and growing gap between the conditions of individuals *de jure* and their chances of becoming individuals *de facto*—that is, to gain control over their fate and make the choices they really desire" (Bauman, 2000, p. 39).

Existing schools do not contribute to closing this gap but, rather, to widening it. In a world inundated with information, schools continue to overwhelm young people with facts that can be acquired at the flick of a switch. Rather than engaging students' capacity to make choices, learning is organized to minimize choices both among and within subjects. The dominant pedagogy does little to expand the ability to make informed and intelligent choices among a multiplicity of incompatible perspectives but, rather, persists in delivering categorical narratives and answers. Developing students' capacity "to connect with themselves"— to discover and shape personal preferences, aspirations and goals—is nowhere to be found in the school agenda. In this area, as well, radical change is called for in the functioning of schools.

Training for the knowledge economy

These days this challenge is placed at the pinnacle of the pyramid of school purposes and, in significant measure, dictates the daily routine of schools. At the same time, the way it is translated into educational practice generates increasing criticism from academics and educators in the field (Tamir, 2011; Ravitch, 2010; Alexander, 2010). Thus, it is necessary to expand a bit on the discussion, and to bring some order to the emotional discourse that saturates the topic—both to discern more clearly among the challenges, goals, and methods to actualize them and, additionally, to hone the nature of the educational response called for.

The first important clarification is that one of the central tasks of responsible, government-supported education is to impart to graduates the skills and qualifications necessary to successfully integrate into the working world. The justification for this claim is not simply practical and political; no state will rely on an educational system that isn't attuned to this purpose. The justification is also educational and ethical: appropriate education should enable its graduates to enjoy open futures and dignified lives, and the capacity to integrate in the working world is a key component for both these purposes. Therefore, the criticism by many educators of the very idea of education serving economic purposes is misplaced.

So what then is the problem? The problem lies, first, in the exclusivity that the purpose gained among education policymakers and in the biased way in which it is understood and, second, in the educational methods employed for its implementation. Anyone who reads ministry documentation and speeches of educational decision-makers and looks at what is happening in most educational systems over the past decades is likely to conclude that there is only a single educational goal: "to confer a long-term, comparative economic advantage [vis-à-vis other states]" in the words of Israel's Dovrat Commission, a national task force for the advancement of education established in 2003 (see also, A Nation in at Risk, 1983; Cuban, 2006). All the other avowed objectives, such as improved educational outcomes, support of weaker students, improved command of mother tongue, and even improved knowledge of the national heritage are all understood as contributing to the stated objective. At the heart of the process stands what may be termed "globalization anxiety"—the fear that in the future the national economy won't compete successfully with other countries in the global economy. This concern shapes the way the objective is understood and translated into action, and the educational vacuum in which schools find themselves today enables that objective to exercise absolute control of the school agenda.

The second aspect of the problem is the way in which the goal's formulation is translated into action in the field. The educational system's success in generating comparative economic advantage is measured by comparing the performance of other developed countries on international achievement tests (e.g., PISA and TIMSS). From here it is only a small step to funneling most system resources to improve student performance by these criteria. The problem is exacerbated in a country like Israel where, for short-range political reasons, there is a massive investment made in direct preparation of students for the exams (Schleicher, 2010). This situation inflicts educational harm in many ways. First, such a course of action entirely misses the essential goal, that is, preparing students to succeed in the global economy. Learning for the test represents a form of learning that is antithetical to the demands of the global economy. It focuses on imparting the skill to precisely reproduce information on tests and for students to deal with tasks in isolation, whereas the global knowledge economy demands active, creative manipulation of information, efficient learning of new knowledge, and collaborative teamwork (Schleicher, 2010). Second, it seriously harms other educational goals that aren't measured by those tests such as training for engaged citizenship, aesthetic education, and teaching for understanding, and it leads to a substantial reduction in the time devoted to subjects perceived as "lacking economic benefit" such as the humanities and fine arts (Karmon, 2012b). Third, and perhaps most important of all, instrumental, test-directed learning dictated from on high alienates many teachers, particularly the good ones, from educational practice, leads to

reduced motivation and, in some instances, to abandoning the profession (Back, In press).

So, what then is the educational response to successfully cope with the economic challenge before us? First and foremost, we must fully grasp the fundamental problem: existing schools are designed and built to train students for an industrial economy. Consequently, without a fundamental change it is not possible within its framework to prepare students for the knowledge economy whose purpose is so different. In most attempts to date to deal with the challenges of the knowledge economy (with limited exceptions such as Finland and reforms of recent years in Southeast Asian countries (Volansky, 2020; Hogan, 2012)), the initial framework of the school has been left in place, so it is no wonder that these efforts faltered. It falls to us, therefore, to establish a new comprehensive educational concept for schools that takes account of preparing students for the knowledge economy. This requirement justifiably demands that we address the educational system: after all, working with and on knowledge is its polestar. However, it by no means has to turn into the principal objective of the system, since domination of this sort will inhibit us from developing educational solutions tailored to the other social challenges identified earlier. The good news is that there is no essential contradiction between the educational solutions needed to cope with the three social challenges. It is possible to establish a new, comprehensive educational concept for schools that will offer appropriate and integrated solutions for all three challenges, and the remaining sections of this article will be devoted to that task.

Outline for a new comprehensive educational concept: Education for meaning

The new concept to be presented is termed "education for meaning." Let me begin by laying out its key underlying concepts and characteristics. Then I examine the degree to which it is comprehensive by presenting a number of its fundamental implications for teaching, for the curriculum, and for the organization of knowledge. Finally, I revisit the conditions called for by such a concept and to the societal challenges to which it responds and examine the extent to which it withstands the test.

Key concepts

"Education for meaning" comprehends the term "meaning" in two senses: first, meaning as **understanding** reality; second, meaning as **significance of and reason for living**. In the first sense, the goal of the educational process is to develop and deepen the students understanding of three interlocking spheres—personal, local (community and state), and global-environmental. In the second sense, the purpose is to conduct educational experiences likely to communicate meaning and reasons for living that go beyond economic success.

With regard to the first purpose, it's worth distinguishing between it and the stated purpose of most approaches to educating for understanding. The existing approaches place the emphasis on education intended to lead to students' understanding of what is taught – in contrast to traditional education that leads to inert knowledge. The emphasis of these approaches is pedagogical—to change teaching and learning in schools. By contrast, the purpose of education for meaning is to lead students to in-depth, complex and critical understanding of the world in which we live. In this instance, the focal question is broader and more radical. The central question of prevailing approaches is: "How do we teach the existing school's course content in a manner intended for understanding?" The question posed by education for meaning is: "What content is most appropriate to teach, and what means and organizational structures should we use such that learners will attain essential, in-depth understanding of the world in which they live?"

To be sure, prevailing educational approaches also are concerned with "understanding the world," but they assume that the material currently being taught in schools enables us to do so—if only we could learn them properly. Therefore, the desired outcomes of prevailing approaches are

expressed in various student performances relating to the taught knowledge. For example, Perkins and Gardner (Perkins, 1992; Gardner, 1991) aim for students' "understanding performances"; Bereiter (2002) aims for outcomes that are expressed through active construction of conceptual knowledge. By contrast, the desired outcome of education for meaning is development of a worldview with specific characteristics that will be explained below. Another point worth emphasizing—a point relevant to both education for meaning and existing approaches to education for understanding—is that it is no longer possible to limit education for understanding to a narrow elite. Addressing the weighty societal crises that we are facing demands education for understanding for the masses. The working models of existing schools are not intended to do this, so they must be fundamentally changed.

"Understanding" in the sense of education for meaning is not directed exclusively to the intellectual-theoretical plane. At the heart of education for meaning is the aspiration for "understanding of self"—the capacity of every learner to know himself in a complex, multi-dimensional way: strengths and weaknesses, predispositions, motivations, and goals that give purpose to life. In order to realize this aspiration, schools should offer learning opportunities and encounters that focus on acquiring knowledge of "the self"—whether by means of relevant theoretical perspectives such as philosophy, psychology, and sociology, or by means of active experiences or workshops of all kinds. This view of "understanding" leads directly to the second meaning of education for meaning: meaning as the significance of and reason for living. In this context, we define meaning as: "a personal connection to an inter-subjective environment based on values, ideas, actions, and principles that impart a purpose and reason for living."[2] For instance, activity in the arts, theoretical realms, practical trades, social engagement, and the like.

The key point is that the times demand that we experiment with activity that isn't merely instrumental, that is, activity whose purpose is within itself (Aviram, 1999). The mission becomes particularly urgent and essential in our materialistic and instrumentalist world, which confronts the individual with an "existential catch." On the one hand, a person constantly must choose among a host of possibilities in order to construct his "personal narrative" and to "self-actualize." On the other, the social pressure for material success, the pressure for unbridled consumerism, and the precipitous rate of change do not afford open space to do so. In the resulting existential emptiness, the basic human need for "meaning" (Frankl, 2006) tends to be fulfilled by insatiable material appetites or by reactionary responses in the form of fundamentalism and reversion to self-centered, isolated identities (Barber, 1995).[3] Both alternatives are devastating from the perspective of education for meaning. Therefore, one of the primary aims of a school that is educating for meaning would be to establish designated spaces for every student to experiment with constructing meaning. This, of course, is a new objective for schools that calls for profound changes in the future.

The relationship between understanding and significance

What is the relationship between the two definitions of "meaning"? In his "Ethics" Aristotle asserted that, in the final analysis, they merge into one. His analysis regarding the relationship between action and purpose in human life is the definitive analysis of the subject, and it is also fundamental to the argument advanced here. For Aristotle, all human action is performed to achieve some end, which is a means towards a larger end, and so on until one reaches the ultimate end. So that the chain of human actions over a lifetime will not become pointless—become "absurd" to use a more voguish concept—there must be an "ultimate end": an end that does not serve a subsequent end, but is an end in itself. Aristotle believed that there was a one ultimate end common to all humankind that was dictated by the uniqueness of humans among all other living creatures. Mankind's unique characteristic is the capacity for wonder and the ensuing contemplation. Therefore, to Aristotle, the ultimate end was the *vita contemplativa*.[4] Contemplative life is fundamentally the effort to understand the world in a more comprehensive and profound way, expressing the concept of meaning as the effort to make sense of the world and vest it with meaning. Meaning as the ultimate end that imbues life with significance and meaning as making sense of the world, therefore, become united in Aristotle's well-known analysis.

The key point adopted from the Ethics in our analysis is the importance of the existence of a consciously held ultimate end, which imbues our choices and actions with significance, and that life without such significance is an unfulfilled life. Another central claim of Aristotle adopted here is that an ethical life demands training and active experience with "the good life" and that learning which is only theoretical and abstract is not sufficient to achieve it. Where my view diverges from Aristotle concerns his claim that there is only a single ultimate end for all humankind. The concept underpinning education for meaning is that there are multiple and varied fields of action that can serve as appropriate ultimate ends for one's life, of which the contemplative life is only one potential choice. Therefore, engagement with learning aimed at understanding the world is likely to turn into life goals for particular students, yet in many other cases the two senses of meaning will be bifurcated.

Notwithstanding the difference between the two senses of meaning in the present context, it is worth highlighting the important affinities between them. First, they are mutually reinforcing. The more students apprehend what they study to understand the world as an end in itself, the more deeply they will understand it. Conversely, to the extent that involvement in activity from the perspective of meaning as significance is subject to theoretical explication, the experience will be deeper and the learning potential will be enhanced. The second affinity is yet more significant: the two senses of meaning share a common basis that is essential to both. What is common to meaning as understanding and meaning as significance is a specific structure of student *involvement* that is essential to them both. We are speaking of involvement on many levels—cognitive, ethical, emotional, and, in many instances, physical as well—without which there is no possibility of achieving deep understanding of a phenomenon or having an experience that is an end in itself. Such involvement must manifest itself in active engagement in creating something, or in the typical mindset of the acted upon domain and not simply settling for abstract learning about that domain. This point is equally valid for meaning as understanding as it is for meaning as significance, and it serves as the foundation of the working model of education for meaning that is shared by both of them.

This brief discussion of the two senses of "meaning" and of the relation between them barely broaches the philosophical and educational discussion necessary to design an educational concept on a firm theoretical and practical foundation. A long series of questions and distinctions with important practical ramifications remain to be clarified. For example, what is the dividing line between an enjoyable casual activity and meaning as significance? What are the different types of ends, and should we establish a hierarchy among them? And, in this connection, should the educational system cultivate specific types of meaning for living? Is there a difference between the educational methods that are required for different categories of meanings-significances? However, in order to conduct a productive inquiry into these issues, we first must resolve that one of the stated objectives of the educational system in the 21st century is coping with the question of meaning, since any effective educational inquiry must integrate theory and practice, as one sustains the other (Dewey, 1938). Moreover, it is important to note that, in significant measure, the answers to these and other questions are best given in communal and local frameworks by reference to cultural contexts and the prospects for actual implementation.

Arts education as a model

A number of practical implications of education for meaning follow from the foregoing analysis. I have maintained that one of the central conditions upon which a comprehensive educational concept must be based is the existence of effective practices out in the field that serve as models. Are there any such examples of what we mean by education for meaning? In fact, there is a working model in the field that well illustrates education for meaning in both its senses, one that summons students to that multi-dimensional involvement and experience in creating things that is essential to both senses of meaning. This model finds expression in creative arts education that take place in secondary schools in the areas of the fine arts, cinema, theater, music, and dance.

Arts education constitutes an excellent instructional model for education for meaning for two reasons. First, it offers living proof of the possibility of education for meaning at its best, performed

with flesh and blood teachers and students in actual schools. Second, arts education is a domain that organizes knowledge and learning in a way that is very different from the way other subjects are organized in schools, thus facilitating inquiry into its unique characteristics. Not uncommonly, observers of students pursuing a course of study in the arts rub their eyes in disbelief. Students who are "slackers" in all other school subjects learn here with enthusiasm, take responsibility for complex tasks such as mounting exhibitions, staging plays and screening films, and form mature relationships with their colleagues and teachers. Their experiences strongly influence their personal, communal and professional identities.

What is the "secret" of arts education? To reveal it we must examine the organizing framework of arts education in comparison to that of the other knowledge domains of schools. An "organizing framework" is a sort of practical mold with specific features whose purpose is to arrange knowledge and learning. Every institution that educates by means of knowledge tends to create a dominant organizing framework through which it educates and teaches. For example, the organizing framework of K-12 schools is the "school subject", whereas the organizing framework of universities is the "research discipline". All information selected for teaching in the respective institutions, regardless of the domain of knowledge, is arranged in accordance with the basic characteristics of its dominant organizing framework. The basic dimensions that constitute organizing frameworks of knowledge are: the main cognitive aim, the key learning performance, the structure of questions, the principles for knowledge selection, the sources of information, the relationship to taught knowledge, and the spread of knowledge across time and space. To these one might add the attitude towards students' choice and towards their emotional dimension (Karmon, 2007, 2010a, 2010b).

Organization of knowledge in school subjects and the arts

Let us briefly consider how knowledge is organized in the arts compared to the typical organizing framework of schools—the school subject. The **main cognitive aim** of the arts as taught in schools is not clearly defined. It tends to fluctuate on a continuum between initial "professional training" of the student as craftsman in his or her chosen specialty to fostering creativity and teaching cultural literacy. Whatever the scope of the purpose, it is far removed from the principal purpose of the school subject, which is to transfer select items of information and skills to the entire student body.

The gap between the aims is most conspicuous with regard to the key **learning performance.** In stark contrast to school subjects, the learning performance in the arts is not a written exam intended to test the ability for precise reconstruction of the taught knowledge but, rather, a creative performance in a discipline—an exhibition, film, theatrical show, and the like. This kind of performance demands that students make choices, actively construct "artistic knowledge" and, in some instances, engage in coordinated teamwork. In this framework there is hardly room for closed-ended **questions**, questions that have only one correct answer, that are typical of the school subject, since classes in large part are conducted as workshops based on guiding and coaching students. A significant number of the questions in art education are posed by the students themselves and are intended to direct them in the process of their art work, while teachers' questions are basically guiding questions for the purpose of improving and advancing this process.

Knowledge selection for what is taught in art is basically done by the teachers themselves in contrast to selection "from above" by officials of the education ministry and disciplinary experts as is common in the school subject. The closer one gets to the culminating project, the more the selection passes to the student. Often, the result is selection (or creation) of works that critique and go beyond the compass of the regular school subject's "accepted knowledge."

Sources of information for arts education are not essentially teachers' talk in the classroom, textbooks, and workbooks typical of the school subject but, rather, authentic creations from the artistic domain—the plastic arts, music, dance, etc.

The **attitude towards knowledge** that is learned in the arts is characterized by deep intellectual and emotional involvement of the students, and the initial assimilation of the perspective through which we perceive and construct the world with the art that has been learned.

And, finally, the **spread of knowledge** in the arts is comparable to that in other areas of learning (art generally being taught in the course of the school day), but often it is taught in longer units than those of other subjects (typically 45 and sometimes 90 minute units), and a significant amount of the learning takes place outside of formal classroom time.

To these features of arts education in schools we should add two additional important characteristics. First, the relation to **choice** of studies. In the arts there are two areas of choice that are rare in ordinary subjects: the choice of the domain of study itself and the choice of the content within it (what to draw, paint or sculpt, what play to stage, what film to produce). Second, the respect accorded to the **emotional dimension.** Involvement with the emotional side of the learner is an essential and legitimate part of the arts discipline relative to its marginal role in other school subjects.

This brief comparison between the organizing framework of the arts and the dominant framework of schools—the school subject—pinpoints the profound differences between them and simultaneously enables us to identify a critical source of the educational potency latent in the arts. Arts education in schools integrates the inherent advantages of the two central models of teaching and learning: the apprenticeship model that characterized the pre-modern period, and the didactic-theoretical model that characterizes the modern period. From the apprenticeship model they derive active engagement of the student in what is being taught—experience with the relevant activity rather than "learning about it"—and from the didactic model they take the systematic presentation of knowledge and looking at things beyond the narrow practical context.

Spheres of meaning

The way arts education works, therefore, constitutes the bellwether model for education for meaning. We can generalize and expand this working method to devise a general organizing framework tailored to serve as the organizational basis for teaching and learning in both senses of "meaning." We'll call this framework a "**sphere of meaning**." A sphere of meaning is an organizing framework that has recast the characteristics of art education so that they also will be suited to other areas of study. Let's take a look at them.

The main aim of the sphere of meaning is **to help students in constructing a worldview that is sustainability-focused, informed, and active.** As maintained earlier, the purpose of education for meaning is to develop the student's worldview. A worldview is a mode of comprehension and experience that guides a person's choices and actions. It is constructed from the two senses of meaning: the way a person understands the world and him or herself and the individual's motivating objectives and values. A sustainability-focused worldview is one that places at its center understandings and ends that advance a broad conception of sustainability, that is, understandings and ends that displace economic and personal success (which are unresponsive to the public sphere) or that infringes on the personal welfare of others. By "informed" we mean a view that is based on sound information and evidence and on thoughtful, guided experiences. By "active" we mean a view that promotes active involvement in the world and particularly with its improvement.

The key learning performance in the sphere of meaning is the experience of creating personal and/or team products that are typical of the domain. This experience can take the form of artistic expression, as shown earlier, but it also can manifest itself by building conceptual knowledge (Bereiter, 2002). Example might include students' choice of an important question or a written work based on research and its oral presentation (possibly online) to experts the way arts students are currently examined (Sizer, 1992). The questions in the sphere of meaning are open-ended, authentic questions that come largely from the students themselves and that require application of the domain's practices to answer them. Within a broad outline established by policymakers, knowledge selection is largely done by the teacher but is progressively transferred to the students. The focus of the chosen area of knowledge is "disciplinary insights": central ideas that constitute the discipline (rather than scattered bits of information) and principal disputes that expose its theoretical and moral complexities. The sources of information in the sphere of meaning are authentic sources of the discipline. Such

sources are today found in abundance on internet sites, in popular scientific literature, and among experts accessible through new technology-based communication media. The spread of knowledge in the sphere of meaning requires reduction of the fields that are concurrently taught in order to facilitate active involvement with them, and flexible time units both in and outside of school during which considerable learning time becomes the student's responsibility (in other words, time not dominated by the instructor's frontal teaching). The required attitude towards knowledge in the sphere of meaning is critical involvement. The idea is that the learner will be engaged in the subject and will be able to apply its perspective, in at least a preliminary way, but will not fall prey to dogmatism that, on occasion, characterizes the researcher in that discipline. And, finally, the sphere of meaning must include emphasis on choice and the emotional dimension that are characteristic of arts education.

The following diagram sets out the general construct of education for meaning.

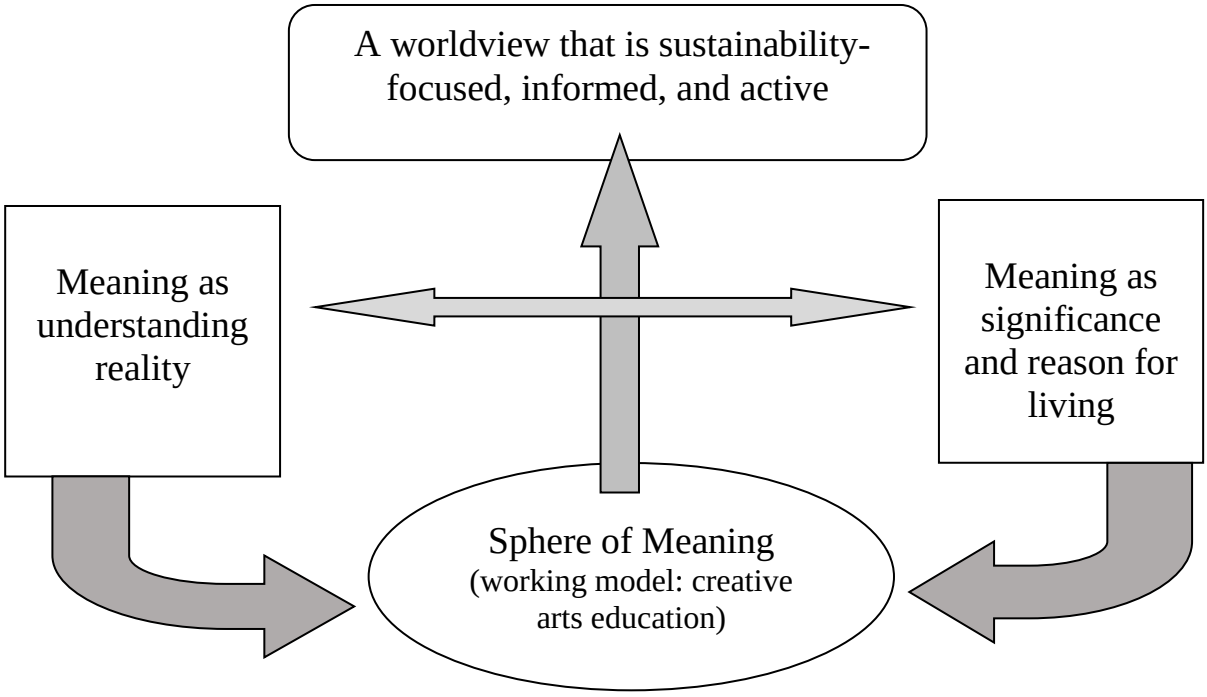

Figure 1: A construct for education for meaning.

Education for meaning: Implications for teaching

Whether the emphasis is on developing the student's understanding of the world (meaning as understanding) or on experiences within the scope of meaning as significance, education for meaning calls for teaching and learning methods as well as teaching personalities that are different from those common in most school subjects. In what follows, I will present three key implications for teaching of the proposed educational concept: personal mentoring; guiding pupils as they experience meaning as significance; and teaching for comprehending the world.

Personal mentoring

Serious engagement in sensitive questions of identity and in complex cognitive questions demands professional, ongoing personal coaching. It cannot be accomplished with frontal teaching, however capable, or by means of a "classroom educator" that is not organizationally and intrinsically structured for personal coaching of students. The role of the personal mentor is to coach the learner along the way through school. He or she may come from the ranks of schoolteachers who simultaneously are teaching subject matter or from the community at large—retirees, students, or others for whom this is their sole task in the school. The mentorship is accomplished by means of regular, face-to-face meetings between the teacher and student and relates to all aspects of school life: studying, social relationships, emotional issues, questions of identity, etc. To these personal

encounters, of course, one could add the variety of virtual contacts and group get-togethers, but the heart and soul of personal mentoring is individual, face-to-face meetings. The mentor "sees" the learner, is acquainted with him or her in multiple dimensions, including family and home environment, and is concerned for his or her wellbeing (Lampert, 2008; Noddings, 2003, 2007).

Providing for at least one significant adult in the life of each student is recognized today as key to student wellbeing, which has a positive influence on all aspects of education. It also is an essential condition of education for meaning. There is a degree of educational irresponsibility in attempting to deal with the deep strata of students' identity—in the process, questioning social conventions and commonly held beliefs—without sensitive and committed personal coaching. The intention, therefore, is that the personal mentor**,** like other teachers in a school, should become significant adults for the sake of their learners. It should be noted that schools do exist that provide deft, ongoing personal mentoring, and we should learn from their cumulative experience.

The teacher-guide in the sphere of meaning as significance

A teacher-guide is a fundamentally different teacher from the familiar "subject matter teacher." A key aspect of his role is coaching, guiding and accompanying learners in their creative processes by means of leading questions, suggestions for change and fresh thinking when the need presents itself, modeling improved performance, providing generative feedback, and the like. In spheres of meaning for significance, we should aspire for a teacher-guide that would be active in the field, even partially—an artist, a researcher, a social activist—and, thus, able to set a personal example as someone who experiences the field as truly meaningful. In addition, it is desirable that such a teacher be subject to professional training in the areas of coaching and guiding of novices in the field, gaining in-depth familiarity with the complex emotional dimensions that the process entails.

In this instance as well, it is conceivable that a portion of the teacher-guides would come from outside the ranks of the main schoolteachers. There is room to expand the circle of schoolteachers with other professionals in the community who desire and are able to serve as teacher-guides for young learners. Spheres of meaning are suited to activities beyond the school walls, especially in senior high school. It is worth noting that spheres of meaning as significance offered for students' choice and experimentation should be taken in the widest possible sense to include not only the arts and academic subjects but also physical and mental activities such as various sports, yoga, martial arts, etc., crafts such as carpentry and metalwork, and social or community activities such as community development, elder support, and the like.

Teaching for understanding the world

The idea behind teaching for understanding the world is to progressively build the learner's worldview such that it will be based on reliable information and on perspectives that go beyond intuition, and that these understandings will function as active knowledge in his consciousness. Therefore, the focus of education for understanding is transforming the knowledge learned in school into active knowledge, which is to say developing the learner's ability and disposition to apply the newly acquired knowledge flexibly and appropriately in new contexts. Additionally, a deep understanding that diverges from our intuitive theories (Leiser, 2001; Gardner, 1991, 1999) necessitates exposing and articulating students' intuitive theories—a deliberate subversion of those earlier conceptual "schemas"—and construction of new insights that will lead to new understandings and actions. There is no prospect of effecting a learner's cognitive transformation without generating undermining and stimulating processes of this sort. This is why learners' "understanding performances" are at the heart of education for understanding—applying new insights that diverge from intuitions, in contexts beyond those that were taught, getting informative feedback (with the help of the teacher) that indicates difficulties and issues that require improved performance, and renewed performance by the learner based on that feedback.

The learner's encounter with knowledge in education for the sake of understanding takes place in various ways: the systematic presentation of information online by experts; communication with

experts; student enquiry conducted in the field, on the internet or in academic sources; peer learning; and, naturally, also by the teacher's presentation of information in the familiar way. Success in education for understanding cannot be measured by the tests in currency today. Assessment must be based on student performances such as presentations before peers and experts, exhibitions, or creating a product that is accepted in the domain such as an inquiry-based document, a film, or the like.

In summary, education for meaning intended to develop the learner's understanding of the world has far-reaching implications for teaching and requires the teacher to act differently from what is customary in existing schools.

Education for meaning: Implications for content

Education for meaning as understanding the world focuses on three intersecting spheres: the global-environmental; the local; and the self. We will indicate below several key educational implications of this tripartite focus by laying emphasis on the new subject matter required by education for meaning.

The global-environmental sphere

The global-environmental sphere receives little attention in the current educational system. At the heart of this sphere is **ecological literacy** and education for **global citizenship** (Boix Mansilla, 2016; UNESCO, 2015). The focus of ecological literacy is **systems thinking**—which ought to be learned as a stand-alone subject as well as an organizational axis of science and social disciplines that constitute the basic knowledge necessary for such literacy.

Among the key characteristics of our age is the increasing complexity of social and economic systems and the accelerated pace of change. As a result, many of our fundamental intuitions about "how the world works" are imprecise or incomplete and, therefore, misleading. The mechanistic legacy of the modern age has taught us to think in discrete "compartments," to divide learning into separate subjects in schools such that each discipline is thought of as a separate "knowledge packet" unrelated to the others. A fundamental cause of major problems in our times, therefore, lies in the poor understanding of reciprocal relationships among the different components of the system. Owing to the interval in space and time and the complex reciprocal relationships between cause and effect, it's hard for us to foresee the operation of the domains in which we operate and to understand the long-term consequences of our actions. Accordingly, to understand what is happening in the world and to enable us to act effectively in response, we must understand, think and act systemically. Systemic thinking enables us to get a clearer picture of the connections between things and to develop a vision of the whole—a vision that is essentially ecological. This is especially critical nowadays owing to the general need to understand the operation of systems whose degree of complexity is increasing exponentially and the reciprocal relations between human action and earth's life support systems.

Ecological literacy complements education for global citizenship, which also must be taught both as a discrete subject and as a component of civic-democratic education (see infra). Within the framework of global citizenship studies, the clear and responsible presentation of key data regarding the social, economic and, of course, environmental situation around the world is of the utmost importance. It is particularly important to emphasize data that indicate fundamental problems on the global level, which promote solidarity and empathy with others, and encourage concrete action to remedy them. For example, poverty statistics and widespread world hunger, income gaps among and within countries, the concentration of wealth in the hands of a few, ecological damage, social and environmental injustice, and the like. Concurrently, it is important to offer practical courses of action for dealing with the problems, e.g., international treaties or an international poor tax. In addition, there are many actions on the local level that reflect a consciousness of solidarity with and commitment to repairing the world. For example, actions that undertake reduction of the ecological footprint of a school or of the community, or actions that emphasize local economic development, sustainable food sources, or fair business and employment practices.

An additional area of content that is essential to developing global consciousness is "**world history.**" This subject area has been refined over the past fifteen years in response to the growing interest in globalization, and a number of books on the subject have achieved best-seller status (e.g., Diamond, 1997; Harari, 2012). Contemporary world history emphasizes humankind's common heritage and explains people's differences based on environmental circumstances in contrast to the racial, national, and cultural explanations common in other historical perspectives. The history taught in schools is still largely rooted in nationalism, with a focus on wars between nations. To nurture a consciousness of global citizenship it is essential to counteract this trend by teaching with a more global perspective.

The local sphere

Education for global citizenship integrates with **civic-democratic** education, which constitutes a pivotal axis of the second sphere of understanding: the local context. Civic education, in contrast to the citizenship studies familiar to us today, is not a separate subject; it is an amalgam of a series of learning activities distributed across all the school years. It includes encounters with a variety of personalities that make up the cultural mosaic of the local community and the state; close-up familiarity with principal political, social and economic institutions; familiarity with youth from distant communities through online shared learning; and learning about pressing problems on the local level. A substantial part of the learning should take place outside the classroom, where the relevant individuals or institutions do their work. These activities should be combined with those that relate to deepening democratic values, which may include learning about the founding principles of democracy as well as techniques for engaging in democratic discourse that will bring about serious and deep discussion of genuine dilemmas in the life of the school, the community and the nation. And complementing all these should be **volunteer work in the community and society**, which is inseparable from civic-democratic education and an important means of developing the students' feeling of capability for social engagement.

The second axis in the local sphere of understanding is the axis of **local identity**. Here we are referring to knowledge areas that are more familiar to us from existing schools, such as literature, history and heritage. These subjects may be taught as discrete subjects or in various cross-disciplinary combinations, but in all instances they should be taught with an aim towards mutual connection and particularly in relation to actual dilemmas of identity and to questions relating to the common good. It is no accident that these subject areas are at the core of the curriculum of existing schools. In point of fact, they are the areas that are likely to mold the national ethos, a process that is a central goal of the modern school.

These subjects play an important role in education for meaning as well, but they always must be taught in conjunction with the other two spheres, the global sphere and the personal sphere. There is, of course, an inherent tension between cultivating local and communal identity on the one hand and identity that is based on membership in the global community that calls for sensitivity and engagement beyond local ties. However, in education for meaning this tension is at the center of the educational dialogue, and it focuses on the varied possibilities of resolving the tension in a productive and constructive way.

Understanding of the self

The third sphere of understanding is the understanding of self. This is the sphere in which meaning as comprehension of the world and meaning as significance merge. Three types of content will be taught in this sphere:

The first type is theoretical **content essential to understanding of self** and one's relation to society. We are referring here to knowledge areas such as psychology, sociology, and anthropology in combination with core subjects in the humanities such as philosophy, literature, and history. (We should note that in existing schools the first four subjects listed here are not part of the general curriculum and constitute only an elective course of study in senior high school.) The second type of

content consists of a variety of **group workshops** related to social and emotional aspects of school life. The emotional dimension is hardly addressed at schools in any structured manner. This, in itself, is highly problematic, and it simultaneously has serious consequences on students' cognitive functions. We are referring here to activities similar in spirit to those found in informal education or group facilitation that enable students to become more introspective and consider their peers from the emotional and social perspectives. The third type of content in the sphere of self is, of course, **spheres of meaning** as significance, which was described more fully in the previous section.

To be perfectly clear, subjects currently taught in schools will continue to be taught within the framework of education for understanding: reading and writing skills (which must include various oral presentation skills that are essential to personal and social action today), science subjects and mathematics at a level required to understand key natural and social processes, mother tongue and foreign languages, etc. However, all subjects should be taught for the sake of understanding—not as discrete, disjointed subjects, but as the indispensable foundation for cultivating an informed, sustainable and engaged world view. And, finally, it should be noted that even today there are schools implementing action of the type described here that offer evidence that the proposed program is decidedly within the realm of the possible.

Education for meaning: Organizational implications

As Seymour Sarason taught us a long time ago, every proposed fundamental school change should identify the main programmatic regularities of existing schools that demand change and propose alternatives (Sarason, 1996; Sizer, 1984). Accordingly, I will lay out here several key programmatic regularities that will facilitate, indeed advance, realization of the behavioral regularities relating to patterns of teaching and content of education for meaning offered in the preceding sections.

Time structure

The first regularity that demands fundamental change is the time structure in schools. It is evident that teaching for understanding and serious experiences in the spheres of meaning for significance cannot be achieved within existing school time structures. Deep cognitive and emotional engagement in any area of learning is not possible within the existing structure with its multiple subjects, taught in brief class units during the typical school day. Moreover, this structure creates a situation in which many teachers, who teach subjects that are studied for a limited number of hours in the course of a week, are forced to meet with hundreds of different students every week (Sizer, 1984, 1992). This makes it impossible for them to form the close relationships and the mutual acquaintance between teachers and students that are essential to education for meaning in our intended sense. Therefore, in a school aiming for education for meaning, class sessions must be longer—from a minimum of one and half hours up to an entire day—and a smaller number of subjects will be covered in a typical week of learning.

A second programmatic regularity that is related to time allocation is what may be referred to as "community day." To introduce spheres of meaning that will be learned beyond the four walls of the school, and in order to bring about genuine encounters with community individuals and organizations so essential for learning in the local sphere, it is appropriate to allocate one day a week to learning activities in the community. This is a day during which students will experience spheres of meaning outside of school, will meet with key figures where they work, will take nature outings, will tour major institutions, and the like. Needless to say, this study outside of school can be accomplished in two half-day sessions or time allocations can be adjusted. The important point is that if we want to achieve meaningful out of school learning, we have to design appropriate programmatic regularities.

Mentors

The next programmatic regularity necessary for the proposed school is individual and group meetings between the mentors and students. In most existing schools there are no established one-on-one meetings between teachers and students. Such meetings take place informally during recess or after school and, generally, only to censure or discipline students. However, in schools where a central

pattern of teaching is personal mentoring, this situation must be fundamentally changed. Therefore, a key programmatic regularity in education for meaning is the allocation of a regular time each week for individual meetings between the mentor and the student and, similarly, allocation of time for weekly workshops of learner groups or mixed-age groupings of students and others.

Students' choice

Another key programmatic regularity to establish in schools is systematic choice by students. It is evident that in education for meaning choice is an important means for promoting student motivation and interest, as well as a goal in and of itself in the prevailing social reality. Therefore, in contrast to existing schools, where students hardly exercise any choice whatever, in the proposed schools students will deal with varied choices coached regularly by the educational staff. Students will choose their mentors; they will choose among different spheres of meaning; they will choose what questions to address within the spheres of meaning that are attuned to developing understanding of the world; and they will choose the social action projects in which they want to participate. All this requires construction of a sophisticated organizational mechanism to regulate the different selection processes and, concurrently, building the procedures for student coaching. Accordingly, it appears that for purposes of teaching for meaning a number of "networking teachers" will have to dedicate a majority of their time to these procedural matters, particularly in providing support to students who inadvertently fall between the cracks.

I have set forth here a number of key programmatic regularities that must be restructured from the perspective of teaching for meaning. It is not possible, and there is no reason, to provide here an exhaustive description of all the programmatic changes demanded by such a school. The purpose of the outline presented here is to identify the key areas requiring change and, particularly, the requisite course of thought and action to successfully establish new schools different from existing schools. One may assume that most of the new and effective programmatic regularities will be created and developed within the schools that focus on education for meaning.

Education for meaning: Does it meet the essential conditions?

The discussion to this point regarding education for meaning has demonstrated that we are talking about a comprehensive educational concept: an *educational* concept insofar as it relates to fundamental aspects of education—pedagogy, content and organization of knowledge; a *comprehensive* concept insofar as it relates in a coherent way to all central educational aspects of the school and to the central facets of the student—intellectual, ethical, identity, and emotional—rather than focusing on only some of them. However, does education for meaning conform to the essential conditions of a 21st century educational concept? Here we will examine this question in light of the four conditions set out earlier (see supra, pp. 158-159).

1. To aim for **a broad common denominator**. It would appear that this is the most challenging condition for education for meaning. It is certainly possible that the pedagogy implicated in education for meaning as understanding the world will be accepted by broad segments of the community and educational policymakers, particularly if its capacity to train students for work in the knowledge economy is emphasized. There is close relationship between the pedagogy of education for understanding and teaching and learning methods recommended by many documents that address "21st century skills" (OECD, 2018; Melamed & Salant, 2010). A good example in this respect is evident in the pedagogical reforms of the last decade in Southeast Asia, where educators are trying to implement problem-based learning and similar pedagogies in order to train students for the global knowledge economy (Volansky, 2020; Hogan, 2012). However, the substance of education for understanding the world—the more critical part concerned with the principles of broad sustainability and that demands learning new subjects beyond the "economic core" subjects that are tested in the international examinations (math, sciences, mother tongue, and English)—is likely to encounter opposition.

   The second aspect of education for meaning, experience with the spheres of meaning as significance, also is likely to encounter vigorous opposition. The basic idea that one key purpose

of school must be active inquiry of personal significance is far from accepted today, and it appears that allocating a substantial number of school hours to activities of this sort is likely to be seen by many as a waste of time and public funds. In current circumstances, education for meaning is, to a large degree, a subversive educational concept in most countries.

Nevertheless, four considerations offer the promise of wider adoption in the near future. First, it appeals to deeply held interests of the general public today, not just to an isolated segment of the population. The need to understand the world and construct meaning is a general human need, not tied to any particular group. Second, despite the fact that it challenges prevailing educational policy in many countries, it does not propose radical changes such as abolition of schools, distance learning, home schooling, or the like. Fundamentally, it seeks to generalize, broaden, and deepen the operating patterns and content currently found in schools and educational systems that are recognized as most successful, such as the Finnish system (Sahlberg, 2011) and schools that offer the International Baccalaureate diploma. Third, criticism of existing schools based on the sense that they are irrelevant to contemporary reality is becoming increasingly common among parents, students, and quite a few educational policy makers as, for example, in Israel (Educational Echoes, 2013; Harpaz & Horwitz, 2020). As these attitudes gain momentum, a concept that offers a comprehensive and coherent alternative that straightforwardly addresses these widely held feelings is likely to be received more favorably. And, lastly, broad support of education for meaning likely will come from educators in the field and academics. Accordingly, if educators succeed in becoming major players in public discourse on the future of education – a discourse that has been dominated in the past decades by business people and politicians – public support for education for meaning will increase correspondingly. This point brings us directly to the second essential condition for a new educational concept.

2. **Correspondence to the basic motivations of educators**. Here education for understanding stands on firm ground. What motivates most teachers to choose their profession is what is referred to as "Bildung culture": the desire to help young people develop their identities through meaningful engagement with knowledge and with individual and societal questions (Back, In press). Education for meaning in both its aspects relates directly to advancing those basic elements. On a number of occasions, I have presented the central ideas of this article to schoolteachers and faculty members of teacher training institutions and, invariably, the reaction has been clear and unequivocal: "This is why we joined the educational system, but the problem is that the ministry of education seems to have a different agenda." To be sure, there is a gulf between emotional and abstract reliance on a concept on the one hand, and teachers' willingness to alter accepted practices to actually effect the concept. And, yet, if education for meaning gains sufficient professional support and teachers in the field feel that this support is not merely rhetorical and empty, driven by some ulterior policy motive, one may count on the fact that an overwhelming majority will embrace it wholeheartedly.

3. Existence in the field of **effective practices** that exemplify the concept. As set forth in the preceding section, the instructional model of education for meaning is teaching that is characteristic of the fine arts in secondary school. This is a major strength of the proposed concept. There is no need to invent a new working model; the concept is based on a successful working method that is being adapted to the demands of new contexts. It is important to qualify this assertion. The road to "translating" the teaching and learning model common in the arts to theoretical subjects and other significant areas besides the arts is a long one, riddled with potholes. The transfer from a student's experience in creating a painting or film of his own to his experience in building knowledge in subjects such as world history or ecology is by no means simple, and it presents us with weighty theoretical and practical questions. Nonetheless, the cumulative experience in thoughtful building of knowledge as a core component of school offers room for optimism (Bereiter, 2002).

4. Adequately **addressing key societal challenges**. According to this condition, the proposed concept must provide appropriate educational responses to key societal challenges of the day that

cannot be addressed absent educational activity (as a necessary but not sufficient condition). I have posited that there are three critical societal challenges that satisfy this condition—transition to broad sustainability; constructing a personal and collective identity in the fluid modernity of our times; and training for the knowledge economy—and that effective educational solutions to each of them demands a profound change in the basic model of existing schools. Does education for meaning provide appropriate educational responses to these challenges? That appears to be the case. First and foremost, education for broad sustainability demands deep and complex understanding of the world as well as a new type of education regarding local and global citizenship and democracy. These, in turn, require a profound change in the forms of teaching and learning, as well as significant changes in content. Education for meaning, as we have seen, proposes a series of changes along these lines.

However, that's not enough. Transition to broad sustainability calls for a humane society in which a majority are motivated by "sustainability-oriented meanings". In other words, the ends that motivate them to action are ends that facilitate, and even reinforce, broad sustainability, and not those that undermine it. At present, the dominant ends are conspicuously adverse to sustainability. They find expression either in terms such as economic gain, self-branding, and competition between individuals and societies (what Benjamin Barber calls the "McWorld" tendency) or in their dialectic opposites such as ethnocentricity, nationalism, and religious fundamentalism (what Barber calls the "Jihad" tendency) (Barber 1995; Ram, 2004).

Experience within the framework of general education in spheres of meaning not narrowly geared to economic or personal financial gain—such as the artistic creation, various crafts, study of various types, social activism, intense physical or spiritual activity, etc.—therefore is an essential stage in the transition to a sustainable society. Of course, sustainability-oriented educational experience does not guarantee that a graduate of the system will make such choices down the road but, nonetheless, they would seem to be an essential step to that end.

Understandably, experience within the spheres of meaning as significance also is an essential educational means of coping with the second challenge—constructing a personal and collective identity in the reality of fluid modernity. By the nature of things, the educational system alone cannot change the structure of the public sphere, but it can provide young people with a variety of worthwhile meanings from which to choose, a protective and supportive environment, and responsible adult guidance that will help them negotiate the intense and complex process of establishing their personal and communal identities. The second aspect of education for meaning, which deals with understanding the world, also is essential to dealing with this challenge. The learner's intellectual understanding of himself and the world he inhabits also constitutes an essential stage in shaping our identities.

And, lastly, does education for meaning serve the need for training graduates for work in the knowledge economy? As maintained earlier, it appears that here, as well, the answer is in the affirmative. There is a strong correlation between the skills and qualifications demanded of the knowledge economy and the working model at the core of education for meaning. In both instances we are talking about active knowledge building, developing the ability to analyze and study new problems, cultivation of independent and team learning skills, and the like. And in both instances it is apparent that the pedagogy of existing schools does not make this possible.

Our discussion of the extent to which education for meaning satisfies the conditions we established yields the following picture: the proposed concept satisfies three of the four conditions, while the first condition—the likelihood of gaining widespread social agreement—is the most problematic. I have posited that even with regard to this condition there are circumstances that are likely to improve the standing of education for meaning and that one of the key factors likely to influence its acceptance is the extent to which educators will fight with determination for their professional positions in the public and political debates regarding educational issues. The future of education for meaning, therefore, is far from secure. Nevertheless, with all necessary caution and modesty I would maintain that the discussion here demonstrates that education for meaning may have

the potential to become one possible synthesis for 21st century education, just as the educational system in existing schools represents a synthesis that took place in the late nineteenth century. Existing schools created a coherent and effective model that served as the appropriate educational response to the central social challenges confronting that generation: molding citizens of the modern nation state and training workers for the industrial economy. Education for meaning offers a coherent model for schools that provide an educational response to the key challenges we confront at the onset of the 21st century: molding individuals and a civil society that will lead the global knowledge society to a sustainable society and the training of workers for the 21st century knowledge economy.

Conclusion

This article has presented five central claims:

1. A critical task in the field of education today is to design a new, comprehensive educational concept for schools, because the existing concept does not address the central societal and educational challenges of the 21st century.

2. In the absence of such a new concept we are left with an "educational-pedagogical vacuum" in schools that currently is filled with extra-educational objectives that are at odds with the basic motivations of educators in the field.

3. The consequence of this situation is the acute instrumentalization of school education that materially denigrates the value of education in the estimation of teachers, students, and the community at large.

4. The concepts current in educational discourse cannot serve as the basis for a new, comprehensive educational concept for schools because either they do not deal with all dimensions of school or the key aspects of the learner; or because they merely offer improvements on the existing model rather than an alternative model.

5. Education for meaning has the potential to become a new, comprehensive educational concept for schools. This concept is designed to address the key societal challenges of our day and to fill the educational-pedagogical vacuum that exists in schools with both theory and practice that relates to the professional ethos of educators in the field.

Most of the foregoing discussion was devoted to education for meaning, but that was not its sole purpose. No less important is pointing out the urgent educational need to initiate a dialogue that focuses on "big theories" of education. In the beginning of the third decade of the 21st century, social and technological conditions are ripe for development of schools that are no longer based on the mass production logic of existing schools. However, for this process to unfold successfully and responsibly, we must think on a large scale and comprehensively about education suitable to our times and to implement our ideas in the field. Unfortunately, just when conditions for change are ripening, the educational discourse of the last decade—a lost decade from the educational perspective—has become superficial and "earthbound," crassly economy-focused, almost totally unconcerned with the important educational and social questions (Karmon, 2012a). This article, therefore, offers one possible alternative for a different kind of school and, at the same time, embodies a call for a different educational dialogue appropriate to our times.

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Notes:

[1] In recent years, general agreement has emerged from a variety of disciplinary perspectives on the importance of motivations that are not external and material. See, e.g., Ariely, 2008; Pink, 2009. On the importance of values as a motivation for learning, see Nisan, 2001, and on teacher motivation that contrasts with common educational policies in many states, see Back, In press.

[2] This definition is largely based on Harpaz's characterization of a "sphere of meaning.. See Harpaz, 2012, p. 54

[3] Barber maintains that the defining characteristic of globalization is a destructive dialectic between the global McWorld of corporations, marketing, competitiveness, and superficial entertainment on the one hand, and the "Jihadistic" reaction that, despite its name, is common to all religions and cultures. This opposing force is characterized by ethnocentricity, isolationism, and fundamentalism (a modern phenomenon that purports to restore the glory of an imaginary past), which frequently finds expression in totalitarianism and terror. According to Barber, McWorld and Jihad are mutually dependent and reinforce each other: McWorld justifies itself as the bearer of freedom and democracy, and as the antidote to Jihad, whereas Jihad sets itself as the protector of local values against the corrupting McWorld. Our common tragedy, he concludes, is that both cultures are anti-democratic and harmful to our personal freedom. Therefore, a central claim of this article is that education for meaning is a vital means for liberating ourselves from the catch identified by Barber.

[4] Aristotle's view on this topic is not unequivocal. In the *Ethics* he sets another ultimate end, namely, the life of the statesman, which constitutes the fulfillment of a second kind of knowledge that he characterizes as "practical knowledge" (phronesis). (The third kind of knowledge is the "techne," which refers to the technical skills of the artist and the craftsman.) Practical knowledge is a person's ability to devise appropriate actions to accomplish his ends in concrete contexts, together with wise deliberation concerning the ends themselves: the ability to choose those ends that will lead to happiness. Practical knowledge requires judgments taken in specific cases that all differ from one another. That is why it develops over the course of one's life through cumulative experiences in exercising judgments and reflecting on their consequences. Accordingly, Aristotle claims, practical knowledge cannot be taught in a theoretical and didactic fashion like scientific knowledge (episteme). To nurture it, one needs to experience it over an extended period of time and with coaching by a wise adult. In many respects, education for meaning fulfills Aristotle's educational concept: education for meaning as understanding the world focuses on scientific knowledge, whereas education for meaning as significance focuses on practical knowledge that is developed through reflective and coached experiences in spheres of meaning that are offered for students' choice in school.

About the Author

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During the years 2003-2012, he was the director of the Kerem Institute for Teacher Training in the David Yellin College of Education in Jerusalem. Since 2009, he is a lecturer at the Beit Berl Collage and from 2012 also head of the Education department at the Sapir College. His main course topics are: Teaching for understanding, globalization and education and philosophy of education. He has published papers on: organization of knowledge, pedagogy and interdisciplinarity. In addition, he is the co-writer of two books on teacher training and interdisciplinary practice. His current area of interest is designing a new comprehensive educational concept which I term "Education for Meaning" that incorporates teaching for understanding and research about internal motivation and education for autonomy.

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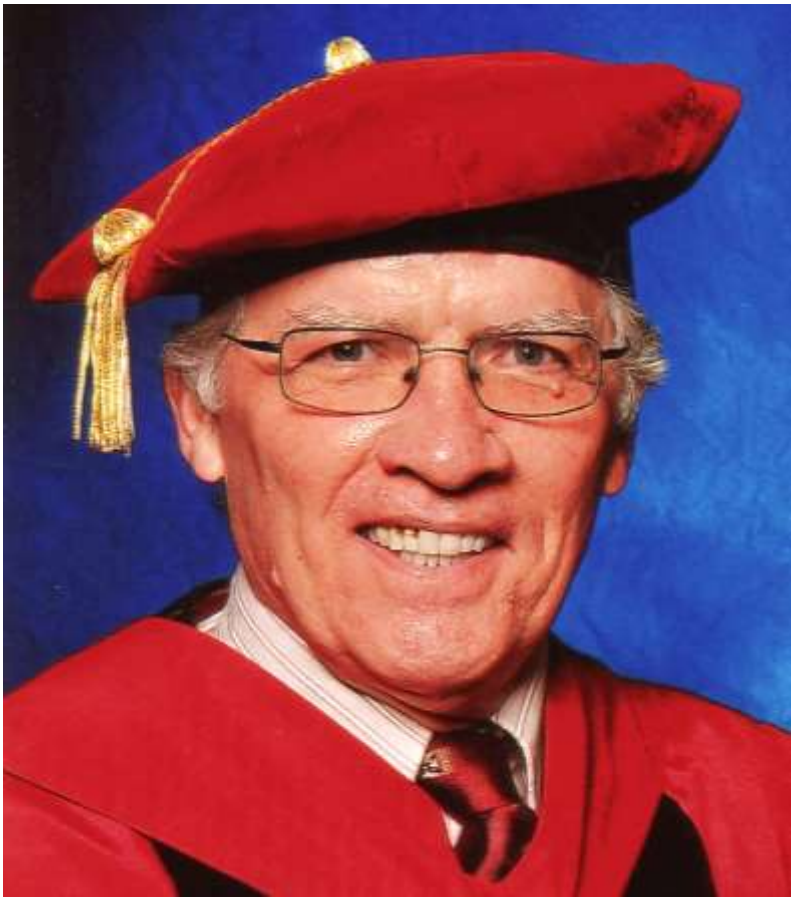
Interview (1):

Dean Keith Simonton

Taisir Subhi Yamin
The International Centre for Innovation in Education (ICIE)

Dr. Dean Keith Simonton is a Distinguished Professor Emeritus of Psychology at the University of California-Davis. Dr. Simonton's research specialty areas are in the study of human intelligence, the psychology of science, giftedness, and creativity. His well-known and influential books include *Great Psychologists and their Times*, *Greatness: Who Makes History and Why*, and *Creativity in Science*. In this interview with Dr. Taisir Yamin, Dean Keith Simonton illuminates his perspectives on creativity, greatness, and intelligence. He shares his own personal journey of learning.

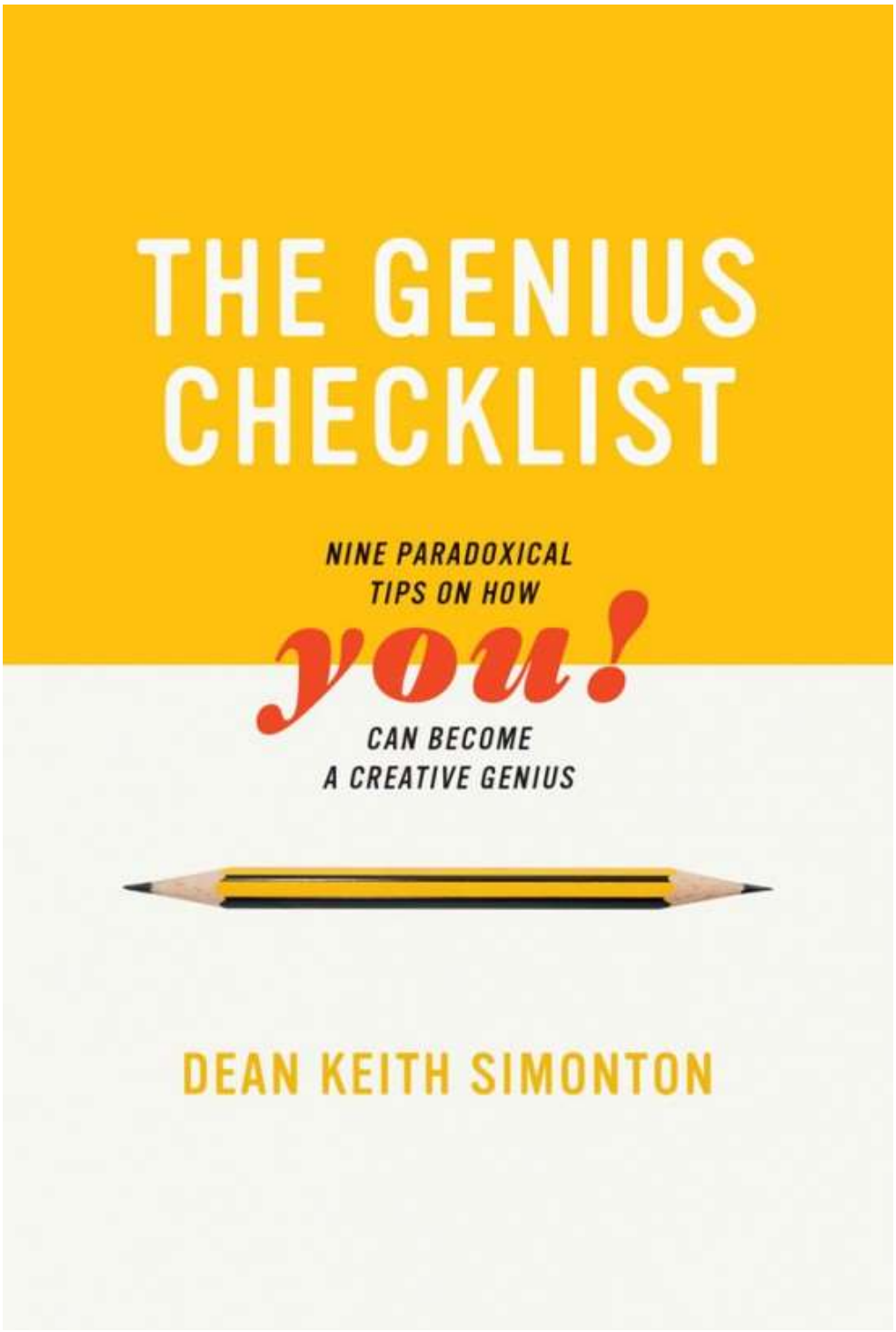


TSY: Can you explain what motivated you to enter the field of gifted and talented education?

DKS:

My research interests were ultimately rooted way back in early elementary school, when my parents purchased a set of encyclopedias specifically designed for K-12 use. I quickly became enthralled by these volumes, just loving to browse through the well-illustrated pages. I eventually became fascinated with the articles about famous historical figures, especially artistic and scientific creators and leaders both political and military. In fact, this fascination evolved into a lifelong curiosity, albeit nowadays I'm far more likely to rely on Wikipedia to get quick access to the information sought.

Yet it wasn't until I got to college that I started thinking that this avocation might be converted into a vocation. Although I started as a chemistry major, I took an introductory psychology course in my second year. Then I discovered that psychologists were already studying topics closely related to the attainment of eminence as a creator or leader. For example, I learned about Lewis M. Terman's (1925-1959) classic longitudinal study of intellectually gifted children, including the final volume examining whether they grew up to become adult geniuses. In addition, I was intrigued by Harvey C. Lehman's (1953) extensive inquiries into the relation between age and high achievement in diverse domains of creativity, leadership, business, and sports. Hence, by the end of my junior year I switched to a psychology major, thinking that I might become a scientist dedicated to understanding exceptional accomplishments.



TSY: When did you start working in this field?

DKS:

Right away! Because I was soon chosen as an Occidental College Scholar, I was permitted to carry out independent research projects. One such project was an attempted theoretical integration of intuitive versus analytical thinking that was about 10 years later published as a monograph (Simonton, 1980). Even so, I was struggling to find my preferred approach, an approach that would enable me to address the key questions that sparked my curiosity. Even after entering graduate school, in the how-defunct Department of Social Relations at Harvard University, I was floundering. As a case in point, the laboratory experiment that I conducted for my master's thesis just didn't meet my needs. I didn't want to use college student participants as proxies for the geniuses who actually attracted me.

Then, happily, I discovered that historiometric methods would enable me to study some of the greatest creators and leaders of history, and to do so in a rigorous and objective manner. I would just collect extensive biographical and historical data on a well-defined sample of luminaries, convert the qualitative information into quantitative measures, subject the latter to sophisticated statistical analyses or mathematical models, and thus address the substantive questions that strike my fancy. Notice how my love of reading biographies now became an integral part of initial data collection!

TSY: What kind of major challenges did you face?

DKS:

I'm glad you asked, because that was the hard part. At that time, hardly anybody used historiometric methods, and certainly not anybody who conducted top-notch research. Indeed, one of my mentors warned me that such research would not be publishable in any reputable journal, specifically mentioning the *Journal of Personality and Social Psychology* (*JPSP*), then considered the most prestigious publication vehicle for my specialty. Consequently, my proposed research program was merely a form of academic suicide. If I couldn't publish in the leading journals, I certainly wouldn't land a position at a highly-ranked research university, and therefore I would be unable to do much research anyway.

Imagine my advisor's surprise when he learned that the core chapter of my doctoral dissertation was actually published in that very journal (Simonton, 1975). The very next year saw two additional publications appear in *JPSP*, including one based on Cox's (1926) historiometric study of 301 geniuses that constituted the second volume in Terman's (1925-1959) *Genetic Studies of Genius* (viz. Simonton, 1976). Then in 1977, I published two *JPSP* articles back to back … well, I could go on and on

All this is not to say that I'm now home free. Many investigators in psychology still believe that research samples should consist of more everyday participants, such as K-12 and college students. No doubt much is gained by such a strategy. Yet if your primary focus is on those rare personalities who have made a lasting impression on human civilization, historiometric research still provides the optimal path (Simonton, 2014b).

TSY: How did you become involved internationally?

DKS:

A few years after I started publication, I began to receive invitations to participate in conferences elsewhere in the world. The first such conference was held in 1979 at WZB Berlin Social Science Center, where I delivered a talk on "Cultural Creativity and Political Leadership: The Lessons of Historiometry" (published as Simonton, 1985a). I can only speculate that my historiometric research featured two assets that might appeal to an international audience.

First, the subjects who made up my samples represented multiple nationalities throughout the world. For instance, the first publication to come out of my doctoral dissertation studied the creative peaks of 420 writers who define the major literary traditions, from antiquity to modernity and from Western to Eastern civilizations (Simonton, 1975a). Indeed, because I have a strong interest in cross-cultural research, many of my findings have been replicated across diverse civilizations (Simonton & Ting, 2010). For example, the impact of "role-model availability" on creative development has been assessed in Western, Islamic, Chinese, and Japanese civilizations (Simonton, 2018b).

Second, historiometric inquiries permit the investigator to address some of the "big questions" that have circulated for centuries, if not millennia. For instance, "Is genius born or made?" The very first historiometric monograph ever published was specifically directed at this issue (Galton, 1869). Even when these key questions can be answered using more standard methods, historiometric approaches provide a unique perspective that would be unavailable otherwise. This potential is seen in the second volume of Terman (1925-1959). Although all of the other five volumes were devoted to a longitudinal and psychometric study of high-IQ children, Cox's (1926) alone constituted a retrospective and historiometric study of whether historic geniuses would have been considered intellectually gifted children (Simonton, in press). Although partially reinforcing the longitudinal results, her findings also added insights unavailable otherwise (for details, see Simonton, 2016b). Adult geniuses and gifted children are not necessarily cut from the same cloth.

Whatever the reason for my international influence, it didn't take long for me to receive international honors. For instance, in 1996 I received the Sir Francis Galton Award for Outstanding Contributions to the Study of Creativity from the International Association for Empirical Aesthetics.

TSY: What are your most significant accomplishments and contributions?

DKS:

Perhaps reword: This is a difficult question to answer, because of the diversity in topics and methods I have included in my research. For example, I have published not just historiometric inquiries but also laboratory experiments, mathematical models, computer simulations, psychometric investigations, meta-analyses, single-case studies, and interviews. That said, all of my substantive contributions concern various aspects of genius, creativity, leadership, and talent. Moreover, I think my best work on these subjects falls into the following four categories:

1. *Cognitive processes and procedures* – Here my special focus has always concerned creativity, especially as conceived in terms of combinatorial models (Simonton, 2017). Those models have been integrated with the "blind-variation and selective-retention" theory first advanced by Donald Campbell (1960). These efforts resulted in a series of theoretical and empirical articles extending from 1985 to the present day (e.g., Simonton, 2007, 2011, 2015).

2. *Individual differences in intellect and personality* – As previously mentioned, way back in 1976 I published a follow-up to Cox's (1926) investigation; her IQ estimates were used along with some new variables to re-examine the relation between intelligence and eminence (Simonton, 1976). Another follow-up much later added some of Cox's unpublished data (Simonton & Song, 2009). In addition, the intelligence-eminence relation was also examined using alternative definitions and samples, including European absolute monarchs (Simonton, 1984), United States presidents (Simonton, 2006b), and eminent African American creators and leaders (Simonton, 2008a). Yet as Cox herself demonstrated, personality variables are just as critical as intellectual variables, and so I have also examined their operation in the achieved eminence of both creators and leaders (e.g., Overskeid, Grønnerød, & Simonton, 2012; Simonton, 1986). Of special interest is the impact of psychopathology, the famed "mad-genius" hypothesis that dates back to Aristotle (e.g., Simonton, 2014c).

3. *Life-span development* – One of the unique features of historiometric research is the possibility of studying the lives and careers of high achievers from birth to death and every age between

(Simonton, 2014b). Not surprisingly, therefore, I have published numerous articles spanning developmental factors across the life span, including family background, education and training, career trajectories, and death. To be sure, some issues on this subject, such as genetic influences, require alternative methodologies. Galton's (1869) family-pedigree method is simply inadequate to the task. Thus I have also ventured into a mathematical model of talent development (Simonton, 1999b), a meta-analytic integration of behavioral genetic and psychometric research (Simonton, 2008b), and a proposed structural equation model that attempts to combine both nature and nurture (Simonton, 2014a). My extensive work on career trajectories – the relation between age and exceptional achievement – has probably had the biggest impact. My most cited journal article concerns this subject (Simonton, 1997).

4. *Sociocultural context* – The original reason why I wanted to pursue graduate studies at Harvard's Department of Social Relations was that it constituted a truly multidisciplinary unit, including not just personality, developmental, and social psychology but also sociology and cultural anthropology. Unfortunately, the year I was accepted, the department fell apart, sociology and cultural anthropology going their separate ways while the social psychology program into which I was admitted the Department of Psychology. Nevertheless, I did not let that circumstance prevent me from becoming familiar with sociological and anthropological perspectives on genius, creativity, and leadership. Nor did that breakup prevent me from devoting my career to studying larger forces operating at the level of nations and civilizations (Simonton, 2019). For instance, I have investigated the impact of political factors such as fragmentation, instability, and warfare as well such cultural influences as religion, ideology, and openness to outside civilizations. I have also examined underrepresented groups within a sociocultural system, that is, both women and minorities (e.g., Damian & Simonton, 2015; Simonton, 1992).

My best work in each of all four of the above categories has received special awards and honors. For example, three of my publications in the individual-differences category were honored with the Mensa Award for Excellence in Research (viz. Simonton, 1985, 2008a; Simonton & Song, 2009). My most frequently cited journal article, mentioned earlier, earned the George A. Miller Outstanding Article Award from Division 1 of the American Psychological Association (APA). Furthermore, several of my more ambitious publications, which attempted to integrate findings across all four categories, have also attained major recognition, such as the William James Book Award (Simonton, 1999a) and the Theoretical Innovation Prize (Simonton, 2003) from APA's Divisions 1 and 8, respectively. Not bad for somebody whose research might not have been publishable in decent journals!

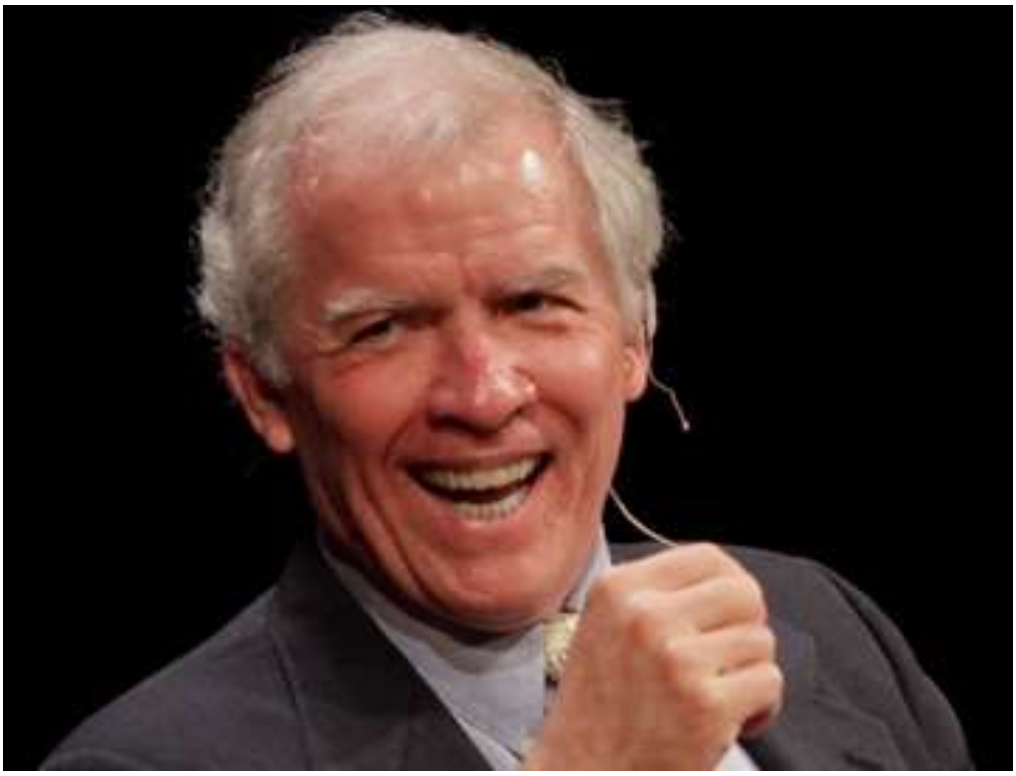
TSY: What knowledge would you wish researchers in this field to have?

DKS:

Well, most obviously, the phenomena of genius, creativity, leadership, and talent not only feature extremely complex relationships, but also each phenomenon is an intricate consequence of a host of cognitive, individual difference, life-span developmental, and sociocultural variables. That's why I have always felt obliged to examine these phenomena from as many different perspectives as possible, plus applying a variety of research methods along the way. And even my research program fails to represent all of the possibilities. For instance, I have not conducted any studies in the cognitive neurosciences. That's not because I have no interest – I studied that approach in both undergraduate and graduate school – but rather there's only so much one can do in the course of a career. At least I compensated by devoting much more effort than the norm to investigating sociocultural factors, doing so ever since my doctoral dissertation.

The above assertion then leads to a critical corollary: If a very large number of variables contribute to exceptional achievement, then any one variable can only account for a tiny portion of the phenomenon. This lesson is too often forgotten by zealous researchers who seek one-variable explanations that purport to do it all, or almost so. Perhaps the most striking illustration concerns attempts to explain high accomplishments in all domains solely in terms of what has been styled

"deliberate practice" (Ericsson, Krampe, & Tesch-Römer, 1993). This one-sided account is specifically directed against any notion that "innate talent" might have anything to say in the emergence of giftedness and genius. Yet despite more than a quarter-century of research, it is now increasingly clear that deliberate practice, though almost always important to some degree, most often explains much less than half of the variance (Macnamara, Hambrick, & Oswald, 2014). Of course, genetic endowment has a partial say.



TSY: Can you please explain some of the strengths and limits of "Gifted Education?"

DKS:

Because I do not work in the trenches, nor even conduct scientific research specifically aimed at gifted education, this question is the most difficult of all to answer. First, I think the main strength of gifted education is that it exists at all. It reflects a society's values in that it is willing to invest in the future of its most promising children, to help them cultivate their fullest potential. Second, the main limit is the lack of resources and of sufficient knowledge to implement these values. Not only are budgets tight almost everywhere, but there exist inherent difficulties in the equitable and valid identification of prospective talents. For one reason or another, too many are left out.

I've actually experienced both ends of this latter problem. On the one hand, I was once identified as scientific talent for a summer enrichment program called "Junior Research Science" run by the Los Angeles school system in California, where I grew up. It was a central educational experience in my path to becoming a scientist. On the other hand, I also qualified for an accelerated class for the mathematically gifted, but it received insufficient funding, leaving me stranded. So instead I was placed in a regular math class appropriate for my age group, which in effect meant that I was expected to learn over again what I had already learned. I just lost interest because the material was so unchallenging. Instead of getting my usual top grades – normally I competed for the best grade in the class – I fell into the middle of the pack. I remember having a tense interaction with the teacher who was frustrated by my lack of effort. Even though I'd score excellent grades on the tests, my performance on the numerous assignments left much to be desired. So he said "You should be getting A's on all of your homework. After all, it's the exactly the same material you did so well on last year." My response was simply, "That's precisely why I'm doing so poorly now!" I just wanted to pass the

class. That was my only motivation. If the school cared so little for my math education, why should I care? I had already learned what I had to learn and my time could have been used more constructively rather than doing meaningless problem sets.

TSY: What are your plans for the next year?

DKS:

This question comes at an unusually pivotal point in my career. I have always been a highly prolific researcher, averaging about a dozen publications per year since my career's onset in 1975. Yet after retirement in 2016, a number of unexpected events, both personal and professional, recently inspired me to press the pause button on that level of output. That pause would give me the leisure to figure out how to use optimally whatever years remain to make the contributions I would most like to make in the field.

The most obvious of these events is the Covid-19 pandemic. In 2019 I delivered seven talks, including one at the Karolinska Institute in Stockholm; yet all invited addresses planned for 2020 had to be cancelled or postponed. In fact, at one such presentation I was to be honored with the 2019 Mensa Lifetime Achievement Award, which by custom is bestowed in person, with appropriate ceremony. The event was scheduled by the Research on Giftedness, Creativity, and Talent SIG (Special Interest Group) for the American Educational Research Association meeting in April of 2020, but no such luck! Eventually Mensa just gave up, and sent the award to me by snail mail without any formal presentation!

Yet aside from this worldwide misfortune there are other problems facing only the academic realm. For example, conflicts over sustainable publication models have led to some drastic changes. In the case of the University of California system, where I am an emeritus professor, the decision was made to no longer provide its faculty and students with access to Elsevier's scientific journals. All subscriptions were just terminated despite the fact that it's one of the leading publishers in the world. To be sure, current articles most often remain available via direct requests to their authors, or sometimes through some service like ResearchGate, yet the whole process of doing "library research" has become more cumbersome and often expensive.

A more serious change in recent years is the increased politicization and polarization of academic research. The security of "ivory tower" scholarship has gone by the wayside. Let me provide one recent example to which many *IJTDC* readers can easily relate. The *Gifted Child Quarterly* (*GCQ*), which is the official publication of the National Association for Gifted Children (NAGC), sent out a call for articles on Terman's (1925-1959) *Genetic Studies of Genius* (https://apadiv15.org/2019/02/14/call-for-manuscripts-special-issue-of-gifted-child-quarterly/). The special issue was to be edited independently of the regular journal editors, and with the editorial independence expected for such issues. After the submission, evaluation, and revision cycles were all completed, the special issue was scheduled for publication in October 2020 along with an introduction by the guest editors. My own contribution, which focused on Cox's (1926) second volume, had even already appeared online (Simonton, in press). Then after protests arose over the issue (see https://www.nagc.org/issue-'un'-special-issue-points-reflection), NAGC decided to cancel the endeavor. Because the contributions had already been accepted, the authors would still get published in *GCQ*, but singly, and if possible only one article per issue (albeit that

provision was impossible to implement without cancelling a whole issue). The considerable efforts of the guest editors came to naught (but see https://psyarxiv.com/nh43b/). An opportunity to place Terman's monumental volumes in an updated scientific context was also lost. Ironically, judging from the table of contents of the revoked collection, that's likely also a loss for those who were opposed to the special issue.

As for my own plans in 2021 I hope to press the start button to examine some possibilities. But I imagine that the narrative will not follow precisely the same trajectory of the last 45 years. Right now I'm contemplating a magnum opus that puts everything together. The tentative title is **The Genius as the Creator of History: A Psychology of Civilization**. But who really knows what the future brings in these uncertain times?

TSY: You have been working with a number of scholars. Can you tell us some memories about these people?

DKS:

My work style is more that of a lone wolf. In fact, 93% of my publications are single authored. Hence, my main contacts take place at professional meetings of various kinds. For example, I first met Howard Gardner in 1990 at a Mini-Conference on Creativity held at Project Zero in Harvard's School of Education. Later in 2009 he and I delivered a joint E. Paul Torrance Creativity Lecture at the NAGC meeting in St. Louis. The topic was on "Larger than life: Exploring the lives of eminent creators," but instead of two formal presentations, we answered questions given us by Ann Robinson, who I think had been elected NAGC president that year. Later I contributed a chapter devoted to evaluating Gardner's *Creating Minds* (Gardner, 1993; see Simonton, 2006a). Finally, I added a piece to the *Festschrift* to honor his 70th birthday (https://howardgardner.com/2014/05/27/mind-work-and-life/). I also met Ellen Winner at that same Project Zero conference, though she wasn't one of the principal participants at the time. We met again in 1995 in an international conference on the acquisition of expert performance, where we represented a minority position. Almost everybody there had the opinion that innate talent doesn't exist, most notably Anders Ericsson and his students.

Interestingly, Ericsson's own mentor, the Nobel laureate Herbert Simon, was there as well. Simon and I got into an uncomfortable breakfast chat in which Simon insisted that the findings of modern behavioral genetics just cannot be believed! In any event, I later wrote an article for Winner's own *Festschrift*, reporting this (Simonton, 2020).

Let's get back to Anders Ericsson, who I also first met at that 1995 expertise conference. We ended up with a long history representing conflicting points of view on whether genius is born or made. Indeed, in 2006 he invited me to give a colloquium talk on that very subject at Florida State University, where he spent his career. Then in 2011 Ericsson and I had a more direct and public confrontation in an evening panel discussion on "10,000 hours: Does practice make perfect?" held at the Student Union at Pomona College. In truth, the most unpleasant part of that meeting was the dinner right before. Echoing his mentor, Simon, he insisted that there are no reliable individual differences in human abilities except what can be attributed to education and training. A few years later, in 2014, we published an exchange regarding creative expertise in the journal *Intelligence*. Despite our differences, we invited each other to contribute to our respective handbooks, his on expert performance and mine on genius (Ericsson, 2014; Simonton, 2018a). Unfortunately, I ended up getting the last word in our debates when I reviewed his book *Peak: Secrets from the New Science of Expertise* (Ericsson & Pool, 2016; see Simonton, 2016a). I say "unfortunately" because he passed away on June 17, 2020, at age 72. Because he and I were born almost exactly three months apart, and as I am also 72 as I write this paragraph, it makes me ponder all the more my own mortality – thus keeping that pause button pressed down!

Naturally, *Festschrifts* tend to evoke thoughts of a different kind of mortality, namely *creative* mortality – a postmortem examination of somebody's career as if it's done. So imagine my surprise when I became the subject of my own *Festschrift* at the 2019 Oregon Creativity Conference! Mark Runco, who I first met at a creativity conference held in 1988, put it all together, right before my keynote address. Although Howard Gardner and Ellen Winner couldn't attend the event, they co-authored an excellent commemorative letter. The panel members who could attend included younger colleagues, namely, Selcuk Acar, Ronald Beghetto, and Gregory Feist, as well as Teresa Amabile, who I also first met at that same 1988 conference where I met Runco. Amazingly, she had saved correspondence from decades earlier, and used it to do a thorough "roasting" of the panel's supposed honoree. Little did she know that I had already accepted an invitation to deliver my own talk at her *Festschrift* held at Harvard Business School only a few months later. But I was a bit nicer.

I guess it's best to stop here. It's dangerous to ask a senior colleague to recall memories from ancient episodes in their career! My apologies to all of the distinguished colleagues who I've known over the years who I didn't manage to fit within this brief interview.

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Interview (2):

Importing Conceptual Gemstones from Diverse Fields: An Interview with Interdisciplinary Scholar Don Ambrose

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Don Ambrose, *Ph.D.*, is professor of graduate education at Rider University in Lawrenceville, New Jersey, USA, and editor of the *Roeper Review*. He has initiated and led numerous interdisciplinary scholarly projects involving eminent researchers and theorists from various fields including gifted education, general education, creativity studies, cognitive science, ethical philosophy, psychology, political science, economics, law, history, sociology, theoretical physics, and critical thinking. Examples of topics addressed by the many books he has published include interdisciplinary explorations of creative intelligence; the moral-ethical dimensions of giftedness; 21st-century globalization and its effects on creative intelligence; innovative, holistic education for the gifted; and applications of complexity theory to high ability. Don serves on the editorial boards of many major journals in creative intelligence fields, and for several book series. He has won many international, national, regional, and institutional awards including the National Association for Gifted Children NAGC distinguished scholar award, the outstanding book chapter award from the American Creativity Association, and the ICIE creativity award. Books just published and currently under construction include *Conceptions of Giftedness and Talent* (with Robert J. Sternberg), a volume on *Transformational Giftedness* (with Robert J. Sternberg and Sareh Karami), and an exploration of *Creative Constraints* (with Catrinel Tromp and Robert J. Sternberg). Other books in development describe new creative and critical thinking strategies Don invented based on constructs from various academic disciplines. He has done invited keynote presentations throughout the world.

TSY: Can you explain what motivated you to enter the field of gifted studies?

DA:

Examples of exceptional creative intelligence started pushing me toward the field from an early age. I grew up on a farm/ranch in the Western Canadian prairies. Both of my parents were highly creative. My mother was artistic and wise. Whenever she had a spare moment, which was seldom, she would draw beautiful portraits of imaginary people. She was also exceptionally compassionate and altruistic to the point where kids would come to our home to get informal "counseling" from her. When this started we (her children) were somewhat annoyed because we mistakenly thought they were coming over to play with us. My father was highly inventive. He had to keep a variety of large, complex machines running (tractors, cultivators, combines, etc.), and whenever

they would break down he would come up with Rube Goldberg-like inventions to get them working again. Decades earlier, his dad had transitioned from being a Grenadier Guard at Buckingham Palace to an immigrant homesteader in the Canadian prairies. He had to invent ways to survive in this new role. One of his inventions was a piece of farm machinery that he used to enhance his own productivity. Someone else "invented" the same machine a couple of decades later and it became widely used after that.

My brothers Clint, Ray, and Doug demonstrated impressive mechanical talents. Those talents certainly bypassed me. My sister Kathy developed very strong interpersonal and organizational abilities. Later, my wife Ann turned out to be an excellent example of Robert Sternberg's (2005) practical intelligence. She generates extremely well-conceived practical plans for the solution of complex problems.

Our children round out the story of family giftedness. Our son Brian combines philosophical wisdom with brilliance in technological innovation as well as college-level athletic coaching expertise. Our daughter Valerie is an outstanding college instructor who inherited the wisdom and compassion of my mother. Her husband Todd is a highly intelligent urban planner with a diverse academic background including expertise in business and the natural sciences. And last but certainly not least, little four-year-old granddaughter Sienna is very bright, immensely imaginative, and speedier than an Olympic sprinter. In my childhood, these family examples sensitized me to the presence of brilliance in others, and they continue to do so today.

When I went to graduate school seeking advanced expertise in leadership I worked with scholars of giftedness and creativity who shifted my direction toward gifted studies. The tipping point of my transition toward this field came when I took a graduate course, "Theories of Creativity," which required us to read large volumes of scholarly material on creativity each week and come back the following week with it turned into visual metaphors (drawings or paintings with the symbolism representing academic concepts). As an amateur artist, I thrived on this process.

My brilliant doctoral advisor, LeoNora Cohen, was the course instructor. She also was the organizer of several international theory summit conferences that brought together over 20 of the world's top creative intelligence researchers at a resort setting near the summit of Mt. Hood, Oregon with the purpose of unifying theories of creative intelligence. The participants included eminent psychologists and philosophers, a pioneering neuroscientist, an economist, a theoretical physicist, and representatives of other fields, so it was an interdisciplinary group.

That posed a problem. They had to understand the work of their collaborators but they didn't have the time to study all the concepts and terminology in diverse fields. So Dr. Cohen came up with a solution. She asked me to be an "interdisciplinary, theoretical translator" who would read articles produced by all of the participants and turn the work of each member of the team into a visual metaphor, with the symbolism in the drawings representing the key ideas, theories, and research findings. So I produced large drawings with brief story-like legends and bullet points describing what the symbolism in the images represented in terms of research and theory. We posted these images around the conference rooms as if in an art gallery so the participants could wander around during breaks, look at the drawings, read the legends, and get familiar with the work of their peers. This helped streamline the idea -sharing by making concepts from diverse fields more available to all of the participants. Figure 1 shows an example of a visual metaphor with a brief, bullet-point description of the meaning in the symbolism. A more extensive description of the symbolism would provide more detail about the research findings and theories from the academic literature that are embedded in the image (for more on visual metaphor see Ambrose 2009b, 2016a; 2021a).

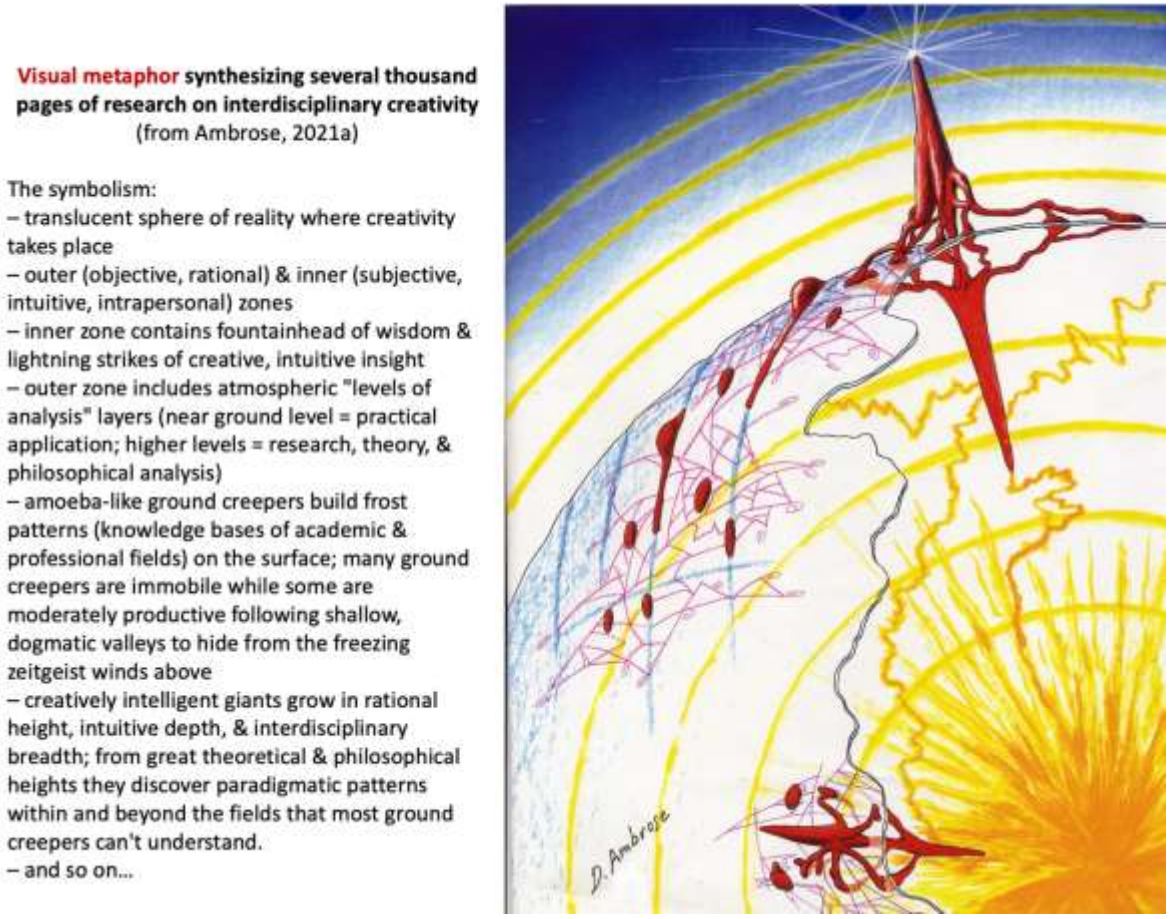

Figure 1: Example of a visual metaphor with explanation of the symbolism. From Ambrose (2021a).

Some of the theory summit scholars thought the visual metaphors were very helpful while others thought they were useless. But for me, this was a major, transformative event because it pushed me toward interdisciplinary scholarship. I love the idea of discovering concepts in diverse fields and pulling them together, and I've been doing that ever since.

TSY: When did you start working in this field?

DA:

If we interpret the term "work" loosely I've been investigating giftedness and talent since I was old enough to read books and articles about creativity and invention. In terms of real work, I did

some practical development and implementation of gifted programs in Western Canadian school systems while starting formal research into creativity and giftedness in graduate school.

TSY: What kind of major challenges did you face?

DA:

Growing up in the prairies provided some significant barriers, as well as advantages. One barrier arose from academia being so far away. After graduation from high school I worked as a laborer in pipeline construction, which entailed hard, physical work for 17 hours a day, 7 days a week. So scholarship pertaining to creative intelligence was invisible, far over the horizon.

After that, I went to college and worked for a while in the K-12 education system, mostly as an administrator; consequently, I got a late start working at the college level. Virtually all contemporaneous researchers in creative intelligence fields were halfway around the academic track before I got off the starting line. But that also represented an advantage because my work in the real world, especially as a laborer on the farm and in construction, enabled me to see giftedness, creativity, and talent in places that others usually ignore. For example, while most associate giftedness with lofty positioning in academic settings I also see it in deprived populations. One example was a heavy equipment operator in one of the construction sites where I worked. The operator maneuvered his gigantic machine like Michelangelo used his sculpting tools to create the famous David statue. While the construction worker never would have been considered for a gifted program, he had strong intuitive and aesthetic sensibilities that made his work "artistic" and immensely effective. He also was an outstanding mentor. Meanwhile, I've come across a lot of "gifted," elite legacy admissions who consider themselves brilliant even though they are rather dull-witted. So my unusual start enabled me to develop some ironic comparisons between "nongifted brilliance" and "gifted mediocrity" (see Ambrose, 2021b for elaboration on these distinctions).

Another major barrier, which persists to this day, is the tendency for scholars to confine themselves within the knowledge bases of their fields. When I started working in higher education I was advised to choose a research trajectory that was clearly defined and limited to a particular area of the conceptual terrain in the field. Going beyond that limited patch of territory would endanger my chances for promotion and tenure, as well as the chances that I would be able to influence the field. Of course, I ignored that advice and wandered out into the conceptual terrain of scores of disciplines, looking for conceptual gemstones that could be brought back and integrated into creative intelligence fields.

TSY: How did you become involved internationally?

DA:

Collaboration with the aforementioned theory summit participants kickstarted my international adventures. After that, the international explorations accelerated while I initiated and produced edited book projects, journal articles, and then started journal editing. For example the *Roeper Review* has become more international over the years, so now about half of the articles submitted come from outside the USA. After building a track record of interdisciplinary scholarship, I began to receive invitations to do keynote presentations in various parts of the world (Europe, Middle East, Australia, New Zealand, South America, throughout North America, etc.). Interacting with leading scholars in these venues led to more international collaborations.

TSY: Can you please describe some of your notable accomplishments?

DA:

Virtually all of my work in the field revolves around the aforementioned interdisciplinary exploration with emphases on big-picture thinking and ethical awareness. Most of my collaborative book projects involve prominent scholars of giftedness and creativity who are asked to analyze large-

scale issues and phenomena through the lenses of their impressive knowledge bases. But the projects also include contributions from "outsiders" and the importation of theories and research findings from outside fields. The outsiders are prominent researchers and theorists from diverse fields, many of whom seem to have little or no connection to gifted studies.

In one example (Ambrose & Cross, 2009), we explored the moral-ethical dimensions of giftedness and talent development by pulling together insights from leading scholars of giftedness and creativity, along with analyses from prominent researchers and theorists in military history, political philosophy, legal studies, economics, critical thinking, and theoretical physics. Another book described the rare, immensely valuable moral-ethical contributions of the Roeper School in Michigan (Ambrose, Sriraman & Cross, 2013). This unique, laudable school for the gifted emphasizes holistic development with special attention to ethical awareness, so the graduates go on to do powerful, altruistic work in the world, while developing strong intellectual capacities and talents, and becoming self-actualized.

Other book projects have involved leading scholars of creativity and giftedness in explorations of large, difficult contextual issues that constrain or distort the development of creative intelligence. For example, I worked with Robert Sternberg and Bharath Sriraman on the development of edited books on dogmatism, which arguably is the world's biggest problem because it causes most of our other problems (Ambrose & Sternberg, 2012; Ambrose, Sternberg & Sriraman, 2012). Dogmatism is any blend of narrow-minded, shortsighted, superficial, rigid thinking. It is the primary force behind climate change, the erosion of democracies and the ascendance of totalitarianism, ethnic conflict up to and including genocide, and a daunting array of other devastating conditions. Gifted, creative minds easily can be trapped within dogmatic thought frameworks and when this occurs severe damage is the result, because a brilliant, self-deceiving, evil mind can produce enormous harm.

In other examples, Robert Sternberg and I collaborated on two edited books dealing with the impact of 21st-century globalization on creative intelligence (Ambrose & Sternberg, 2016a, 2016b). We determined that humanity needs to make a significant leap forward in cognitive evolution and ethical awareness to address the effects of globalization; otherwise, we will find ourselves in the "Hobbes trap." Thomas Hobbes was a pessimistic 17th-century philosopher who claimed that humans left to their own devices would create lives for themselves and for others that are poor, nasty, brutish, and short (1985/1651). Without this evolutionary leap forward, the misery of the Hobbes trap will be our fate. Arguably, events in the year 2020 and 2021 suggest that we are well on our way into the trap because authoritarian populism is on the rise around the world, leaders in large parts of the world have not dealt effectively with the coronavirus pandemic, mass extinctions are underway, and climate change is ramping up wildfires and hurricanes while producing a climate refugee crisis. These books on 21st-century globalization were attempts to elevate the thinking of professionals and policymakers above everyday mundanities so that they could help bright young minds adapt to the complexities of today's world.

Other book projects have dealt with more specific topics derived from outside disciplines. For example, in one project we explored ideas from complexity science, which is an interdisciplinary field addressing the structure and dynamics of complex adaptive systems (Ambrose, Sriraman & Pierce, 2014). Just one example of an insight derived from this project is the way in which complex systems such as intelligent human minds can be trapped within excessive order, or excessive chaos, or find their way into a highly productive zone of complexity produced by the dynamic tension between chaos and order. Among the many implications for giftedness and creativity are the injection of more choice and freedom into excessively ordered instructional environments, and more creativity producing constraints into excessively chaotic classrooms.

Another book, which wasn't a collaborative effort, exemplifies what I am attempting to achieve through interdisciplinary work. In this book (Ambrose, 2009a) I analyzed 87 theories and research findings from 29 academic disciplines and professional fields, and connected them through the process of creative association to show how a concept from one field can influence a concept in

another field. For example, in one of the 87 conceptual syntheses I connected the concept of root-metaphorical world views from linguistics and philosophy with theories about the gylanic pockets in prehistory and patriarchal conquests described by feminist theorists. The four root metaphors (mechanism, organicism, contextualism, and formism) are conceptual lenses for the perception of reality (Ambrose, 2016a). For example, if you are a mechanistic thinker you strongly favor reductionism and see everything as machinelike, including the human mind. But if you are an organicist you perceive holistic-systemic-integrative connections while resisting reductionism. The connection I made between these concepts is the idea that entrapment within excessive mechanism prevents a more balanced view of creative intelligence from emerging. That balanced view would blend together insights from the four worldviews, as seemed to be the case in the more feminist societies that emerged in some locations in the ancient world. A realization like this could help us bring more ethical creative intelligence into 21st-century societies.

In addition to these and other book projects, I've been moving the field toward more interdisciplinary thinking through book chapters, journal articles, keynote presentations in many locales, and my editorship of the *Roeper Review*. Many of the publications and presentations explore events, phenomena, and large-scale contextual forces that are revealed by scholarship in diverse disciplines and then establish implications for the development of giftedness, talent, and creativity. For example, while investigating various 21st-century issues, I show how democracies can strengthen or erode, and discuss the need for the gifted to become more aware of democratic erosion and its pernicious effects (2019c; for some other examples of interdisciplinary explorations of creative intelligence see Ambrose, 1996, 2006, 2011, 2012a, 2012b, 2015, 2016, 2017a, 2017b, 2018, 2019a, 2019b).

As for the editorship of the journal, we've run special issues along these lines. For example, one special issue on the neuroscience of giftedness included insights from leading cognitive scientists on the optimal functioning of the brain-mind system (Kalbfleisch, 2008). Another brought insights

from diverse disciplines into analyses of the impact of socioeconomic inequality on giftedness (Cross & Borland, 2013). Another way I bring interdisciplinary thinking into play is through a very brief section in the introduction to each issue of the *Roeper Review*. I conclude each Editor's Desk introduction with a description of a research finding or theory from an outside discipline and its possible implications for giftedness, talent development, or creativity.

Yet another development in the *Roeper Review* is the inclusion of an "ask the expert" feature in each issue. This feature pulls together the aforementioned domain-specificity and interdisciplinary thinking. Each interview delves into the knowledge, skills, motivations, and experiences of a highly accomplished domain-specific expert. The interviewees have included a Hollywood movie videographer, federal judge, nuclear engineer, ecotoxicologist, artist-restaurateur, ecological economist, entrepreneurial lighting designer, Olympic gold medalist figure skater, orchestra conductor, pediatric cardiologist, psychiatrist, mathematician, president of a leading academic publishing company, and Pulitzer Prize winning New York Times journalist, among others. Readers can appreciate the nature of domain-specific expertise while also expanding their thinking beyond the borders of our field.

TSY: Can you please explain some of the strengths and limits of "Gifted Education?" What do you wish that the researchers in this field would know?

DA:

Having served as a journal editor for 15 years, I'm well aware of the conceptual landscape of the field. The scholars and practitioners have done a lot of impressive work in a wide variety of areas including theory development, research trajectories, and practical innovations.

Of course, as with any field, there is considerable room for improvement. For example, there is a need for more connection making among levels of analysis. I've used the term *telescoping* to signify making more connections to the ability to navigate through four levels of the field, which include practice, research, theory, and philosophy (Ambrose, Van Tassel-Baska, Coleman & Cross, 2010). I metaphorically portrayed this as traveling from the ground level of practical work (e.g., practitioners tilling the practical "soil"), up to the level of research (e.g., surveyors using their theodolites to analyze the conceptual terrain), to the level of theory (e.g., groups of practitioners and researchers following theoretical leaders into new conceptual valleys), and finally the level of philosophical analysis (e.g., surveying the terrain from various philosophical mountaintops).

The higher levels of telescoping provide panoramic views of the field but they lack awareness of detail, and the reverse prevails at the lower levels. If we can get professionals in our field to make more connections throughout these levels of analysis they will be less likely to become trapped within one level. For example, theorists won't cling dogmatically to a single perspective, and practitioners will be more open to new ideas about curriculum and instruction.

Another area that needs improvement is attention to the aforementioned interdisciplinary connection making. Doing interdisciplinary work always has been important but it has become more so in the 21st-century. For example, a past president of the National Science Foundation in the United States argued that the new way of doing science entails international, interdisciplinary collaboration (Suresh, 2013, October). Other prominent scholars outside our field also have magnified the importance of interdisciplinary idea sharing (e.g., Morson & Schapiro, 2017; Nielsen, 2011; Page, 2017; Root-Bernstein, 2014).

But interdisciplinary work shouldn't be confined primarily to STEM. Fields addressing creative intelligence should be promoting it more vigorously because the relevant phenomena are not confined within the borders of psychology or education. Unfortunately, there are some countertrends working against it. Both the fields of gifted studies and creativity studies, which overlap to some extent, have strong arguments for domain-specific expertise influencing their direction (see Baer, 2015; 2016; Olszewski-Kubilius, Subotnik & Worrell, 2017; Subotnik, Olszewski-Kubilius & Worrell, 2011). The work on domain specificity is important and valuable; however, it can push the minds of

professionals in toward silo thinking. An academic discipline or professional field can become a silo, insulated from outside knowledge. If work on domain-specific expertise encourages us to value knowledge -building within our field it can incline us to confine our thinking within the walls of our own silo.

Fortunately, such confinement doesn't have to occur. We can invigorate domain-specific expertise while also engaging in interdisciplinary exploration. In a recent paper I metaphorically portrayed this as navigating through "Creative Intelligence City" with work inside the walls of high-rise buildings representing the development and use of domain-specific expertise, and traveling throughout the city to visit and connect the various domain towers representing interdisciplinary exploration (Ambrose, 2019b). We can and should do both.

If we travel throughout *Creative Intelligence City*, here is just one of thousands of concepts that can be pulled from other domain towers into the gifted studies high -rise to enrich our thinking. A leading geologist argues that 21st-century societies are plagued by "chronophobia," which is a tendency to think in the short term only and ignore long-term phenomena and their implications. A society suffering from chronophobia is metaphorically trapped on "the island of now" with bodies of water separating it from the long-range future and past (Bjornerud, 2020). Consequently, decision making is dominated by short-range priorities and the society suffers in the long run. The results are gigantic 21st-century macroproblems such as climate change and resource shortages (for elaboration on macroproblems see Ambrose & Sternberg, 2016a, 2016b).

TSY: What are your plans for the next year?

DA:

I have a lot of projects underway. Along with a couple of colleagues, Robert Sternberg and I have been working on three books, one published just now and the other two likely to come out in 2022. We just completed the edited book *Conceptions of Giftedness and Talent*, which includes insights from many of the leading creative intelligence scholars from around the world (Sternberg & Ambrose, 2021). In another book we are inviting leading researchers and theorists to develop ways to push the field away from transactional giftedness toward transformational giftedness (Sternberg, Ambrose & Karami, in press). The former entails developing one's talents for one's own benefit while the latter means developing and employing one's abilities for the betterment of the world. Given the threats that come from the aforementioned gigantic 21st-century macroproblems, transformational giftedness is desperately needed in the world's socioeconomic and political systems so that humanity can survive and perhaps thrive in the decades to come. The third editor of this book is Sareh Karami, an up and comer who has developed highly creative perspectives on wisdom. In another book, Bob and I are collaborating with Catrinel Tromp, a visionary psychologist at my university who is an expert on the ways in which constraints can strengthen creativity. We are producing a book on the nature and dynamics of creative constraints (Tromp, Sternberg & Ambrose, in press).

Another project that is consuming much of my attention has to do with new creative and critical thinking strategies. Throughout my interdisciplinary explorations I keep discovering theories and research findings that can be turned into new strategies. Consequently, I've been pulling these strategies together into a volume that is nearing completion (Ambrose, 2021a). So far, the book includes 54 creative and critical thinking strategies. About half of them are strategies that others have created and used within and beyond education to strengthen the workings of the human mind. I've developed new insights about the use of these strategies. The other half of the book comprises strategies I've invented. I provide a brief overview of each strategy, outline its step-by-step process, give examples of its application to various topics, and suggest the best ways it can be used to strengthen student learning and professional problem-solving.

Here are brief descriptions of the nature and purpose of a few of the new strategies:

- *Undermining Your Own Position.* Few of us can escape our own dogmatism; however, those who are willing and able to seek evidence that undermines their own positions on issues can

develop new, refined, more accurate, and more powerful perspectives. This enables them to become stronger, more authoritative experts.

- *Panoramic Timeline Impact Analysis.* Map an ongoing, long-term phenomenon onto a vertical timeline showing beneficial and harmful effects of the phenomenon over years, decades, or even centuries. The positive effects appear in a line graph extending to the right of the timeline and the negative effects extend to the left. Conclusions can be drawn about the overall consequences of the phenomenon.
- *Moral-Legal Overlap Analysis.* Mapping human actions, individual or group, onto a graph with the horizontal dimension showing a continuum from illegal to legal and the vertical dimension showing a continuum from immoral to moral. The process recognizes that legal systems in nations don't always align well with morality and ethics. For example, an illegal action can be ethical and a legal action can be immoral. Productive arguments can ensue about where a particular action should be placed.
- *Merit, Earned or Unearned.* Categorizing individuals or groups according to the extent to which their actions in the world are meritorious, unworthy, or psychopathic. The individuals or groups can be identified as cases of earned merit, unearned merit-slothful incompetence, or unearned merit-psychopathic predation. The strategy enables us to more accurately determine the presence of impressive ability and ethical, creative work in the world.
- *Personal Responsibility Determination.* Ideas about personal responsibility have shifted over time, making us more likely to be selfish. The deterioration of the concept of personal responsibility inspired this critical thinking strategy. Participants in the process analyze examples of behavior in the real world, literature, the professions, history, philosophy, and other arenas. They decide where individuals or groups end up on a personal responsibility continuum and consider the implications.

In addition to these examples, here are the names of some of the other new strategies: The Invention Machine; Metaphorical Analysis; Chaos-Complexity-Order Analysis; Worldview Analysis; Metapattern Analysis; Altruistic Analysis; Aggressive-Assertive-Passive Analysis; Macroproblem Analysis; The Continuum of Consent; Intellectual Spectrum Analysis; Visual Metaphor, Images of Wide Scope; and Artistic Story-Hypothesis Generators.

TSY: You have been working with a number of scholars. Can you share with us some memories about these people?

DA:

I've been fortunate enough to collaborate with many highly creative, visionary, ethical scholars within and beyond the fields of gifted studies and creativity studies. I've worked frequently with the eminent psychologist Robert (Bob) Sternberg. Some of our projects are mentioned earlier in this paper. Bob exemplifies creative intelligence. He comes up with new, high-impact ideas so frequently that it seems as if he is an entire university concentrated within one person. He seems to work 24/7, 365 days a year. I'll get up at 5 AM to share edits on a paper with him, only to discover that he sent me his own revision 2 hours earlier. In just one example of the intensity of his work, we were putting together a book project and I sent him a chapter I had received from a collaborator. Knowing that he was on a trip to Europe with his family I didn't expect a response for a few days. But I received his reaction to the chapter within an hour, and it was 4:30 AM where he was. He said he edited the paper as quietly as possible in the hotel room while trying not to awaken his family. Along with his great sense of humor, the thing I like most about Bob is his ethical awareness. Most of his recent work aims at creating a better world and making creatively intelligent minds more ethical.

Another highly ethical scholar is Tracy Cross. He and I have collaborated on multiple projects. Tracy has outstanding leadership skills. His brilliance, self-effacing demeanor, and terrific sense of humor make others want to listen to his ideas and follow his advice. Jennifer Reidl Cross, Tracy's better half and another frequent collaborator in many of my projects, also does highly impressive, creative, visionary, ethical work in the field.

The leaders of two influential, impressively ethical organizations also come to mind. Taisir Subhi Yamin, General Director of the International Center for Innovation in Education, has done much to spread knowledge about ethical creative intelligence around the world. He has done this through a wide variety of leadership initiatives and the production of many books, journal issues, and other publications. One other thing that really stands out is his willingness and ability to promote ethical giftedness and creativity in dangerous parts of the world that have been plagued by large-scale conflicts and the aftermath of foreign invasions.

A group of scholars from the University of Winnipeg in Canada also has carried out a considerable amount of important, ethical work around the world. Through their Lost Prizes initiative they have discovered and developed impressive talents in deprived, troubled, often incarcerated young people, while showing the rest of us how to do the same. Ken McCluskey stands out as a leader of this group which includes many other visionary altruists such as Karen Magro, Andrea McCluskey, Ken Reimer, Alan Wiebe, Phil Baker, John Anchan, Joe Goulet, Kevin Lamoureux, Kari McCluskey, and Chris McCluskey.

Finally, LeoNora Cohen (mentioned earlier in this interview) was my advisor when I was a doctoral student, and we collaborated on various projects after I entered higher education. Nora is an inspiring, immensely creative individual who has transformed many minds for the better, mine included.

If I've done anything of value in my career it's primarily due to the strong, positive influences of these intellectual and ethical giants. My admiration for them is boundless.

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Profiles of Creativity:

Lynn D. Newton

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Lynn D. Newton, *MA(Ed.), PhD.,* is a lecturer and researcher at Durham University and she is also the Head of the School of Education. Her academic interests relate to teaching and learning in primary schools, particularly in the areas of science education and in how to encourage learners to understand and think creatively about science. She was one of the Durham authors of the report for the Durham Commission for Creativity in Education (James *et* al, 2019) and is involved in the second phase of the Commission's work, currently underway. She has published a number of books and papers on creativity over the past decade or so, including *Creativity for a New Curriculum: 5-11* (Newton, ed., 2012), that addressed the challenges of thinking about creativity in all disciplines of the National Curriculum for England, not just in the arts subjects.

Durham University
School of Education

Being a learner

I think my academic interest in creativity, and teaching for creative thinking in particular, began about 15 years ago, but it was more of a natural development from previous research into teachers' questioning, understanding and problem solving in science. But perhaps even these weren't the starting points. Before came my own experiences as a learner and as a teacher and the opportunities that fostered creative thinking were probably there from a very early age.

The starting point was possibly my curiosity about the world around me. I know that my interest in science, and particularly in biology, began when I was very young. I grew up in a small rural village with countryside around me to explore. I recall clearly one particular infant school teacher who regularly took us on nature walks to investigate the hedgerows, fields and streams near our school. She encouraged us to look carefully at things, draw them and talk about what we saw as things changed through the seasons. She taught us the names of common plants and birds, but knowing the names wasn't enough. I wanted to know more. The first prize I was awarded in the primary school was an *Encyclopaedia of Nature.* Since we did not choose our prizes, I think my teacher summed me up well. I know I was a pest, always asking questions and wanting to know why things were as they were. My father did his best to answer my questions, although usually by turning them on their head and

asking me about what I already knew and how we could find out what I didn't know. My father wasn't a teacher – he was a mining engineer – but his approach stayed with me and is one I used myself when I was a teacher in schools and I still use it with undergraduate and PhD students.

As an only child, I often had to entertain myself but I loved reading and making things so this was not a problem. I learned to sew, knit, cook and bake. I played with construction kits like Lego™ and Meccano™ and I helped my father in the garden and in his garage, where I learned to handle tools. There were also lots of books at home: encyclopaedias and books on mathematics and science, world history and geography. As I grew older, I began to use these as reference sources. I also knew from a very early age I wanted to be a teacher.

I attended a very traditional Grammar School and here began my appreciation of great teachers who encouraged understanding and made explicit the relevance of what was being learned as opposed to those who simply pushed you to learn because it might be on the exam papers. Although I doubt I was aware of it at the time, constructs such as creative thinking, understanding, and critical engagement must have been growing in my adolescent brain. What I did know was that I did not like simply trying to rote learn things. I needed explanations about how things worked and opportunities to try things for myself. Although I enjoyed subjects like art and history, I loved doing the practical work in the science subjects, so it was inevitable that I would go on to study the sciences – Biology, Chemistry and Physics - at the Advanced Level.

For whatever reason, I ended up with a place at university to read Biochemistry. This was never going to work for me so I soon changed track and began to study Education with Biology. Without doubt the highlights of my degree were when we were active and doing things, especially the biology laboratory work and the fieldtrips. For me, the practical activity was so very much more important than just reading about something or listening to someone. Alongside the biology, I was studying aspects of education in preparation for becoming a teacher. After four years at university, completing my degree and gaining qualified teacher status, I began a career as a teacher. I know my Biology tutor was very disappointed that I did not want to stay on at that time to do research. At the very least, he felt I should go into secondary schools and teach biology. But I wanted to teach children, not subjects. So I went into a primary school and thoroughly enjoyed being a primary teacher.

Becoming a teacher

My first head teacher said that he appointed me for my science expertise and, as the school coordinator, I not only planned the school's science curriculum but also taught science with all children in the school, from the 4-5 year olds to the 11 year olds. Working with my husband, Professor Douglas Newton, we designed and had published a series of workcards for primary children that brought together the history of science and the primary curriculum, *Footsteps into Science*, published by Stanley Thorne. Each card focused on a scientist's life (e.g. Isaac Newton), a particular theme from his or her life (e.g. for Newton, that was light and colour) and then some cross-curricular activities that linked that theme to English, mathematics, art or other areas of the curriculum. I loved the way this integrated thinking brought ideas together, invited explanations and investigations, and applied ideas in new contexts.

I had already joined the Association for Science Education (ASE). I began to write for their professional journal, *Primary Science Review*, publishing ideas for teaching that I had tried in my own classroom. These were usually ideas that brought science and other curricular areas together. For example, one article described how to combine work on the Fibonacci series (mathematics) with an exploration of patterns in nature (science). Another discussed how to use the regular year by year growth of lichens (science) on gravestones in local churchyards (history, geography, mathematics) and reconstructing family life stories (English). It wasn't long before I was invited to speak at my first conference, the ASE annual conference which was that year in York. I was asked to talk about strategies to encourage children to record and communicate their science ideas and was told it would be an audience of about 30-50 primary school teachers. Imagine my horror to see the lecture theatre

full. I later learned there were over 200 people. But my talk was well received and I was now interested in the idea of bringing about change by raising awareness of alternatives based on research and practice.

Around this time, I was invited to join my local authority's advisory team as a primary science specialist. Initially, I had a seconded fellowship to develop learning resources for older primary pupils around the theme of *Plastics*. This was not the most exciting topic – creativity and imagination were definitely required on my part. These were also the days before the internet and Wikipedia so involved a lot of reading and practical work. The activities were primarily around ecology and the pollution caused by plastics, again using an integrated approach. There then followed a period helping teachers in primary schools to develop their school science curricula and demonstrating potential approaches.

Being an academic

My next step saw me move from working in schools to working in universities, where I have now spent over 30 years. I became a lecturer in primary science and technology education at Newcastle University, trained primary teachers, supervised their school placements and ran teacher development programmes in science and design technology (D&T). In the English National Curriculum these are two very different subjects, although in some countries D&T is treated as part of science –technology as science applied to solve problems.

The Head of Department at Newcastle, Professor Tony Edwards, encouraged me to register for a Ph.D. The topic I chose was *Teachers' Questioning for Understanding in Primary School Science*. With Tony as my mentor and supervisor, the next six years of my research life were mapped out exploring issues that brought together my interests. Using Johnson-Laird's mental model theory as my theoretical framework, I studied older primary school children and their teachers to explore the relationship between four different approaches used in the classroom to teach science: from a didactic information driven approach, to a totally practical work approach and two hybrid approaches in

between. Using three different science topics, I investigated the change in the learners' scientific understandings. Following this, I began to work with Doug (also an academic) on what teachers think counts as understanding in different disciplines. Together we gathered research data and published a number of papers, one for each area of the primary curriculum. At Newcastle I taught postgraduates and supervised doctoral students, and progressed through various teaching and administrative roles, including being Acting Head of School.

Then came the opportunity to work at Durham University, leading a new degree programme training teachers as primary science specialists. Working on this BScEd degree, I was able to bring together my knowledge and experience to support the development of the next generation of primary science specialist teachers.

Once again, I progressed through various teaching, research and administrative roles, leading teacher training and eventually becoming Head of School.

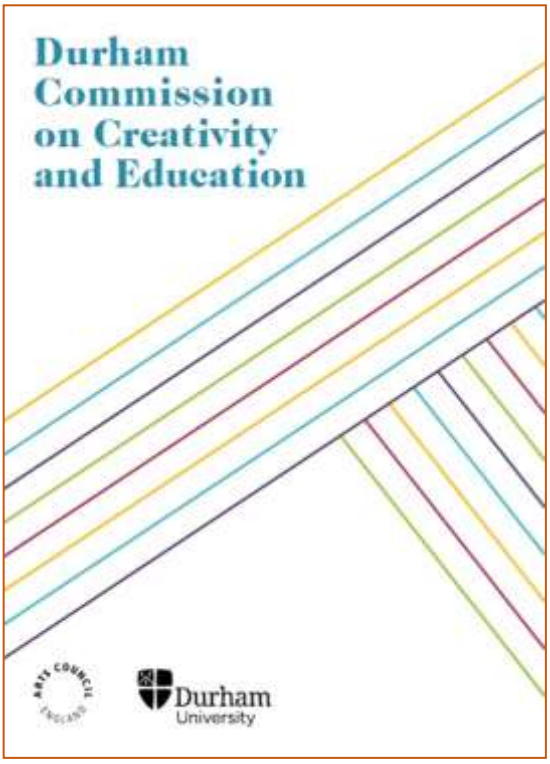
Doing research

My research began to shift more and more towards fostering creative thinking. Working with Doug and a research group of about a dozen colleagues (some academic staff from this and other universities and some doctoral students), we began to explore a shared interest in creativity. Reflecting our different subject specialisms, we collected data on primary teachers' notions of creativity in different disciplines. We identified their misconceptions, a general lack of awareness of opportunity to think creatively in disciplines other than arts, and major concerns about the assessment of creativity.

As a group, we published over a dozen papers and I produced a book that encouraged teachers to think about creativity in anticipation of the new 2014 (and still current) version of the English National Curriculum. In the book, *Creativity for a New Curriculum: 5-11* (Newton, ed., 2012), we worked our way through different areas of the curriculum with each chapter discussing first what research tells us about creativity in that subject and then giving ideas for effective practice.

The science part of this work was the first presentation I gave at an ICIE conference in Paris in 2008. The final full data were also the basis of a presentation at the ICIE Conference in Prague in 2013 and a summary was published as a monograph by ICIE (Newton, 2013). This was the beginning of my interesting and enjoyable involvement working with ICIE colleagues.

One of my doctoral students at that time (Dr Rebecca Chan, from Singapore - in the striped sweater in the picture above) was investigating very young pupils' drawings as a tool for assessing their ideas and creativity in science. Rebecca, with several other of my doctoral students, nominated me in 2013 for an award for *Excellence in Doctoral Supervision*, which was a great honour when I won. I still have doctoral students exploring aspects of creativity; one at the moment is looking at problem solving and problem finding in primary science; another is studying creative teaching; and a third has looked at engagement and creativity and has just successfully completed.



Most recently I have been involved in a major University collaboration with Arts Council England, a commissioned report on Creativity and Education which looked at the role that creativity and creative thought should play in the education of young people.

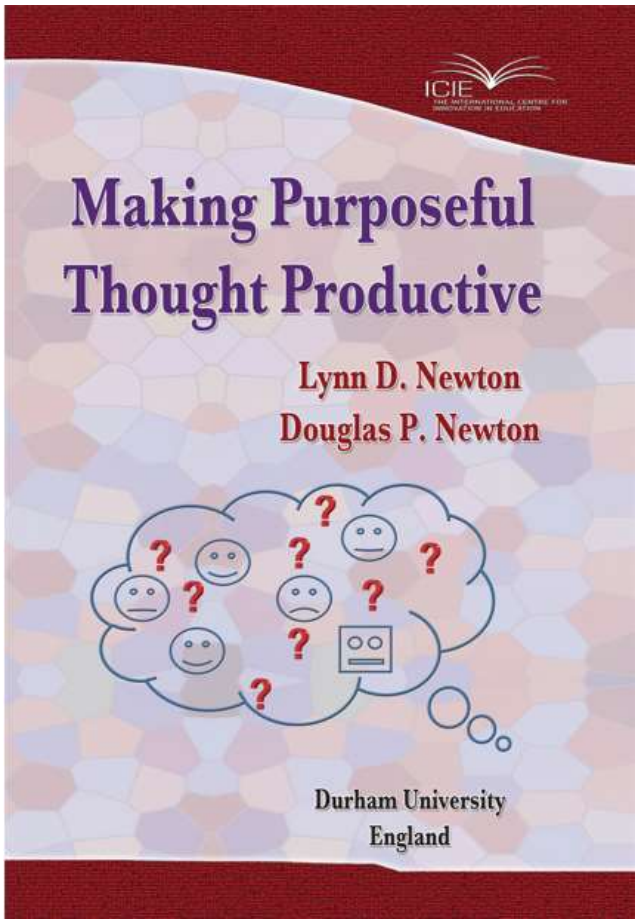
The collective knowledge of the Commissioners (Chair: Sir Nicholas Serota) has enabled the Commission to look beyond the immediate horizons of schools to the wider economic, societal and personal benefits of creativity. The Commission was convened in response to a growing consensus across business, education and public bodies that young people are emerging into a changing world in which they will need new skills and abilities to adapt when meeting extraordinary life-long challenges that require them to exercise creativity in their approach to life and work.

This has been demonstrated significantly in the current pandemic with its impact on families, schools and businesses. Over these last twelve months creative competence has become a pressing concern. The Commission explored the role of parents, creativity in the very early years, the place of digital technology in fostering creative thinking, and the impact of creative thinking on identity, mobility and wellbeing of young people. The report made ten recommendations and was launched in Westminster in November 2019.

Although the pandemic has slowed the implementation of some of the recommendations, I am still involved in developments and dissemination. I am working with a charity in Norfolk, *Into Opera*, to create and support internship projects to promote creativity in five primary schools in Norwich. This project is funded for two years and we have a programme of evaluation and teacher development. I am also acting as an adviser to several local authorities as they work to embed creativity in their schools. Within my own University, I gained funding to explore creativity within higher education disciplines generally, and within the STEM (science, technology, engineering and mathematics) curricula in particular. We are currently working on mathematics, but have already seen a book published on creativity in chemistry, a contract for one focussing on physics, and the biology version is in the planning stage.

My Head of School role leaves little time for teaching and research but I still do sessions on topics associated with creativity for our trainee teachers and convene a Masters' level module which I teach annually with Doug on *Purposeful Thinking*. About ten years ago we embedded our ideas from

across the years –work on questioning, understanding, creativity, emotions and thinking, and decision making - into a broader framework of purposeful, productive thought. We developed the module for our MA (Education) and MA (International) pathways and we have been teaching it to different groups since 2012. This module captures the essence of our holistic approach, presented in the book, *Making Purposeful Thought Productive* (Newton & Newton, 2018).



The module begins with an analysis of reproductive thinking (rote learning and memorization) and quickly introduces how to think productively. This includes how to teach for understanding; how to solve problems creatively; how critical evaluation can enhance the quality of thought; the relationship between emotions and thinking; and finally, how to think and to make decisions wisely. This year we include a focus on the impact of technology and artificial intelligence (AI) on purposeful thought.

I have had opportunities to work on creativity through some related projects that have arisen through international contacts. For example, the School of Education has for many years worked with the International School of Geneva (ISG), offering a PGCE (International) and a Masters' programme there. While in Geneva to work with our students, I gave several research seminars on creativity for the school staff. The ISG Director of Learning and Teaching at that time was Dr Conrad Hughes. He was working with Dr Clementina Acedo, the Director of the UNESCO International Bureau of Education, to develop principles for learning and competences for the 21st Century. I was invited to lead a staff development workshop on creativity and to contribute a paper on creativity as a 21st century competence to a special issue of the UNESCO journal, *Prospects* (Newton & Newton, 2014). I am also a member of the University of Utrecht's Creativity Consortium, joining the meetings and sharing ideas with like-minded colleagues. Participation in international conferences such as the ICIE conferences and the *Learning & the Brain* conference in Boston, USA which in 2018 focused on creativity, talent and potential, provide me with opportunities to take thinking into exciting new directions for me.

Looking back and looking forward

When I reflect on my own experiences across the years as both a learner and as a teacher, I see regular growth and change in my own ideas about teaching, learning and curricula. As we look back across the 20th century, we see educational systems that were designed initially to meet the needs of industrial societies and curricula that have emphasised particular types of skills, knowledge, understandings and attitudes. As we look forward in the 21st century, we have to ask, are these curricula still relevant? What will future adults need to know, understand and be able to do? If we have learned anything from the pandemic of the last year, it is that creativity and purposeful, productive thinking are crucial for adults of the future, those children in our classrooms today.

Here, in the School of Education, we recognise that training teachers as they used to be trained may no longer be fit for purpose. Apprenticeship models, in which trainees emulate practising teachers, no matter how good they are, are not in themselves sufficient. The world is changing so rapidly that tomorrow will not be like today. We have to future-proof our trainee teachers, so that they are flexible, adaptable and resilient, able to meet future needs and any demands for change they encounter. How can we ensure our trainee teachers of today can foster creative thinking in their classrooms of the future? I am encouraging the person in charge of our teacher training programmes to adopt this view and working with her to provide for teacher training that fosters not only teaching creatively but that fosters creative thinking across the curriculum. The UK government is introducing a new curriculum framework for teacher training and newly qualified teachers, the *Early Career Framework*. This is the beginning of what the government describes as the golden thread that is a teacher's progression from pre-service trainee teacher, through their early career, to being a subject or phase coordinator and eventually a senior leader. The skills, knowledge and understandings needed to follow this golden thread into an uncertain future are unclear. But for us in Durham, our golden thread is creativity – preparing our trainee teachers to teach creatively and teach for creative thinking.

For more experienced teachers, I am involved in the planning for and delivery of the first of the Creativity Commission's ten recommendations. This is the establishment of network of Creativity Collaboratives, groups of schools, colleges and universities, businesses, industries and cultural enterprises, parents, children and teachers all working together to embed creativity in the children's experiences. The schools collaborate with each other and with external partners to establish and sustain the conditions required for nurturing creativity in classrooms and across the school curriculum. This is not going to be easy – it will take effort and commitment.

My own secondary school's motto was *Nitendo Surgimus*, meaning "We rise by striving". But it can also be translated as "We grow through effort". I think this sums up my feelings about how creative thinking sits, as a very personal process, at the heart of purposeful, productive thought. And I still have my *Encyclopaedia of Nature* on my bookshelves, and look at it occasionally.

Lynn Newton - Publications on Creativity

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