The Blue Dot

Exploring new ideas for a shared future

TECH 2019

21st Century Learning Spaces

The BlueDOT

Exploring new ideas for a shared future

TECH 2019 SPECIAL ISSUE

THE BLUE DOT features articles showcasing UNESCO MGIEP's activities and areas of interest. The magazine's overarching theme is the relationship between education, peace, sustainable development and global citizenship. THE BLUE DOT's role is to engage with readers on these issues in a fun and interactive manner. The magazine is designed to address audiences across generations and walks of life, thereby taking the discourse on education for peace, sustainable development and global citizenship beyond academia, civil society organisations and governments, to the actual stakeholders.

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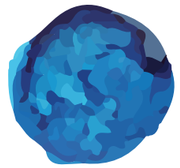


“Look again at that dot.
That’s here. That’s home. That’s us.

On it, everyone you love,
everyone you know, everyone you ever heard of,
every human being who ever was,
lived out their lives.
The aggregate of our joy and suffering
thousands of confident religions,
ideologies, and economic doctrines,
every hunter and forager, every hero and coward,
every creator and destroyer of civilization,
every king and peasant, every young couple in love,
every mother and father, hopeful child,
inventor and explorer, every teacher of morals,
every corrupt politician, every superstar,
every supreme leader, every saint
and sinner in the history of our species lived there-
on a mote of dust suspended in a sunbeam.”

CARL SAGAN
PALE BLUE DOT: A VISION OF THE HUMAN FUTURE IN SPACE

DIRECTOR’S MESSAGE

Imagining 21st Century *Learning Spaces*

UNESCO MGIEP’S ANNUAL FLAGSHIP CONFERENCE – TECH 2019

The challenges we face today are quite unlike those faced in the last millennium. While experiencing the unprecedented interconnectivity created by the Internet, we are also witnessing persistent and new disparities and tensions, alarming illiberal and undemocratic trends, and uncertainties and risks about the future of the planet we share. **Interconnected local to global challenges—ranging from climate change to violent extremism—call for education that enables learners to engage creatively and responsibly with the rapidly changing world.**

The lastest edition of the Institute’s annual flagship conference, Transforming Education Conference for Humanity (TECH) 2019, focused on showcasing the role of digital technologies in enabling a shift from “transmissive pedagogies” to “transformative pedagogies” to create more peaceful and sustainable societies. Within this, the three core focus areas / sub-themes of the conference were ‘Transformative Pedagogies for Social and Emotional Learning’ (SEL), ‘Reimagining Learning Spaces for Planetary Citizenship’ and Data, Learning & Education - Role of Artificial Intelligence (AI).

In the first sub-theme, on SEL, experts convened to discuss recent research that suggests that students need to be “socially aware” and “emotionally connected” in order to learn and for societies to flourish. Discussions also ensued on how our education systems can be transformed to teach SEL skills in the classroom and how the digital medium can be employed to scale SEL as well as provide for personalised learning. The second sub-theme, focused on innovative learning spaces, in which various stakeholders came together to deliberate on future classrooms, which are conducive for people to take multiple perspectives, engage in dialogue and critical reflection, and transform society through self-transformation. Lastly, the theme on AI saw debates on key issues such as individualised learning at scale – whether this is oxymoronic or a utopian reality, the possibility of developing technology with emotion and the battle on data privacy and ownership. **A unique intervention in the conference was a highly popular children’s panel on “Education today: Challenges, concerns and wish-list for the future”, in which we invited school children to voice challenges and concerns on the present education system as well as share their needs and wants for future education systems.**

This “Special Issue” of The Blue Dot provides a detailed account of what transpired at TECH 2019 – towards imagining and creating innovative 21st Century Learning Spaces across the three sub-themes of the conference. We hear from various specialists on SEL, AI and those who have pioneered path-breaking learning spaces towards making education fun, immersive and experiential. Amongst others, we hear from experts such as Tyralynn Frazier, Research Scientist, Center for Contemplative Science and Compassion- Based Ethics, Emory University, on “Reframing Educational Success from the Mind to the Heart: An introduction to SEE Learning; Paul Darvasi, Educator, Writer, Researcher on “The Lucid Century: How Games and Play might Help Dismantle the People Factory” and Julien Mercier, Director of NeuroLab (FCI) at the University of Quebec in Montreal, Canada on “Moment-by-moment measures of affect and cognition in learning”. We have also compiled a “wish-list” from some of the brilliant child panelists we had participating in the special children’s panel. Additionally, we have put together a summary of the key discussions that emerged during the catalytic sessions, pre-conference workshops and policy-forum. I do hope you will enjoy reading this issue – and trust that it will provide you enough motivation to join us for TECH 2020 as we continue our quest to transform education for humanity towards Education 2030 – details forthcoming on our brand website: mgiep.unesco.org .

ANANTHA KUMAR DURAIAPPAH
Director, UNESCO MGIEP

TECH
Transforming Education Conference for Humanity
2019
VISAKHAPATNAM

Transforming Education Conference for Humanity *(TECH): December 10-12, 2019*

VISAKHAPATNAM CITY,
STATE OF ANDHRA PRADESH, INDIA

Building on the success of TECH 2017 and 2018, TECH 2019, held in partnership with the State Government of Andhra Pradesh, India, **SUCCESSFULLY SHOWCASED THE ROLE OF DIGITAL TECHNOLOGIES IN ENABLING A SHIFT FROM "TRANSMISSIVE PEDAGOGIES" TO "TRANSFORMATIVE PEDAGOGIES" TO CREATE MORE PEACEFUL AND SUSTAINABLE SOCIETIES** with over 1,000 diverse stakeholders coming together from close to 30 countries in Vizag from December 10-12, 2020 to deliberate on the role of digital pedagogies in building sustainable societies.

KEY HIGHLIGHTS:

- 1,000 diverse stakeholders
- Several pre-conference capacity building workshops for over 500 teachers from 6 nationalities
- Policy Forum on Digital Learning with pedagogues and industry leaders from 12 countries who came together to deliberate on the policy interventions required on the use of technology
- Keynotes
- 12 Catalytic Sessions
- Highly engaging Disruptor's Panel on "Agenda for Rethinking Education"
- Special Children's Panel titled "Education Today: Challenges, Concerns and Wishlist for the Future"
- TECH Talk by Director, UNESCO MGIEP

CONTENTS

The BlueDot
TECH 2019 SPECIAL ISSUE

Digital Technology for ***Teacher Practice***

WORKSHOP SUMMARY:

Date : December 8-9, 2019

Number of Participants : 104

Facilitators : Cathie Norris, Elliot Soloway

Co-facilitators : Shraddha Rawat, Akash Saini, Robin Sharma (UNESCO MGIEP)

Venue : Gitam University, Visakhapatnam City, State of Andhra Pradesh

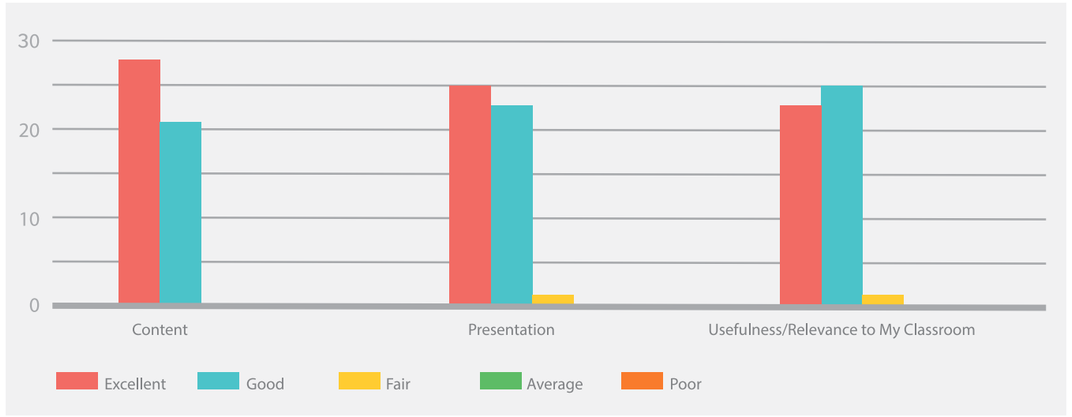
The workshop 'Digital technologies for teaching practice' was part of a larger course called 'Becoming a 21st Century Teacher: Leveraging digital pedagogies for teaching practice' being developed by UNESCO MGIEP for pre-service and in-service teachers across the globe.

The intent of this workshop was to inspire teachers from Andhra Pradesh Government schools and Jawarhar Navodaya Vidyalaya to use technology in their teaching practice. The daylong workshop was conducted twice for two different sets of teachers. The workshop followed two different formats: A self-learning format to introduce teachers to the concept of self-paced online learning and an interactive workshop format, which most teachers are used to and prefer. The workshop was conducted by seasoned facilitators from University of Texas and University of Michigan with expertise in education technologies.

It was noteworthy that only 4-5 out of 104 teachers had ever taken an online course before the workshop. While initially, many teachers were unclear about how to engage with a MOOC, they all enrolled in the course from their laptops and mobile phones with support from volunteers.

Although participating teachers gave a high rating on overall content, presentation and relevance of the workshop (refer to the graph below), their favourite parts were the ones where they learnt new open source tools for their classroom. These included Kahoot – for classroom quizzes, word it out – for making Wordclouds, and collabrify map for making concept maps.

At the end of the sessions, some of the participant feedback was as follows:



Although many teachers had a slow and hesitant start; by the end of the workshop, all of them had used at least two of the three tools covered in the workshop. Teachers of maths, biology, history created Kahoot quizzes and got everyone to play them online. Many others displayed their wordclouds and concept maps on the projector. Some teachers who were familiar with some of these tools supported other teachers in practicing them.

Although teachers talked about infrastructural barriers that may prevent them from using some of these tools in their classroom, they were also thrilled with the possibilities of making their classrooms more engaging and fun. The workshop definitely created enthusiasm amongst the community to learn and experiment more! ▲

Feedback from Participants

'I learned something which is new to me. I am more excited to use these tools in my teaching.'

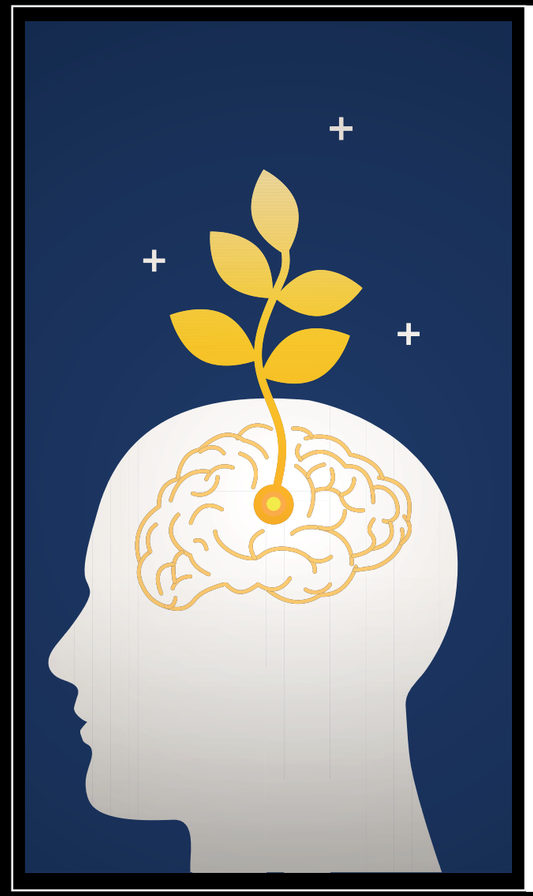
'I want to learn how to create Google docs, how to create a website and how to prepare content that suits the needs of the students using digital technology apart from Kahoot & Mind maps.'

'I would like to develop the skill to create web page, php and online multiple questions and answers, Adobe Photoshop, Primer Pro, After Effects, animations.'

I learnt about Kahoot, word cloud and Collaborate through Collabrify but since our students did not have access to computers during the sessions, it was difficult to use these tools. However, we can show them in the Computer lab and ask them to use the tools and do their homework.'

Project Based Learning and Social Emotional Learning

'The MyDream Project' is a collaborative project of Samsung, UNESCO MGIEP, and the Jawahar Navodaya Vidyalaya (JNV) school system. The project aims to engage students in Mathematics and Science through project based learning along with improving their social emotional skills. A two-day TECH pre-conference workshop was conducted for JNV teachers on December 8 & 9, 2019 at GITAM University, Visakhapatnam. **The objective of the workshop was to support teachers to integrate activity based learning, project based learning, and social emotional learning (SEL) into their classrooms.** A total of 52 teachers from 31 JNVs attended the workshop.



The workshop started with a brief presentation about the findings from the need assessment phase of the project in terms of academic difficulties and areas that need SEL support. Teachers were then engaged in an energetic and interactive session about activity based learning facilitated by Mr. Manish Jain (Associate Teaching Professor, IIT Gandhinagar). **Through stories and activities, Mr. Jain demonstrated that we are often unable to use knowledge from the textbooks in real life situations.** He urged the teachers to revise their approach towards teaching and bring more of the real world into their classrooms.

During the third session, Dr. Matthew Farber (Assistant Professor, University of Northern Colorado) introduced teachers to project based learning. While students often engage in projects at the end of the lesson, Dr. Farber advocated for engaging students in projects throughout the teaching and learning process. He demonstrated the use of various teaching techniques that can be paired with project work such as questioning, storytelling, and role-playing. The last session by Ms. Renuka Rautela and Ms. Aditi Pathak discussed the importance of social and emotional learning. With the help of mindfulness activities, the teachers experienced MGIEP's approach towards SEL.

PRE-CONFERENCE WORKSHOP

SEL at Pre-Conference Workshop, *TECH 2019*

UNESCO MGIEP's mandate is to mainstream Social and Emotional Learning (SEL) in education systems, and the Institute focuses on empowering teachers with key SEL tools and strategies.

During TECH 2019, two pre-conference workshops were conducted by UNESCO MGIEP's Rethinking Learning team. **The focus of the workshop was to help teachers understand the rationale of SEL, and to familiarize them with MGIEP's SEL programs which are designed for students between 12-14 years using an issue based approach.** The unique feature of MGIEP's SEL programs is that the social and emotional competencies are embedded in knowledge curricula, which makes them easy to implement in the classroom.

The first workshop was conducted by Ms. Renuka Rautela and Ms. Aditi Pathak from UNESCO MGIEP with a group of Jawahar Navodaya Vidhyalaya (JNV) teachers. The teachers were invited as part of an ongoing programme at the Institute- the MyDream Project. The second workshop was a day-long workshop for teachers from the State of Andhra Pradesh as well as other interested participants from TECH. The workshop was conducted by Ms. Anurati Srivastva, Ms. Renuka Rautela and Ms. Aditi Pathak.

The following key topics were covered as part of the workshop:

- Neuroscience Of Learning
- Digital Pedagogies
- SEL Approaches Around The Globe
- Simple SEL activities and games for classroom
- Understanding UNESCO MGIEP's SEL framework- EMCC

The teachers were also introduced to the two digital courses of UNESCO MGIEP that build SEL skills, including Global Citizenship and Digital Intercultural Exchange (DICE). Global Citizenship curricula essentially integrates key SEL skills of Empathy, Mindfulness, Critical Inquiry and Compassion with

contemporary issues of global importance such as Migration, Democracy, Refugee Crisis, Citizenship rights and duties, Identity and Violence. DICE, on the other hand, focuses on helping students take multiple perspectives and reflect on their biases.

As part of the course, teachers are trained on how to encourage 'dialogue' or more open conversations around 'self', 'others' and the 'world' within the classrooms and help students understand the 'different other'. Both the courses are rendered on MGIEP's indigenously developed platform, FramerSpace (FS). FS is an anonymised platform and is compliant to the most stringent Data privacy & ownership laws such as GDPR & COPPA. Also, FS is one of the very few platforms that helps build Emotional Intelligence in conjunction with Cognitive Intelligence in learners, leveraging the latest in Artificial Intelligence (AI) & Neurosciences.

The workshop with the educators ended on a high note with participating teachers sharing their feedback and learning. Most of the teachers acknowledged the need to integrate SEL in their classroom and shared the critical requirement to organise similar training workshops. ▲

PRE-CONFERENCE WORKSHOP

UNESCO MGIEP *Strengthens Compassion Training at 2 Indian Universities*

The MGIEP Youth Programme conducted two back-to-back capacity-building workshops on the Compassionate Integrity Training (CIT) course for over 80 faculty and senior staff from GITAM University (Andhra Pradesh) and KIIT/KISS Universities (Orissa) at the Transforming Conference Education for Humanity (TECH).

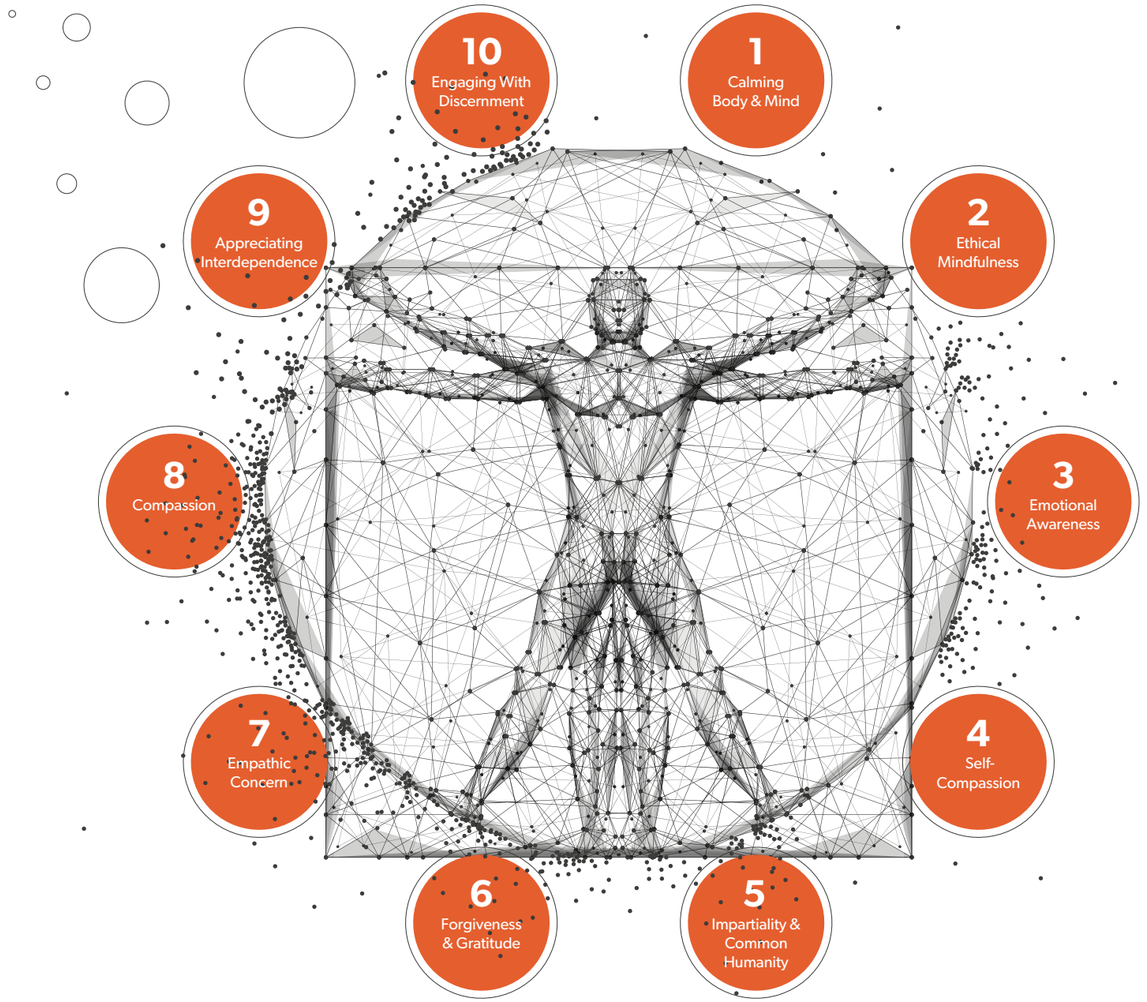
The CIT course developed by Life University (USA) is a multi-part online social-emotional learning (SEL) programme that cultivates basic human values as skills for the purpose of increasing individual, social and environmental flourishing.

UNESCO MGIEP and Life University entered into a partnership in May 2019 to develop an online self-directed learning version of CIT that would mainstream SEL by allowing large numbers of youth to undertake the high-quality course. MGIEP conducted the 2 workshops in collaboration with Centre for Compassion Integrity and Secular Ethics (CCISE) of Life University, USA.

The first workshop for GITAM University, attended by 25 GITAM Faculty and 20 teachers from the State Government of Andhra Pradesh Ministry of Education, was a pre-conference activity for the 2019 TECH event in Visakhapatnam City, Andhra Pradesh, India. The second workshop was held for 30 faculty and students from the Kalinga Institute of Industrial Technology (KIIT) and the Kalinga Institute of Social Sciences (KISS) based in Bhubaneshwar City, India.

Participants at the workshop were engaged in a mindful dialogue and underwent a 20-hour training spread over 3 days covering ten core skills, which included empathy, compassion and mindfulness. The workshops are designed as a journey professing through skills for self-cultivation to engage in systems to understand the wicked and the complex problems plaguing the world community.

COMPASSION INTEGRITY TRAINING (CIT) TEN CORE SKILLS



The trainees took guided meditations, held mindful dialogues, and captured reflective writing for an embodied understanding of the skills. The workshops were facilitated by Mr Shane O'Connor from Life University and Mr Shankar Musafir from UNESCO MGIEP.

MGIEP is currently developing a SEL++ course which is based on the current CIT course content but will be available online in a self-directed learning model. ▲

Policy Forum on Digital Learning at TECH 2019

Group of Governments come together to promote wise, innovative and ethical use of digital technology in education at the Policy Forum on Digital Learning at TECH 2019

Building on the Vizag Declaration on Guidelines for Digital Learning adopted at TECH 2018, UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development (MGIEP) organized a Policy Forum on Digital Learning on 9 December 2019 in Visakhapatnam City, State of Andhra Pradesh, India, ahead of TECH 2019. **The Forum was attended by representatives from 13 countries such as India, Bangladesh, Sri Lanka, Maldives, Japan, Kyrgyzstan, New Zealand, South Africa and Sweden, out of which nine countries were officially represented.** Other participants included scholars from the fields of digital and games based learning, Universal Design for Learning (UDL) and comparative and international education, select educational technology companies such as Dell, Microsoft, Samsung as well as 15 school teachers from India, Bangladesh, Sri Lanka and Maldives who were leading two of MGIEP's digital Social and Emotional Learning (SEL) projects. The Policy Forum aimed at raising awareness about the current state and future prospects of the use of digital technology in education, including the role of Artificial Intelligence (AI) in supporting teaching and learning, and exploring the feasibility of forming a voluntary group of countries committed to the wise, innovative and ethical use of digital technology in education.

Ms. Tota Mukherjee, Former Indian Ambassador to UNESCO and Prof Yusuke Morita, Associate Professor of Waseda University, Tokyo, Japan, served as Co-Chairs of the Policy Forum. Prof Morita was also the official representative of Japan in the Forum. The forum was inaugurated by Dr. Anantha Duraiappah, Director of UNESCO MGIEP. In his opening remarks, Dr. Duraiappah stated **"We are proud to be joined by the participants in the Policy Forum for TECH 2019. This platform reinstates our commitment to transforming the educational landscape to embrace digital pedagogies by collaborating with our eminent stakeholders. Such discussions are imperative to drive awareness about digital technology and leads UNESCO MGIEP to get closer to SDG 4 of providing quality education. The world is changing at a brisk pace and through these conversations education systems will prepare learners and educators for both the changes and the challenges of the 21st century".**

Following the inauguration, country representatives made a brief presentation on the state of digital learning in their respective countries probing 1) the current national policies, strategies and action plans on digital learning; 2) challenges related to digital learning, specifically on a) hardware (availability of adequate infrastructure and equipment), b) software (access to high quality content and learning platforms), and c) teacher capacity and training, and d) nature and purpose of digital educational resources that are already being used in schools. The presentations also laid out areas of support needed from UNESCO MGIEP and international cooperation to meet the national educational priorities of countries. It was interesting to note that representatives from Quebec shared its Digital Competency Framework, which provided a roadmap for digitalization efforts in education and teacher training, an inspiring case in point for many countries.

The presentations provided a critical overview of the state of digital education in each country, whether it served an economic, instrumentalist purpose or whether it was more oriented towards enhancing individual and collective well-being and democratic principles, as well as its unique challenges and trends. While some countries had an advantage of having better access to physical hardware and infrastructure, availability of good quality content and learning platforms poses a challenge to many countries. A clear need for better equipped teachers—who are pedagogically confident in meaningfully employing digital learning in their school—was felt across countries from global north and south.

Following country presentations, MGIEP presented brief summaries of two recent publications that were released at the 40th UNESCO General Conference in November 2019. Dr. Yoko Mochizuki, head of MGIEP's Rethinking Policy Programme, presented the findings of 'Rethinking Pedagogy- Exploring the Potential of Digital Technology in Achieving Quality Education' and Dr. Duraiappah gave an overview of the Industry Guidelines for Digital Learning that was created to support developers of digital learning resources and games to create pedagogically sound, high quality learning products that do not compromise on the fun element. Dr. Nandini Chatterjee, Head of Rethinking Learning at MGIEP, presented an overview of the pilot tests of MGIEP's two digital learning projects on global citizenship—Digital Intercultural Dialogue (DICE) and Global Citizenship—aimed at middle school adolescents.

This led to an animated presentation by lawyer Dan Shefet, Adviser to the Council of Europe on the Internet Ombudsman, about the legal and ethical challenges to digitalization of education through possible future scenarios. He flagged concerns related to issues of data privacy, ownership and control, especially of minor students, which need be deliberated and debated at length before any large-scale adoption or endorsement of digital learning platforms.

The presentations gave way to enriching discussions about the role and nature of technology that would be suitable to address the growing concerns about quality, equity, inclusion, innovation and market-driven skills development amongst learners.

Experts from the field of universal design for learning, human-rights based and gender sensitive education, game-based learning offered their insights using examples from their fields in addressing some of those concerns.

The Policy Forum concluded with the co-drafting of the Terms of Reference (TOR) of the Group of Governments and Other Relevant Stakeholders on Social-Emotional and Digital Learning. The countries offered their inputs to make the TOR relevant to their country-context and priorities. **The Group would be informal and voluntary in nature, and explore joint activities to promote the wise, innovative and ethical use of digital technology as a new dimension in achieving SDG 4—ensuring inclusive and equitable quality education and enhancing lifelong learning opportunities for all.** The Group came into effect officially in 2020, and the next Policy Forum is being planned for the latter half of 2020. ▲

Social and Emotional Learning: Why teachers need it more than anyone else!

Aditi Pathak | DIGITAL INTERCULTURAL EXCHANGE SPECIALIST
Renuka Rautela | SEL CO-ORDINATOR

Introduction

When a smiling, amusing face approaches a crying infant, the chances that the weeping stops and the child reciprocates with a smile, is high. Similarly, the infectious power of a yawn is well known.

Research from the neurosciences shows that humans and other primates have mirror neurons that simulate the action and emotions of others, and give them the impulse to feel and act accordingly[1]. Supporting research from evolutionary biology and social cognition have reaffirmed that the 'ability to mirror' is necessary and important to understand and empathise with others, and is a crucial aspect of human social behaviour[1].

As much as this revelation is fascinating, it also has its downfalls. Recent research from learning, behaviour and relationships reported that teacher relationships with students impact not just classroom learning but also student well-being. For instance, a recent research study published in the Journal for Health and Social behavior examined the relationship between classroom environment and student mental health[2]. Drawing from a national sample of 10,000 first graders and their teachers, the researchers examined how classroom features affected first grade learning. Some of the features the study examined were - student attention, fights and friendships in classrooms, presence and absence of adequate resources as well as teacher stress. The results of the study were shocking! The study found that teachers who reported higher levels of stress had more students in their classrooms with mental health problems.

Surprising as it might be, the research concluded that stress was contagious[2].

Similar results from another study examined the link between teacher burnout and student stress in Canadian students of grades 4 and 7, and found that students with high cortisol levels (cortisol is a hormone that is indicative of stress levels in animals) corresponded to teachers who reported higher burn out rate[3].

Both these studies strongly suggest that teachers communicate their stress to their students, hampering their social and emotional well-being, which further impacts their academic development and progress.

Having said this, **it cannot be denied that teaching is one of the most challenging, demanding and stressful professions in the human service industry[4].** Teachers have long working hours, rigid-inflexible calendars, and often carry school work back home. In many parts of the world, a teacher's work- life balance is extremely poor. Teachers are required to not only complete academic work, manage complex classroom behaviours, ensure their own professional development, but also fulfill administrative responsibilities, organise parent-teacher interactions and of course live their personal lives. Amidst these and other similar expectations, the likelihood of a teacher to be stressed is indeed very high, with their own social and emotional needs compromised.

Teachers need SEL: Teacher and Student wellbeing

Navigating the teaching profession is difficult and stressful and demands support to manage both social and emotional well-being. Teachers need to be equipped with both knowledge and skills that can support them to filter their stress and anxiety, and calm them in times of need. Research also supports this argument, and shows that empowering teachers with social and emotional learning competencies better equips them to navigate challenging times[5].

Social and Emotional Learning (SEL) can be described as learning that allows all learners to identify and navigate emotions, practice mindful engagement and exhibit prosocial behaviour for human flourishing towards a peaceful and sustainable planet.[6]

Teachers need to be equipped with SEL so that they can create healthy and safe learning environments and promote human flourishing in their classrooms. Teachers with high SEC (social and emotional competencies) can recognize and manage their own emotions as well as understand how their emotional responses impact others, especially their students. Such teachers also know how to build strong, supportive relationships with students, colleagues, and parents, deal effectively with conflict and set firm but respectful class norms[7].

SEL at UNESCO MGIEP

Realizing the urgent need for continuous and comprehensive SEL support for teachers, UNESCO MGIEP is developing SEL courses and training for teachers.

The programs will be designed around MGIEP's framework for SEL and focus on empowering teachers with the knowledge and skills of SEL, and support them with tools and strategies that can help them navigate personal and professional challenges.

THE CORE FEATURES OF MGIEP'S SEL FRAMEWORK EMC[2]

Empathy:
Ability to understand the emotions, thoughts, and motivations of another and to resonate with them[9].

Mindfulness:
The awareness that arises from paying attention to the experience of right now, non-judgmentally[10].

Compassion:
The intent to alleviate someone from her/his suffering or distress, and using one's discernment to act accordingly[11].

Critical Inquiry:
The process of finding out about a concept, phenomena or claim, through one's own observation, experience, thinking, reasoning and judgement[12].

While empathy and compassion are the basis for human connections, critical inquiry abilities are required to develop a rational temperament to realise a compassionate society. Necessary for learning all of the above is the training of mindfulness, which is the ability to cultivate conscious awareness of attention, emotion and thought[8].

In keeping with MGIEP's focus on digital pedagogies, teacher training programs will be designed on MGIEP's indigenous learning and interactive platform, FramerSpace and will be freely available for teachers across all member states.

To read more about the recently concluded Teacher training workshop at the Transforming Conference Education for Humanity (TECH) 2019, please refer to the section on pre-conference workshops.

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THEME I :

Transformative *Pedagogies for SEL*

The need for resilient and adaptive individuals to rapidly changing environments is the need of the hour. **RECENT RESEARCH HAS DEMONSTRATED THAT STUDENTS NEED TO BE "SOCIALLY AWARE" AND "EMOTIONALLY-CONNECTED" IN ORDER TO LEARN AND FOR SOCIETIES TO FLOURISH.** That SEL skills can now be explicitly taught in the classroom has also been demonstrated. UNESCO MGIEP seeks to promote the idea that SEL is not only building both emotional and intellectual intelligence but is key to achieving peaceful and sustainable societies and this can be delivered to all learners through the use of innovative technologies.

KEYNOTE:

Well-being is a Skill | Richard Davidson, William James and Vilas Research Professor of Psychology and Psychiatry and Founder & Director of the Center for Healthy Minds, University of Wisconsin-Madison

CATALYTIC SESSIONS:

- The Social and Emotional Brain and Its Role in Learning
- SEL for Teachers – Empowering Teachers with SEL for Self and the Classroom
- Gamestorming Curricula
- SEL Programs can address Anxiety, Stress and Violence in the Classroom – The Case for Adolescents

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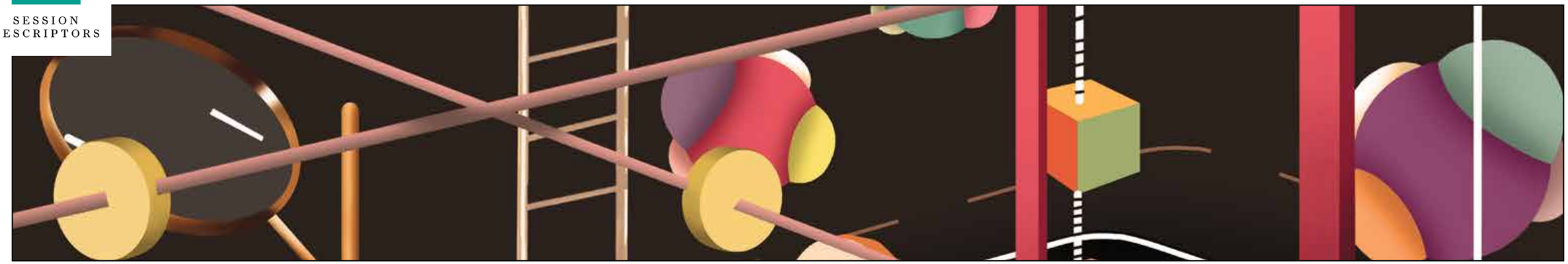

CATALYTIC SESSION NO. 1

The Social and Emotional Brain and its Role in Learning

Accumulating neuroscience research now shows that in order to learn, it is necessary for the brain to be 'socially connected' and 'emotionally engaged'. It is therefore critical that this new knowledge on how children learn inform both the content and processes of learning in both formal and informal spaces and guide classroom practices. In this session, speakers from the field of neuroscience, developmental psychology and content creators were invited to share research and discuss the relation between the social and emotional brain and learning across different ages. The session was moderated by Dr. Nandini Chatterjee Singh from UNESCO MGIEP.

CATALYTIC SESSION NO: 4

SEL for Teachers

Empowering Teachers with SEL for Self and the Classroom

One of the most complex jobs in the world is that of a classroom teacher, which can only be compared to a medical staff inside an emergency room during a natural disaster. This is an observation made by Lee S. Shulman, an educational psychologist. In addition to training an inquiring young mind, there are a multitude of stressors in a teacher's life, ranging from the less talked of administrative roles such as marking attendance or invigilating an examination; to more managerial ones such as designing and executing effective lessons; to leadership roles such as mentoring new teachers and providing expertise. This range of responsibilities and the constant narrative to create life-long learners leads to more anxious and stressed out teachers with low self-efficacy and poor work life balance. Rightfully said, teachers' own social-emotional competence and well-being is compromised. It is then very natural for this stress and aggression to transcend to classroom spaces where students are the receiver of this burnout. In this session, we invited speakers from the fields of neuroscience, SEL and learning spaces to share classroom practices and research that advocates the need for teachers with SEL attitudes for self and the classroom

CATALYTIC SESSION NO: 7

SEL through Digital Games

Harnessing the Power of Digital Interaction and Play to Teach and Assess SEL

The role of play in learning has been under emphasised. Over the last decade, a large body of research in the field of games and learning has established the need for fun and motivation in learning. From games that encourage physical movement to games that restrict it, games have seen their own transformation. Harnessing the intrinsic potential for motivation to play, this session highlighted the role of games not only for experience but also for assessment and intervention. The MGIEP Games for Learning team discussed the enormous potential of digital games as a medium to build student agency by participating in learning experiences where they can relate, evaluate, take decisions, solve problems, collaborate and most importantly discover their creativity.

CATALYTIC SESSION NO: 10

SEL Programs can Address Anxiety, Stress, Violence in the Classrooms

The Case for Adolescents

While adolescence is a period of tremendous learning, exploration, and opportunity, it is also a time when vulnerability to behavioral and health problems is at its peak with extended negative consequences that last into adulthood. According to a recent WHO report, nearly 25 million children worldwide have anxiety and stress and are at risk for depression. This is fast leading to a distorted reality wherein well-being of children is compromised. With the motivation to understand the potential of SEL programs to support adolescents in navigating this difficult time and harnessing their true potential, the session brought together experts from the field of psychology, Neuroscience, education and youth services to shed more light on the issue at disposal. The session was moderated by Dr Shelja Sen, Child Psychologist and family therapist.

Some Thoughts On ***Adolescent Socioemotional Learning (SEL) In Quebec***

MARYSE LASSONDE & **NADINE** FORGET-DUBOIS

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Abstract

Adolescence is characterized by increased importance and complexity of peer relationships. Neuroanatomical changes also occur during this period and include rapid development of the prefrontal cortex, a region associated with executive functions, which are thought to underlie socioemotional competencies. Although well-being could be expected to improve with these changes, children and adolescents show high rates of mental disorders. In Quebec (Canada), already high levels of psychological distress have worsened during the last decade, affecting 29% of students, especially girls. Other mental disorders also show high prevalence. The Quebec government consequently has launched several programs over the years, promoting a positive school climate and emotional skills training, but their implementation has proven difficult. Thus, the Quebec Higher Council of Education has issued a series of recommendations: consider students in their entirety as flourishing human beings; implement systemic, school and community-wide SEL approaches; train the entire school staff in managing students' emotions and well-being; and develop more effective collaboration with social services and community organizations. Notably, SEL programs, including prosocial videogames, show promise in fostering empathy and SEL. Implementing systemic programs is, however, a long-term, complex process and caution is warranted.

Keywords

- Adolescence
- Behaviour
- Brain
- Social and Emotional Interventions
- Information and Communication Technologies
- Applicability
- Implementation

Background

Adolescent years are characterized by increased self-awareness, increased importance and complexity of peer relationships, and improved understanding of others (Pfeifer and Blakemore, 2009). Adolescence is also characterized by the growing need for independence and issues related to educational achievement. During this period, young people are increasingly exposed to phenomena such as violence, bullying or alcohol and drug use that may be risk factors for their mental health. It is also during this period that the first manifestations of anxiety, depression, eating disorders, psychosis and substance abuse usually appear (Commonwealth Department of Health and Aged Care, 2000).

In parallel, numerous neuroanatomical changes occur during this timeframe that may provide some insight into brain behaviour relationships. Indeed, notwithstanding the fact that the human cortex develops early in ontogenesis, the overall maximum cortical volume occurs between ages 8 to 10, followed by a gradual decrease in overall thickness during adolescence (Paquette et al, in press), with white matter exhibiting a steady linear increase in the same period (Arain et al., 2013). More importantly, several studies have demonstrated considerable development of the pre-frontal cortex during adolescence (Shaw et al., 2009), a region subserving the so-called executive functions, which are thought to underline several socioemotional competencies (Corcoran and Slavin, 2016). Considering these important brain changes, one would expect that emotional control and well-being should improve during adolescence. However, among children and adolescents aged 5 to 19 years, the annual prevalence of all mental disorders estimated from Canadian and American population surveys using validated diagnostic instruments remains high over the age range (14%, Boyle and Georgiades, 2010). In view of these alarming results, several educational initiatives have been launched in order to improve socioemotional adjustment.

In Canada, education is under provincial jurisdiction and any educational intervention aimed at addressing socioemotional maladjustment must take into account the epidemiological data pertaining to its provincial authority. In this context, the Quebec high school youth health survey (Institut de la statistique du Québec, 2018) examined the mental health and social adjustment of 62,000 teenagers representative of Quebec regions, socioeconomical status and languages (French and English). Regarding mental health, the proportion of students with a high level of psychological distress has increased since 2010-2011, from 21% to 29%, with more girls than boys showing a high level of psychological distress. Among high school students, 17% reported physician-confirmed anxiety, 6% depression, 2.2% eating disorders and 23% ADHD. About 38% of high school students exhibited at least one direct aggression behaviour and 65% exhibited indirect aggression. According to this survey (Institut de la statistique du Québec, 2018, p. 159), "The prevalence of anxiety disorders,

depression, eating disorders and ADHD has been increasing since 2010-2011. Similarly, medication for anxiety or depression, as well as that taken to calm down or focus, is on the rise. The same can be said about the relative proportion of students with high psychological distress at all levels of secondary school. Such increases are observed elsewhere in the world." [Personal translation]

Current Interventions

In order to counteract the relatively high incidence of socioemotional problems observed in these population studies, the province of Quebec has launched a series of educational interventions over the years. The 20-year+ longitudinal study of Quebec children initiated by Tremblay and collaborators in 1996 indicates that the mechanisms that lead to socioemotional deficits are intergenerational and based on complex genetic and environmental interactions, including epigenetic mechanisms. This study has also demonstrated that prevention of these deficits requires early and long-term interventions with both parents and child (Tremblay, 2010). Indeed, social and emotional skills do not relate solely to a person's genetic inheritance but depend essentially on abilities learned through life experience (Gendron, 2007), particularly through the experiences that the child has at school.

Mastering a set of skills related to the expression, understanding and control of emotions (social and emotional skills) is an important protective factor identified by several researchers (Boncu et al., 2017; Durlak et al, 2015, OECD, 2015). In addition, meta-analysis studies have shown that social and emotional learning programs also increase academic achievement (Taylor et al., 2017). Taking into account these findings, there have been many Quebec government initiatives over the years (e.g., Fluppy, http://www.centrepsed.gc,.ca; EKIP, https://www.msss.gouv.qc.ca › professionnels › jeunesse › ekip). These initiatives concern the promotion of a positive school climate, development of emotional skills training, as well as measures aimed at improving mental health and countering violence in the school environment. Moreover, a collaborative agreement has been reached between the Ministries of Education and Health in order to reinforce and generalize these initiatives to a wider community than the school environment. After all these years, however, it has become apparent that these approaches remain poorly understood, overly compartmentalized and therefore insufficiently implemented in the field (Durlak and DuPre, 2008).

In light of these observations, the Quebec Higher Council of Education has issued a number of recommendations that need to be addressed in the near future: 1) Consider the student as a whole person, not only as a learning individual but as a flourishing human being; 2) Propose a systemic approach to SEL (Oberle et al., 2016) involving training of students, school staff, parents and members of the community; 3) Review the initial and continuing training of the entire school staff in order to take into account the management of students' emotions and well-being; 4) Develop more effective collaboration with social services and community organizations in order to achieve a more coherent and complementary action plan.

Future Developments

Currently, most of the Quebec programs aimed at improving SEL have used individual or group interventions. Considering, on the one hand, that the Ministry of Education is phasing in a Digital Action Plan in education and, on the other, that the Quebec Higher Council of Education is currently studying the education system's role in preparing children and youths for living and working in a deeply transformed digital world, it seems appropriate to consider the use of information and communication technologies (ICT) in fostering SEL learning.

One must also consider that ICT used for prosocial and educational purposes may be misused or abused and that, in adolescents, high social and emotional competency levels have been related to a lesser use of technology

According to a meta-analysis (Gretemeyer and Mugge, 2014), prosocial video game use has been shown to increase empathy and therefore prosocial behaviour. In the same context, recent studies have shown that video games may offer learning benefits, especially in the SEL field (Granic et al., 2014). The implementation of such programmes may improve emotional intelligence and psychosocial adjustment in adolescents (Cejudo et al., 2019) and may also produce functional neural changes after a few hours of gameplay (Kral et al., 2017).

Nevertheless, the integration of ICT programs within the context of whole school systems constitutes a challenge in itself. **One must also consider that ICT used for prosocial and educational purposes may be misused or abused and that, in adolescents, high social and emotional competency levels have been related to a lesser use of technology** (Nasaescu et al., 2018). The digital divide is another important issue, as equality in access to digital tools and high-speed Internet between schools, regions, and families remains to be achieved; technology can reduce inequality in education but can also replicate and amplify existing social and economic inequalities.

In conclusion, although a systemic approach to social and emotional learning has produced compelling evidence of its efficacy, the introduction of new practices is a complex and dynamic process rarely occurring in the short term (Bélanger et al., 2012). Regardless of the program involved, the conditions in which it operates in the field are as important as the program itself. Caution should therefore be exercised regarding the implementation of any new intervention programs deemed to be effective.

About the Conseil supérieur de l'éducation du Québec (Quebec Higher Council of Education)

The Quebec Higher Council of Education was created in 1964 at the same time as the Ministry of Education. The Council is dedicated to the development of a global vision of education. Its role is to collaborate with the Minister of Education and Higher Education and to advise the Minister on any matter relating to education. ▲

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Restorative Justice and ***Honouring Personal Agency***

SHELJA SEN

Therapist, Writer, Story-Weaver, Co-Founder of Children First Institute of Child & Adolescent Mental Health

Discipline and obedience are traditionally considered the two sides of the same coin.

> *'He does not listen. All that he needs to learn is discipline.'*
>
> *'He will not do as he is told. All his problems are due to lack of discipline.'*

I have had teachers getting upset in my workshops when I try to question the significance of 'teaching' discipline. I remember a well-meaning teacher almost came to tears telling me, 'My job is to teach discipline to children and if I need to take harsh disciplinary measures, so be it.' I could not get her point, but I understood her emotions. We have made some practices sacrosanct in education, and it is time we question them. Teaching discipline is one. When we talk about teaching discipline in schools, we are talking about children learning to respect the authority of teachers without any questions, follow the rules, be good and behave themselves.

Through this typical approach all 'behavioural issues' are addressed through anger and antagonism. 'Strict disciplinary measures' are taken, like a visit to the principal, punishment, detention, suspension and in some cases, even expulsion.

> *'Raghav, you lack discipline.'*
> *'You should be ashamed of yourself.'*

The underlying belief is that the problem lies in the child and hence, it is the child who must be fixed. There is a belief that the only way to discipline a child is through stringent measures. Typically, a teacher spends a lot of her time trying to manage the class through chastising, critiquing, complaining and punishing. There is a mistaken belief that if we criticize children, they will become disciplined. However, does it work?

> *'Misbehaviour and punishment are not opposites that cancel each other – on the contrary, they breed and reinforce each other.'*
>
> **HAIM G. GINOTT,**
> TEACHER AND CHILD PSYCHOLOGIST

Some schools which are a little more aware and progressive use behaviour charts, red-yellow-green cards and a complex system of rewards. Let me make it very clear that I am not much in favour of this Skinnerian – from B.F. Skinner, a mid-twentieth-century behavioural psychologist – approach where reward and punishment are used to 'discipline children'. This approach again focuses on 'fixing the child' and somehow completely takes away the personal agency of the individuals and sees them as mere objects. Children learn to do things only for the incentive. They give their project on time as they have been promised that every child who does so will be given a special sticker or candy. There is hardly any learning. In her research spanning twenty years, Carol Dweck has clearly demonstrated that rewards and praise tend to erode children's motivation and their intrinsic need for learning.

Building respectful and ethical minds needs to be at the core of our learning game plan in schools. As teachers, we need to aim at helping children to understand their choices and their consequences of their behaviour rather than controlling it ourselves. That is how we help them to build life skills of self-regulation, motivation, autonomy, sense of competence and social justice.

We cannot teach discipline to children in the same way that we cannot teach character to them. We can facilitate building a culture where qualities like discipline, kindness, compassion, integrity are valued. Where they are not empty words thrown at the children to make them feel inadequate about themselves.

Across the world, there is a growing awareness (backed by research), and schools are rejecting the model of zero tolerance for 'discipline issues', punitive measures, shame and punishment. However, we have a long way to go.

Discipline at times is nothing but educational violence in disguise.

One model that is gaining a lot of credibility as an effective, respectful, more humane way of building discipline is Restorative Justice. The main philosophy behind Restorative Justice is building

a culture of ethics, character and inclusiveness. It is a collaborative approach to raising responsibility levels in a safe space. The focus is on inviting personal agency through dialogue, accountability and building a stronger sense of community. Let's understand it through an example.

Suppose the child is caught with alcohol or cigarettes in her bag. What do we do?

SCENARIO 1

We call a disciplinary committee meeting, and we take harsh measures against the young person. We call her parents and tell them in no uncertain words how their parenting has been inadequate, and we announce that we have decided to suspend her for two months.

Now let's see the learning in this situation (isn't that what schools are about?). The young woman goes away with a huge sense of shame, resentment and anger. The word has spread around the school and the wider community, and she feels she will never be able to return to school. Even if she does, she plots ways of smoking without getting caught. The parents are angry with the school for their own humiliation and for blaming without taking any responsibility. They are extremely disappointed in their daughter, and their sense of rage is going to leave a huge dent in their relationship with her, which might never be repaired. The school authorities, despite what they show to the world, are left feeling inadequate and confused. Did they take the right step? After all, they had some responsibility too. Is this what teaching discipline is about?

SCENARIO 2

Now imagine another scenario but the same situation – a girl, found with cigarettes or alcohol. In this school, there is a strong culture of community, cooperation and accountability. The focus on this school is on accountability and learning rather than blaming. A teacher

Restorative justice has been widely researched and found to be extremely effective in cutting down challenging behaviours.

or a counsellor sits with the girl and understands the situation. The focus here is on asking and not telling, and the You-Me-We approach.

Let's see how it might play out in a condensed version.

[Young Person: Rhea, Class Teacher: CT]
Rhea (body tensed, angry voice): I don't care what you say. CT (quiet power and soft, gentle voice): I can sense you are upset, Rhea. In your shoes, I might have felt the same. However, before we decide on anything, I would like to hear your side of the story.
Rhea (softening up a little): What do you want me to say?

After some time, reassured that the teacher is genuinely interested, Rhea might give her version which may be true or untrue. Rather than sitting and arguing about it, she would be given a fair listening without any judgement.

CT: Let's work on this together as a team. I have heard you, and now I will share with you my perspective.

She goes to share the school's concerns and ask questions like:

Do you know the reason we follow this procedure?
What are your thoughts about this procedure?
What do you think of the choices you made and its impact? What can you do to show accountability?
What would be the ethical thing to do?
Would you like to talk to your parents or would you want us to do so?

Then the teacher could summarize with: We need to find ways so that we are accountable for your choices and define how we can support you in it. Would be fine with you?
Rhea (shrugs her shoulder): Sure.

Whatever Rhea decides, the two areas that require work are personal and community. Finally, after some reflection, she might decide that to seek counselling, and she could also opt for some community work in an NGO for a month after school hours.

Then, another meeting with the parents, the principal, the class teacher and the counsellor could be called. The focus of the meeting would not be on shaming or humiliating anybody but highlighting that a boundary had been crossed and now the young woman had to choose a suitable way to seek accountability. The emphasis would be on how the action caused harm to her and the community, and some restorative steps would need to be taken to address it.

Restorative justice has been widely researched and found to be extremely effective in cutting down challenging behaviours. The crucial aspect of this approach is that the focus is on separating the person from the problem. The team, comprising all the adults, comes together as caring and concerned members who do not challenge the dignity or the honour of the young person. On the one hand, there is respect, but on the other, there is clear understanding that there has been harm to the person and the community and definite steps would need to be taken to restore that. She is given choices in the way she would like to address the issue. She is being invited to exercise her agency and be in touch with her ethical compass.

In the end, the parents walk away assured that their daughter, despite her earlier incorrect choices, is now working towards more responsible behaviour, the school will feel assured that they have done all they could to support their own student and the young woman would walk with her dignity intact and possibly a huge learning about healthy and unhealthy choices.

This approach is about collaborating with the child, respectfully, to make them think for herself, build skills of responsibility, autonomy and accountability.

The focus needs to be on staying respectful, defining how the action had harmed individuals or the self-worth of the person rather than shredding it, are always positive. Depending on the damage, the restorative practices could include measures like community work in class/school (when damage has been caused to the community), apology letter (when a person has been hurt), arriving half hour earlier to school to arrange the supplies needed that day (when punctuality boundary has been crossed) and many other such practices which balance accountability and raise responsibility levels.

It is heartening to see how contemporary research in education backs this approach. Many schools have seen a major shift in the so-called 'disciplinary issues' since this model has been adopted. Of course, it goes without saying that teachers are included in these open, transparent, collaborative restitution practices. If I as a teacher have crossed certain boundaries, it stands to reason that I show accountability too. Children have sensitive radars for hypocrisy, so do watch out! ▲

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Reframing Educational Success from the Mind to the Heart: *an Introduction to SEE Learning*

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Education needs not only to develop our intelligence but also to support the basic human values of warm-heartedness and compassion.

DALAI LAMA

It is universally accepted that the education of a nation's citizens is one of the pillars of a nation's success. Indeed, per capita, educational expenditures are associated with increased employment and decreased levels of poverty. Additionally, the successful education of a nation's people has been associated with improvements in social conditions. Globally, there is evidence that successfully educating a population when they are young increases future overall economic attainment and confers positive social benefits such as improved socioeconomic status, reductions in crime, and improved public health[1,2], all of which are signs of a nation's successful social and economic development. Accordingly, what is it that education is doing within a nation that makes it so influential to a nation's success?

Education changes what a person can do in society, thus changing the quality of human capital available to that society. Nations allocate large portions of spending towards education because increases in literacy and the direct skills

This framing does not capture a nation's social production of or alleviation from suffering. Nor does it capture the happiness of its citizens. While educational attainment, globally, is on the rise, when we look at success through the lens of happiness, global trends are not as positive.

training provided by an education enable people opportunities that increase their life choices, potentially. This increase in life choices means increased access to resources that could improve the per capita standard of living. At the individual level of experience, this translates to children growing up healthier and to women, men, and families having more robust economic security. These observations drive the current global pressure to further invest in educational systems to continue to increase the skills that prepare young students to compete in a global economy. This drive accelerates competition for employment and reinforces even further needs for improvements in educational systems through economic investment. This preparation arms race[3] positions educational success based on lifetime productivity[4] that, like a corporation, must continue to accelerate productivity to continue to succeed.

It is clear that education can catalyze increases in measures of productivity that are good for a nation. But what is missing in this framing of success? **This framing does not capture a nation's social production of or alleviation from suffering. Nor does it capture the happiness of its citizens. While educational attainment, globally, is on the rise, when we look at success through the lens of happiness, global trends are not as positive[5].** The Easterlin Paradox, first put forth in 1974 by economist Richard Easterlin, states that a nation's happiness tends to increase with growing economic development, to a point. Easterlin suggests that there is a threshold beyond which happiness and economic development, at the national level, either no longer correlate or have a negative association[6]. This paradox has been contested since it was first proposed, but this reframing of "success" has set off a global discussion about the nature of economic development, and the responsibility of a nation to support the development of happiness in their citizens[7]. For example, **The United Nations began tracking national measures of happiness through the World Happiness Report and has included measures of well-being in their Sustainable Development Goals[8].** Measures of social conditions that impact happiness have also become more prevalent within the social discourse. For example, measures of inequity, not just absolute wealth, have emerged as essential indicators of national well-being[9]. Inequity is a robust indicator of social discomfort, low cohesion, disparities in health, and other factors associated with well-being[10]. More nuanced understandings of education[11], equitable access to education, and the purpose of education are evolving too. Literacy and employment remain key indicators of the success of a nation's education system, but the conversation is now expanding to include indicators of success that more closely resemble the notion that nations need to consider how students are actually feeling. This reframing has become most prevalent in discourses on the social and emotional development of a nation's young students. This is more commonly referred to as social and emotional learning (SEL). The term SEL gained prominence in the US educational vocabulary around the mid-90s. This is when the Collaborative for Academic, Social and Emotional Learning (CASEL) was established[12]. The skills or capacities that were emerging as important during this time included social awareness, self-management, relationship skills, and other capacities that are often referred to as "soft skills." Globally, other terms that encompassed this idea of cultivating soft skills were becoming more prominent as well in education. Phrases such as 21st century skills and transversal competencies represent the global recognition that attaining student success in this age of ever-evolving technological advancement means supporting student capacities that go beyond traditional academic achievement goals. Transversal skills and 21st century skills are similar but have some differences. UNESCO has identified domains of transversal skills that students will need to cultivate to succeed in this new age of technology. These include critical and innovative thinking, interpersonal skills, intrapersonal skills, global citizenship, media and Information literacy[13]. Twenty-first century skills more broadly refer to learning, literacy, and life skills such as flexibility, leadership, initiative, productivity, and social ability.

Support for the cultivation of such "life" capacities has been expressed by the National Research Council, The World Health Organization, The World Bank, and many other global non-profit and for-profit institutions[14].

While there is a lot of global activity around this focus on the cultivation of "soft skills" in education, there is little consensus on which of these capacities are most important, nor is there a consensus on how to measure them. This confusion is driven by the number of varying educational frameworks that may capture some capacities but not others or define these capacities differently, even when they have the same name. The Harvard Taxonomy project was created to wade through this confusion. This was designed to create a coherent taxonomy of non-cognitive skills that are often categorized as "soft skills" across disciplines and educational frameworks[15]. This initiative to organize these ideas acknowledges the need to support students beyond literacy and traditional learning but also highlights the fundamental problems around trying to measure this development. What should be measured? How should it be measured? At what point in development should it be measured, and how do we approach measurement without becoming reductivists in how we approach the cultivation of these life skills in our students. The Organization for Economic Cooperation and Development (OECD) is working to address some of these issues through the development of their international survey to assess social and emotional skills in 10- and 15-year-old students in countries around the world[16]. While there is no consensus on which of these capacities or competencies are most important, CASEL has been a leading voice in framing and communicating the evidence-base supporting the cultivation of social and emotional development in schools in a way that is most useful for schools and educators[17]. But much more work is needed to create consensus around the aspects of social and emotional development that support students both academically and in life.

In all of this confusion, what this activity demonstrates is that there is a new framing of success that is emerging. The globe might be ready for a more dynamic movement to push the needle on this shift. But, to do this, we need more powerful tools. We need these tools to address measurement. We also need these tools to address equitable access to educational programs that target the cultivation of these life skills associated with improved well-being, beyond just productivity. Embedded in this call for access is the issue of equitable global access to educator training that supports educators in facilitating their students in cultivating social and emotional skills. Another implicit idea within this discussion goes back to the notion that the role of a nation might be, at least in part, to support the cultivation of happiness in its citizens. The Dalai Lama has called for a new way of thinking about education. He calls for educational systems that "support the basic human values of warm-heartedness and compassion." While the discourse on social and emotional development is very important, it does not go so far as to say that we should be educating the hearts of our children not just their minds. At Emory University, we take this stand. We have developed a program that aims to do just this.

Through a supportive partnership between the Dalai Lama and Emory University, the SEE Learning program was developed. This program was a response to the call from the Dalai Lama to create a non-secular curriculum that supports children in their ethical development. He said that we need to educate the heart. This program aims to do this at a fundamental level by providing students with a curriculum that was developed through a framework (Figure 1a) that supports the cultivation of compassion for self, others, and humanity at large. This framework consists of nine components. Within each component are enduring capabilities that we have identified as essential to developing that component. For example, appreciating interdependence can be cultivated by creating learning experiences that develop a child's understanding of the interdependence of systems, as well as, their understanding that individuals exist within contexts that they are both effected by and can influence (Figure 1b). By assisting children in cultivating the awareness of and compassion for this understanding, we are supporting children in finding ways of engaging compassionately with the world they inhabit.

The SEE Learning curriculum consists of learning experiences that target the development of these enduring capabilities in elementary, middle, and high school students. This curriculum is available online, and it is free and open to anyone interested in obtaining it. The SEE Learning program also provides an online educator orientation program where any educator around the world is welcome to gain initial orientation towards the SEE Learning program. This technological tool has been incredibly powerful in expanding the reach of our program. Currently, over 4,000 educators from around the globe have used this online platform. We are also developing an online facilitator training program to train expert facilitators in conducting in-person training workshops to support educators who would like to bring SEE Learning to their communities. His Holiness says that this program must reach every child on the globe. The vision of the SEE Learning program at Emory University is to serve students and educators from the moment they start their education through their developmental years, worldwide, in response to this call.

This program has been developed in collaboration with experts in education, child development, neuroscience, systems thinking, and resilience cultivation. This is a highly evidence-informed program, and we are working with our team of experts to develop a robust evidence-base. We are also working to develop our research program in compassion science that aims to understand the cultivation of compassion throughout child development. While education is the pillar of a nation, cultivating reading, writing, and arithmetic are not enough. There is a growing agreement on this. Now we need to harness this collective understanding and utilize the powerful advances in technology to further amplify this movement. As with any inspired idea, there is the potential of the idea, and then there is the actualization of that potential. This is where the real work begins. The cultivation of happiness, joy, and well-being matter so much. No longer can success be defined of old, as a measure of individual productivity. We need a new definition that is inspired, compassionate, equitable in access, and fills the heart with joy. This is a vision for global education that could change not simply a nation, but the world. ▲

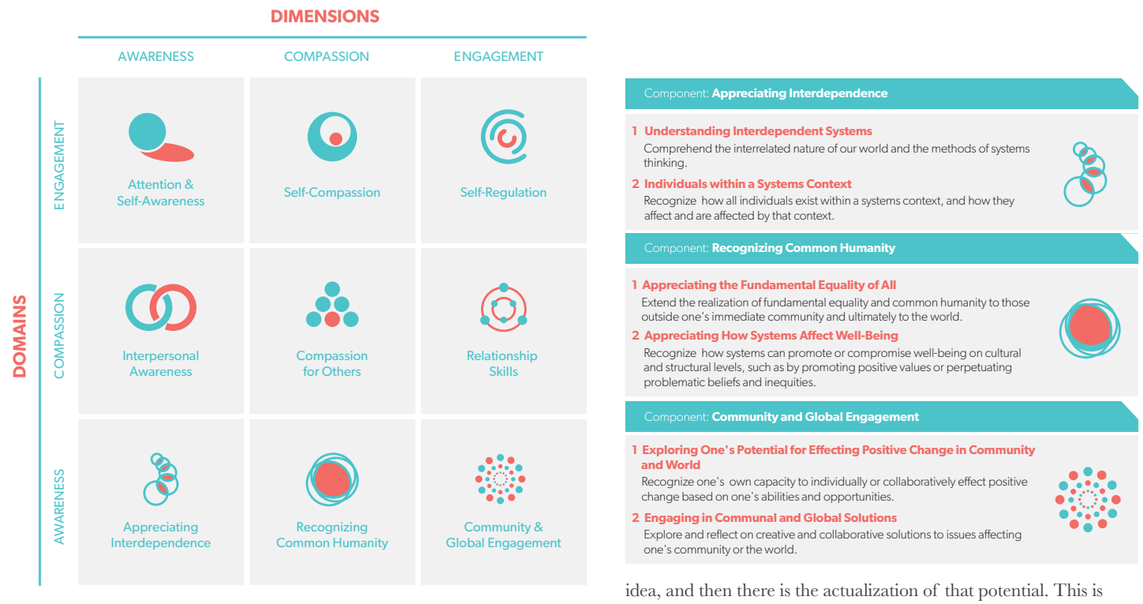

Figure 1. The SEE Learning Theoretical Framework. Social, Emotional, and Ethical (SEE) Learning program is based on a three by three theoretical framework. This framework forms the basis for the curricula, the educator trainings, and the SEE Learning program as a whole. For more information about SEE Learning, please go to https://seelearning.emory.edu/

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TECH
Extended Conversations on SEL

THE FOLLOWING PIECE IS AN EXTENDED CONVERSATION FROM TECH 2019'S CATALYTIC SESSION ON SEL FOR TEACHERS — EMPOWERING TEACHERS WITH SEL FOR SELF AND THE CLASSROOM, BETWEEN FOUR EXPERTS.

CATHIE NORRIS

ELLIOT SOLOWAY

TYRALYNN FRAZIER

SHELJA SEN

Social-Emotional Learning (SEL): How are we going to address our children's emotional needs?

Our children are hungry — food-wise and emotion-wise. Schools have addressed the former and they are starting to address the latter. We begin by defining social and emotional learning, then we raise a few provocative questions, and then we hear from Dr. Tyralynn Frazier, an SEL expert, who explores "SEL and Equity."

• "Hungry Children Can't Learn Properly!"
• "School lunch is critical to student health and well-being, especially for low-income students — and ensures that students have nutrition they need throughout the day to learn."
• "… food [is] a basic school supply, akin to textbooks and pencils."

Recognizing the need to provide America's children with food – lunch and now breakfast – the U.S. Congress has passed a number of bills (the National School Lunch Act of 1946, the Child Nutrition Act of 1966 and the Healthy, Hunger-Free Kids Act of 2010) to address this issue. Sadly, though, hunger is still an issue in America's schools.
• "More than 13 million kids in this country go to school hungry… Currently, 22 million students across the country rely on reduced-price or free school lunches through the National School Lunch Program (funded by the USDA)."

Stressed children can't learn
• "Our findings indicate that stress in the classroom environment affects children's likelihood of exhibiting learning problems (difficulties with attentiveness, task persistence, and flexibility), externalizing problems (frequency with which the child argues, fights, disturbs ongoing activities, and acts impulsively), problems interacting with peers (difficulties in forming friendships, dealing with other children, expressing feelings, and showing sensitivity, or internalizing problems (presence of anxiety, loneliness, low self-esteem, and sadness in the child)."

And there are many sources of stress outside the classroom that the children then bring into their classrooms:
• "Stressed out, overscheduled, hurried: These words are often used to describe children these days."

Based on the pioneering work of the Collaborative for Academic, Social, and Emotional Learning (CASEL), an organization started in 1994 to spread the word about social and emotional learning (SEL) — and on the work of other organizations (e.g., the UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development – MGIEP, the Committee for Children) who are now lending their voices to the choir, there is recognition that:
• "… in order for kids to be successful academically, their other needs must be met, too. That includes their social and emotional needs."
• "… students need to be socially aware and emotionally engaged to learn effectively."

The U.S. Congress has even begun to participate. There are some funds provided in the 2015 "Every Student Succeeds Act (ESSA) " for schools to implement "evidence-based SEL" programs.

So, what is SEL — social and emotional learning?
• "Social and emotional learning (SEL) is the process through which children and adults understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions."

In contrast to cognitive skills, which have traditionally received the lion's share of attention in schools, SEL are the "soft," non-cognitive skills. CASEL identifies five core SEL competencies: self-awareness, self-management, social awareness, relationships skills, and responsible decision-making
• "These competencies enhance students' understanding of themselves and others around them."

While CASEL has been around since 1994, it is only relatively recently that SEL has received serious attention. Indeed:

• "Social-emotional learning (SEL) has become arguably one of the hottest topics in education in the last couple of years."
• "The Future of Education Depends on Social Emotional Learning: Here's Why"
• "I believe [SEL} is the start of a new education for the future."

Why SEL now? Good question.
Can SEL be taught? Good question, too.
Does SEL have positive impacts on students — their learning, their behavior, etc.? Yes. (Oh, and another good question!)

SEL and Equity: Both Need to be Addressed

Prepared by: Dr. Tyralynn Frazier

During a training that I was taking on equity in education, I was talking with an expert and respected colleague about the work that I do on social, emotional, and ethical (SEE) learning. With respect and warmth, she turned to me and made this comment:
• "Mindfulness-based social and emotional learning programs feel like the warm hug of white supremacy."

The purpose for my presence in the training was to learn how to bring genuine and overt equity skills into our program. I was among a group of educators in the South Eastern United States, an area living with legacies of racial inequity. As someone who was raised in the south, I knew this struggle well, but her comment confused me. How could she say this? This talented, dedicated teacher working passionately for her students, all of them, seemed to fundamentally misunderstand what social and emotional learning (SEL) programs are about.

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After the training, I brought my confusion and frustration to an educator and team member working with me on the SEE Learning program, and she said
• "I get it."

This response transformed my perspective on what SEL needs to be to support all of our students, not simply the most privileged. My team member said,
• "We are like fish, swimming around in systems of inequity that depend on the maintenance of these unseen structures of supremacy to remaining unseen. We are fish who refuse to acknowledge the existence of the inequitable waters because the privileged in these inequitable waters get the most oxygen and thrive, while the most disadvantaged are suffocating."

My friend and team member said that I was coming to the educators I work with to bring SEE Learning into their classrooms giving children tools for individual capacities such as self-regulation without creating spaces that acknowledge the inequity. A person cannot change a system simply by trying to "fix" an individual. This is a piece of the puzzle but not the whole picture because it is the disparity and inequity that has created the stress and adversity many of the most disadvantaged kids carry. When some SEL programs that do not address equity explicitly are introduced into schools it can feel to the educators and students of those schools that these tools are to navigate the inequity thus passively allowing the supremacy structures to remain in effect. This is the "warm hug" that educator was talking to me about in that equity training.

Wow! By not thinking about the systems in which the students were embedded, I was inadvertently and ignorantly, ignoring a fundamental need.

After this experience, my colleagues and I, in the SEE Learning program, continued the conversation about equity and what it means in the context of SEL skills. Equity is hard when we talk about SEL because SEL programs tend to target individual capacities, while equity challenges tend to be entrenched in systemic patterns. The solution that I put forth is to think about where change happens in a system. It happens at a policy level, which is not the domain of SEL programs.

Change also happens at the level of the relationships. How do I see you and how am I seen by you? We live in entrenched systems of dominance and oppression, but can I both see this and have compassion for you and myself? If SEL programs ignore this need to sit comfortably with discomfort, and to compassionately see one's own place in inequitable systems with humility, then the programs are potentially enabling systems of white supremacy to remain unaffected.

There is overwhelming evidence that SEL in schools improves social, academic and health outcomes. The social and emotional development of our children, globally, is a powerful tool for global change. But there are additional responsibilities that must accompany social and emotional development programs as they come into the classroom and schools we support. This is a long conversation that must begin with students and educators being provided the skills to hold space for compassionate discomfort and disagreement, without getting dysregulated. And schools, globally, need greater support in implementing social and emotional development programs at the level of the whole school.

Social-Emotional Learning (SEL): Helping teachers to address their children's emotional needs

K-12 education has spent the lion's share of its energies on developing the cognitive side of our children. And, that's not a bad thing, don't get us wrong! But, "we" — educators, parents, researchers, and students — are now seeing that "we" need to deal with the emotional, non-cognitive side of our children too. A child who is hungry for food, is not prepared to learn, and a child hungry for emotional stability is also not prepared to learn.

Let's go ahead and explore the role that the classroom teacher can play in helping our children develop just such emotional stability.

The blogpost is written by a noted expert on children, teachers, and education, Dr. Shelja Sen. Based in Delhi, India, Shelja is a co-founder of Children First:

It Takes Courage to Be a Teacher

Prepared by: Dr. Shelja Sen

As a mother and a therapist, I have seen children go through an almost magical transformation every time they have an exceptional teacher. I remember working with a child who was struggling with depression and recurrent self-harm. We had tried all kinds of interventions for months, but the darkness was not budging. Then the school decided to change his section and put him with a teacher whose skills were known far and wide. And what she did was amazing. In a couple of months' time this child had not only pushed depression out of his life but was actively involved in the class play, being a buddy for another child with a learning disability and making new friends. When I asked the boy what had changed, he replied with a shrug and, "Dunno!"

Not satisfied with this answer and thoroughly intrigued, I contacted the boy's teacher and asked her what "strategies" she had used. Her answer was very simple, "I just make sure the child knows that he is loved, he belongs and that the whole class is with him. He is not alone." I remember just sitting still for a long time after talking to her as the power of her words struck me. All that talk and the buzz we hear about classroom management, teaching strategies, and inclusion all amount to nothing if the teacher is not able to love each and every child in the class and make sure they know it.

It is my deep faith that the magical relationship that a teacher builds with each child is the heart, the lifeblood and the bare-bones of learning. I use a simple mantra that I call the message of WOW:
• **W:** You are Worthy as you are now! I will not define your worth by your marks, abilities or background.
• **O:** You are Original! I will value your uniqueness, what makes you — "you" and not compare you to others.
• **W:** You are Welcome! I will accept you as you are, I will not shame you and will make sure I give you an emotionally safe space to grow.

The core thing in WOW is "no matter what" — you are worthy, you are original and you are welcome – no matter what your gender, ability, marks, sexuality, looks or background. WOW is at the core of Socio-emotional learning (SEL).

In order to help teachers better understand WOW, I have an exercise for them:
• To start with, think of one or two children in your class with whom you might be struggling. Now take a paper and pencil or pen, and answer some of these questions.
• **Worthiness**
When I look at/think of this child, do I feel he is worthy of my attention, my recognition, my respect, my trust, my optimism?
Do I see him as worthy as any other child in the class?
Do I make this sense of worthiness unconditional
• **Original**
When I look at/think of this child, do I see the uniqueness of her being?
Do I see her struggles, her difficulties but also her strengths, her assets and her affinities?
Do I connect to what makes this child tick? Do I know her dreams, her passions, what makes her buzz?
• **Welcome**
Do I enjoy the presence of this child in my class?
Do I communicate it through eye contact, calling out his name, greeting him, recognizing him at various levels?
Do I make sure that he understands that he has a unique place in the school community?

As teachers and adults, it is critical that we constantly keep reflecting and asking ourselves these questions. If you felt uncomfortable while doing this reflection, you are on the right track. These are tough and painful questions for us to face. It's not about being a perfect teacher but a more mindful and compassionate one. As a teacher, I have to be aware of children I connect to easily and where the WOW flows spontaneously.

However, more importantly I have to be mindful when I struggle to give WOW to a child. Again, here I would like to reiterate my deep belief that teaching is not about them but about us. It is a daily practice for us to connect to our children and create the wonder of learning. If I am not able to make the connection and see the WOW, I need to dig deep and reflect on what is stopping me from doing that. There is no greater learning than that. No workshop, seminar, training can help me become a better teacher until I look within and face the gremlins that stop me from connecting to the

Game-Based Courses – *Exploring New Paradigms in Game-Based Learning*

GAMES FOR LEARNING TEAM, UNESCO MGIEP
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Ms. Aditi Pathak | NATIONAL PROGRAMME OFFICER, UNESCO MGIEP
Mr. Akash Kumar Saini | DIGITAL PEDAGOGY DEVELOPER, UNESCO MGIEP
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Mr. Devesh Kumar | CONSULTANT, UNESCO MGIEP
Mr. Robin Sharma | GAMING CURRICULUM DEVELOPER, UNESCO MGIEP
and **Mr. Vignesh Mukund** | INDIVIDUAL SPECIALIST, UNESCO MGIEP

Abstract

With the advent of digital technology entering education systems, the potential of digital games based learning is enormous. This article discusses UNESCO MGIEP's approach of harnessing the ability of digital games for building social-emotional skills and the process of designing learning experiences around existing games.

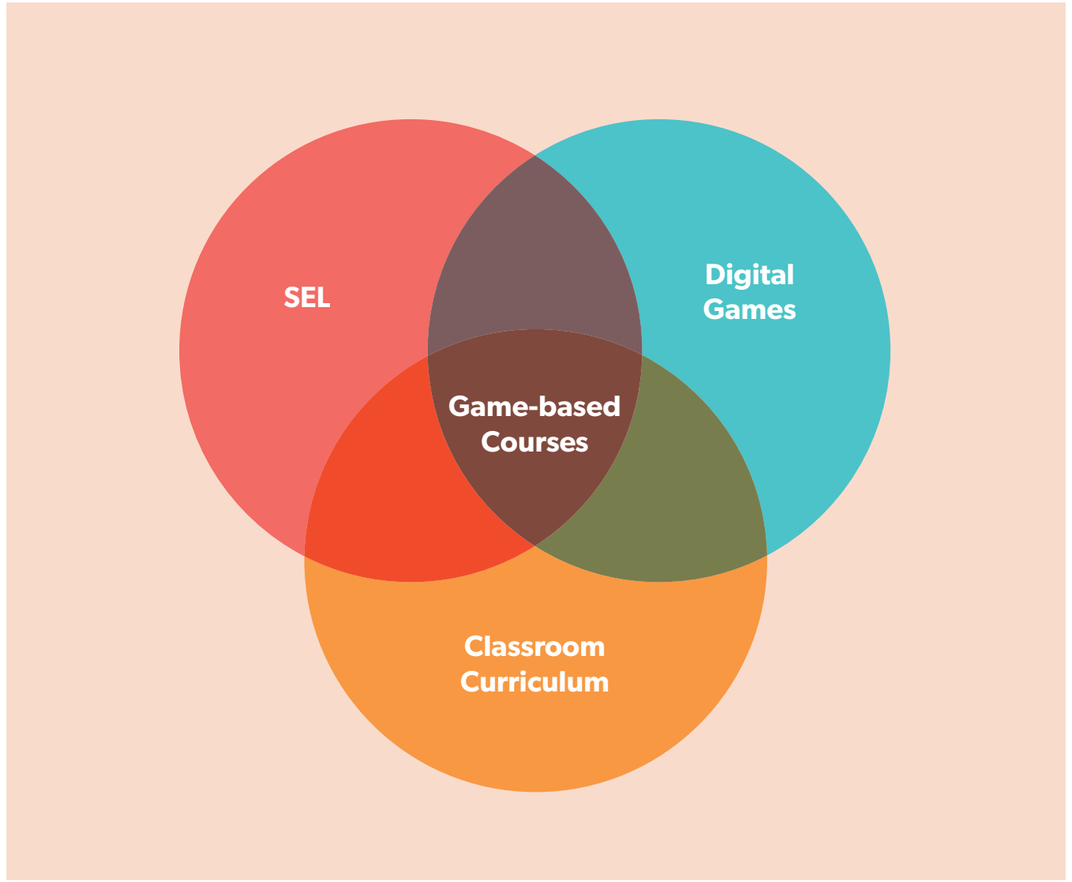
Recent research from the cognitive sciences shows that to achieve learning that is deep, adaptive and lifelong, pedagogies need to include - storytelling; reward; play; curious; reflective; multisensory; interactive and experiential (Rautela & Singh, 2019). Game-based learning is an emerging pedagogical approach that ticks many of these boxes and provides access to content using real-world situations. Emerging research shows that such game-based approaches not only facilitate learning but also enable rapid assessment and real-world skill development (Squire; Shute, Ventura, Kim & Wong, 2012). **Since games are designed using principles of play and motivation, they also allow learners to proceed at their own pace and permit the tracking of incremental progress** (Bavelier, Green, Pouget & Schrater, 2012). In recent years, digital games have emerged as effective tools to teach mathematics, science, humanities and even social-emotional skills (Gee, 2014). This makes it imperative for both teachers and students to be aware of the advantages and potential of games for learning (Kirriemuir & McFarlane, 2004).

Games for Learning: UNESCO MGIEP's Approach

At UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development (MGIEP), we seek to explore the potential of video games by taking learning a step further and have initiated the process of developing game-based courses. While these game-based courses may be created across schools and universities, MGIEP focuses on developing courses for adolescents in the age group of 13-18 years.

MGIEP's mandate is to work towards achieving peaceful and sustainable societies through education – with a focus on social and emotional learning (SEL). Social and emotional learning (SEL) can be described as learning that allows all learners to identify and navigate emotions, practice mindful engagement and exhibit prosocial behaviour for human flourishing towards a peaceful and sustainable planet. Consequently, all game-based courses designed at MGIEP focus on building knowledge about the Sustainable Development Goals (SDGs), while also explicitly cultivating SEL competencies.

MGIEP's game-based courses are designed to leverage the narrative of video games. The game forms the 'central text' around which a curriculum is designed, such that the user acquires new knowledge and cultivates SEL competencies. **Game-based courses provide an opportunity for learners to experience different social reactions and to solve situational problems as well as social dilemma thereby enabling an assessment of the user's actions, motivations, and biases.** This also helps the learner in translating knowledge and skills gained within the game to real-life.



MGIEP conducted a catalytic session entitled 'Gamestorming Curricula' at its annual flagship conference, 'Transforming Education Conference for Humanity (TECH) 2019, during which the Games for Learning team shared the process around which the game-based courses are developed, and how they may be used in classrooms. The objective of the session was to engage in conversations about the process and philosophy of creating game-based curricula and how they might facilitate the cultivation of SEL skills.

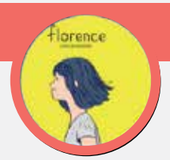
To ensure the efficacy of the course, the creation of the game-based course should be followed by a research study with pre and post-assessments to ensure that the identified competencies are cultivated in students in the classroom.

Process of Designing Games Based Courses

The process of designing game-based courses at MGIEP is rooted in best practices in both instructional design and game mechanics. The various processes involved in designing a game-based course are described below.

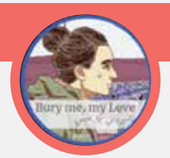
The first and most important step in designing a game-based course involves the selection of the game. The course creator must:

GAME-BASED COURSES BY UNESCO MGIEP



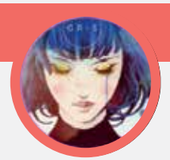
Florence: Perspective and Patterns

Gender Identity: This course explores the concepts of Identity and Gender through the journey of Florence, a 25-year-old girl.



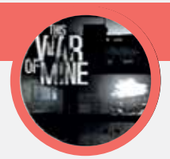
Bury Me, My Love: Identity in Crisis

Refugee Crisis & Identity: This course revolves around the life of refugees, their altered sense of home, belonging, identity and aspirations.



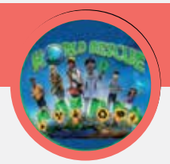
Gris: Perception & Interpretation

Art Appreciation & Critical Inquiry: This course integrates the concept of grief and loss and builds critical inquiry and empathy with the tool of art appreciation.



This War of Mind: To be, or not to be

Prevention of Violent Extremism & Resource Management: This course takes the learner through a set of stories of people trying to survive in war-affected regions.



World Rescue: Decision Making towards Sustainability

Sustainability & Decision-Making: This course explains the overall concept of 'sustainability' while the learners play as different characters from around the world.

Take the courses by logging onto:
https://framerspace.com/

For further information, visit the Institute's website:
https://mgiep.unesco.org/games-for-learning

PROCESS OF CREATING A GAME-BASED COURSE AT MGEIP

Selection of the Game

Identification of Learning Outcomes

Identification of Pause Points

Integration of Instructional Activities

Integrating Assessments

• Identify the specific Sustainable Development Goal (SDG) around which the course is focused and the Social and Emotional (SE) competencies it seeks to cultivate in the learner. SE competencies are specifically centred around MGIEP's framework, entitled EMC^2, which stands for Empathy(E), Mindfulness(M), Compassion(C), Critical Inquiry(C) (Singh & Duraiappah, 2019).

• Games that meet the above requirements may then be explored in greater detail to design the course and curriculum. This requires the games to be played by multiple players (at least 5) followed by objective analysis of its abilities to provide information about knowledge and achievement of the specific SDG and EMC^2 SEL skills.

• This is followed by the creation of course design such that users build explicit knowledge of the focused SDG and SEL skills.

• The last and final step involves identifying specific pause points in the game, during which the user switches from the game to the online course. The pause points are breakaway points from the gameplay and present a crucial turning point within the narrative of a game, allowing users time to reflect, engage in dialogues and discussions, and take perspectives of different users within the game. This is done to indulge the user in explicit learning experiences outside of the game. While designing this process, it is important to keep in mind the pace at which the game should be played in the classroom.

To ensure the efficacy of the course, the creation of the game-based course should be followed by a research study with pre and post-assessments to ensure that the identified competencies are cultivated in students in the classroom.

A few game-based courses that have been created by MGIEP are listed on the page to the left. In case you are interested in participating in any of our research studies around these game-based courses, please contact gamesforlearning@unesco.org

The Catalytic Session was moderated by Mr. Devesh Kumar and the panel speakers included members from the 'Rethinking Learning' team at MGIEP - Ms. Aditi Pathak, Mr. Robin Sharma, Mr. Akash Kumar Saini, Ms. Anurati Srivastva and Mr. Vignesh Mukund.▲

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THEME II :

Reimagining Learning Spaces *for Planetary Citizenship*

TO ACHIEVE A MORE PEACEFUL AND SUSTAINABLE SOCIETY, WE NEED TO MOVE AWAY FROM A CULTURE OF COMPETITION TOWARDS A CULTURE OF PEACE AND COLLABORATION, recognizing spatial and temporal interdependence amongst us, and our embeddedness and dependence on the ecosystems. For education to be transformative, it must explore notions of intersectionality and create learning spaces conducive for people to take multiple perspectives, engage in dialogue and critical reflection, and transform society through self-transformation.

CATALYTIC SESSIONS:

- Rethinking Assessment of Learning for Human Flourishing
- Redesigning Learning Spaces for nurturing Global Citizens
- Fostering Learner Agency
- Innovative pedagogies for SDGs

CATALYTIC SPEAKERS:

Anantha Duraiappah,
Director, UNESCO MGIEP

Elisa Navarro Chincilla
Educational Video Games Developer

Joanna Skorupska,
Founder and Sustainable Future Strategist, Radicalzz Studio

Jon Ramer,
Founder, Compassion Games International

Kavita Rao,
Professor of Special Education at the University of Hawai'i, Mānoa

Matthew Farber,
Assistant Professor, Technology, Innovation, and Pedagogy, University of Northern Colorado

Monisha Bajaj,
Professor, International & Multicultural Education, University of San Francisco

Narendra Mehrotra,
Senior Consultant, UNESCO MGIEP

Nirmal Govindaraju,
Research Assistant Professor, Oklahoma State University, Tulsa, Oklahoma

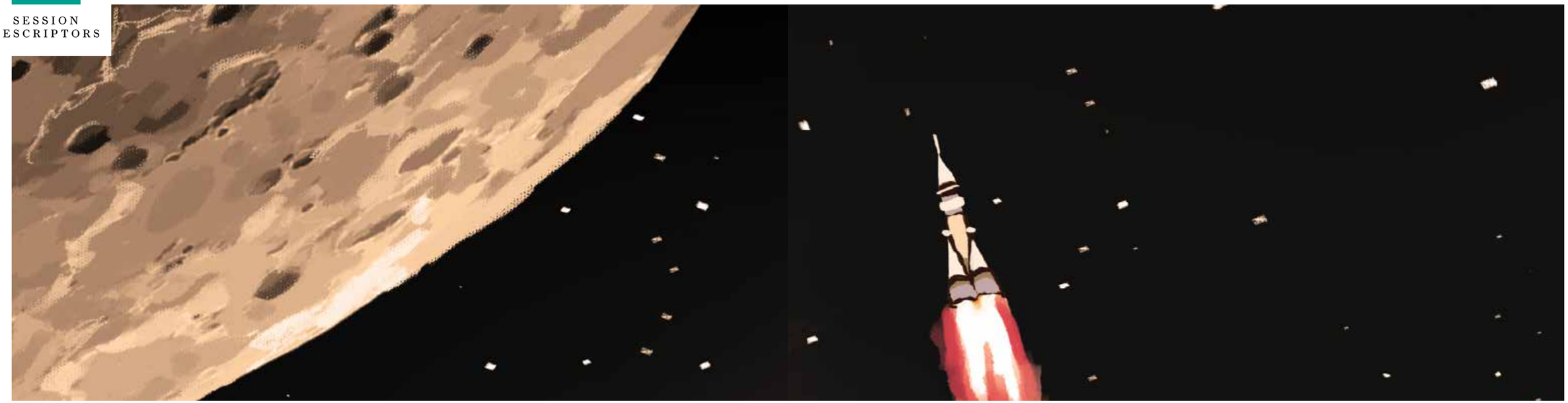
Olivier Crouzet,
Head of Pedagogy at "42", a disruptive educational model and coding school

Paul Darvasi,
Educator, Writer, Game Designer

Santhya Vikram,
Yellow Train School

Tobias Krantz,
Head of Education, Research and Innovation Confederation of Swedish Enterprise

Vipul Reddy,
Head of School Enablement, Khan Academy



CATALYTIC SESSION

Learning Spaces

The Catalytic Session on Learning Spaces explored ways in which the structures and design of learning space influences the quality of the relationships and interactions in the classroom both amongst peer learners and between student and teacher, as well as its influence on quality of participation. Speakers representing traditional, experimental, and digital learning settings shared their experience of creating learner-centric learning spaces, elaborating how learning space can inspire an open and inclusive classroom culture or instigate a regimented one and how it can shape the power dynamics and learner engagement.

CATALYTIC SESSION

Fostering Learner Agency

The Catalytic Session on Fostering Learner Agency was opened by the moderator Prof. Monisha Bajaj, who shared a powerful story of students from a remote school in south India, who used their training in human rights education to demand better quality mid-day meals at school as opposed to the food mixed with dead insects and stones that they were used to being served. During the course of the session speakers went on to unpack the concept of agency in the classroom; its place in the 'Social, Emotional and Ethical (SEE) learning' framework; and the practical things that can be easily done in regular classrooms to promote agency.

CATALYTIC SESSION

Rethinking Assessment for Human Flourishing

The Catalytic Session on Rethinking Assessment for Human Flourishing invited speakers to share their experience of devising meaningful, learner-centric assessment. Assessment is an important determinant to the overall learning experience for both learners and teachers. However, the indicators of educational quality, especially in developing countries, continue to be driven by a utilitarian human capital ideology. The session began with an overview of the skills gap that exists today, and dove into games-based assessment and games that are specifically designed for assessing certain learned skills and knowledge could become effective means for assessment.

CATALYTIC SESSION NO. 11

Innovative Pedagogies for SDGs

The Catalytic Session 11 on Innovative pedagogies for SDGs explored a number of teaching and learning approaches, both digital and non-digital, that hold promise as effective tools for transformative learning. Ms. Elisa Chinchilla, a game-based learning expert from Mexico, shared how a video game on gender-based violence (GBV) is being used to build awareness on gender violence and discrimination amongst adolescents in Mexico; Mr. Nirmal Govindraju shared his experience of using project-based learning (PBL) for STEM learning to cultivate critical thinking and problem solving skills in students from low-resource schools in India. Finally, Prof Bajaj spoke about the role of human rights education in building the learner's knowledge as well as their agency to 'talk back' to hegemonic discourses and effect positive social change.

Beyond Access: Universal Design for Learning (UDL) and ***Digital Tools for Meaningful Inclusion***

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Keywords

- Universal Design for Learning
- Digital Tools
- Instructional and Assistive Technology

Abstract

In the past decade, emerging digital tools have changed the educational landscape, by expanding the possibilities of how we teach and learn. With access to computers, digital devices, and the internet, students have various options to learn, communicate, and create. Technology gives students flexibility and the ability to connect to authentic experiences beyond school walls, providing an engaging and motivating environment for learning. However, used without intentionality and purpose, technology can hinder learning and widen the digital divide in the classroom, disadvantaging some students. To ensure that technology is used to support the learning of all rather than contributing to marginalization of some, it is essential to consider educational technology adoption in the context of inclusion and equity. This paper describes how digital tools can be integrated with instruction in alignment with Universal Design for Learning (UDL) guidelines that promote inclusion.

Inclusion and equity are overreaching priorities of education in the 21st Century as noted in **United Nations' Sustainable Development Goals 4 (SDG 4)**. These goals uphold the importance of access to education for all individuals, regardless of ability, background, and socio-economic status. *Access is an essential aspect of inclusion, ensuring that all learners are able to attend school, participate with their peers, and avail of educational resources.* However, access alone does not automatically ensure that students are meaningfully included in the educational experience. To ensure meaningful inclusion, it is necessary to design learning environments to recognize the variability of learners and to support diverse needs, abilities, preferences, and strengths of all individuals. In an ideal inclusive environment, every student will be supported and engaged in the learning process.

Digital tools, integrated purposefully into learning activities, are a powerful way to support inclusion. Simply having access to digital tools, however, does not ensure that students use the tool to meet learning goals. To maximize the potential of digital tools as a resource for learning, it is important to consider environmental, pedagogical, and student-level factors. This paper describes how the Universal Design for Learning (UDL) guidelines provide a framework for taking these factors into consideration and thereby making purposeful decisions about how we support students with technology.

Universal Design for Learning (UDL)

Universal Design for Learning (UDL) is a framework for designing inclusive educational environments. Developed by the Center for Special Education Technology (CAST), UDL

The concept of learner variability is at the heart of UDL. Learner variability is the recognition that every individual has varied abilities, needs, strengths, and preferences.

is based on the premise that when we design to include those at the margins, all learners will benefit. The developers of the UDL framework noted that it is the curriculum, not the child, who needs to be changed (Meyer & Rose, 2005). As a result, the UDL framework focuses on the reduction of barriers and takes a learner-centered approach to design in order to increase access to learning for all.

The concept of learner variability is at the heart of UDL. Learner variability is the recognition that every individual has varied abilities, needs, strengths, and preferences. In addition, learner characteristics are not fixed and immutable; an individual's needs and preferences can vary and change depending on the situation and environment. By designing with learner variability in mind, teachers can offer flexibility and choice and integrate instructional scaffolds that can be useful for many. Based on the premise that learner variability is the norm, UDL is about proactive design of learning environments, with supports built in and accessible to all students (Meyer, Rose, & Gordon, 2014).

These three principles are further defined by nine guidelines and 31 checkpoints. The UDL guidelines can be downloaded from http://udlguidelines.cast.org/. Using the UDL guidelines, we can build in supports and scaffolds that address learner variability and make learning environments more inclusive of all students, including those with varied experiences, backgrounds, and ability levels.

Based on research on cognition and learning, the principles of UDL address how, what, and why we learn. The three principles of UDL are:

PRINCIPLE 1

PROVIDE MULTIPLE MEANS OF REPRESENTATION (WHAT WE LEARN)

PRINCIPLE 2

PROVIDE MULTIPLE MEANS OF ACTION AND EXPRESSION (HOW WE LEARN)

PRINCIPLE 3

PROVIDE MULTIPLE MEANS OF ENGAGEMENT (WHY WE LEARN)

Educational and Assistive Technologies

Emerging digital tools have the potential to transform education. These tools can help teachers create engaging and relevant learning experiences for students. Technology allows us to consume, create, and share information in ways unprecedented in the past. Today's digital tools can play a powerful part in learning, allowing students to (a) search for and find information on any topic, (b) access information in a variety of formats, (c) create information and (d) easily share information andinteract with others locally and globally.

In addition to the ways in which technology allows us to access and share information, digital tools have brought assistive technology features to our fingertips. Assistive technologies that were once specialized are now available for free or at low cost, easily accessed on commonplace devices, such as our laptops and mobile phones. For example, speech to text software (e.g., Siri) is commonly used to convert what we say aloud into a text message. We can also easily convert text to audio, watch video clips to learn a variety of skills, and invoke translators, grammar checkers, and online dictionaries with ease. These assistive features, which were once the realm of specialized assistive technologies, are now available within our everyday tools. In addition to assistive supports, digital tools include various multimodal options that can support diverse learning needs. Multimodal features of technology allow us to integrate visuals, audio, video and text and give students various ways to consume and comprehend information and demonstrate what they know.

Emerging digital tools have the potential to transform education. These tools can help teachers create engaging and relevant learning experiences for students.

Simply having access to digital tools, however, does not ensure that students use the various features and supports that make them powerful tools for learning. For technology to support meaningful inclusion and equity in the classroom, it is necessary to consider the features of digital tools in the context of the learning experience (Nelson, Fien, Doabler, & Clarke, 2016). It is imperative to evaluate how technology supports the purpose of lessons and learning objectives for the students. Digital tools can then be integrated into the learning environment to support individual students as well as to facilitate learning for all.

Considerations for Fostering Inclusion and Equity with Technology

Technology integration into education begins first with basic access to the tools. Before we can decide whether and how to use digital tools for instructional purposes, it is important to consider who has access to the tools and what additional supports they need to have sustained access. Taking learner variability into consideration, there are several pre-requisite questions in relation to these issues of basic access:

1. For the student, what barriers exist in relation to technology access?

2. For the student, what aspects of the technology are cost-restrictive?

3. Are there learners who do not have prior experiences with technology and who will need additional support to effectively use the tool?

4. If technology is used for educational purposes, do students have access to the technology at home?

5. For students who can benefit from specialized tools and assistive technologies, is there support to learn and use these tools and features?

6. How can all learners be given access to the assistive features of technology that are built into digital devices?

After considering issues of basic access to the tools, we can examine digital tools from the lens of meaningful inclusion and equity. The UDL guidelines can be used to ensure that digital tools can facilitate learning for all. The table below presents examples of ways in which digital tools can be integrated in alignment with UDL guidelines.

EXAMPLES OF USING DIGITAL TOOLS FOR INCLUSION/EQUITY

UDL Principle I: Provide Multiple Means of Representation

Digital tools provide several features and affordances that inherently provide multiple means of representation. The multimodal nature of digital information and the flexibility of digital text are two powerful ways to address learner variability. The three UDL guidelines under Representation focus on providing options for:

1. Perception	• Built in features to modify display of information (contrast, font size, spacing) can provide options for perception. These options can be essential for learners with sensory disabilities and learning disabilities (Dawson, Antonenko, Lane, & Zhu, 2019). • Multimodal aspects of technology affords varied formats for accessing information (e.g., using photos and/or audio) instead of just text (Bryant, Ok, & Rao, 2014; Rao, 2015)
2. Language, mathematical expressions and symbols	• Digital text is inherently flexible, allowing users to engage with information in varied ways. Assistive features such as text-to-speech and other literacy support tools (e.g., hyperlinks to definitions, annotating) can support decoding, vocabulary, reading fluency and comprehension.
3. Comprehension	• Online sources provide information in varied and multimodal formats; this can be used to build background knowledge and support comprehension.

UDL Principle II: Provide Multiple Means of Action and Expression

Digital environments provide a canvas for demonstrating skills and knowledge in varied formats. Integrated into instruction, technology gives students alternatives for demonstrating their understanding and articulating their knowledge. The three UDL guidelines under Action and Expression focus on providing options for:

4. Physical Action	• Built in assistive technologies provide varied means of action and expression. It is important to ensure that students know how to and when to uses these features in the context of instructional activities (Ok & Rao, 2019).
5. Expression and Communication	• Multimodal environments can be used for creating and demonstrating knowledge, giving students means of expression that go beyond traditional written products and assessments. These tools can be integrated purposefully to give students scaffolds for expression, e.g., using photos, audio, and video instead of or along with text to articulate information. (Hitchcock, Rao, Chang, & Yuen, 2016; Skouge, Rao, & Boisvert, 2007)
6. Executive Functions	• Several features of technology can support executive functions that are essential for learning (processing information, memory, organization, goal-setting). These include software/apps for calendars, reminders, note-taking, and audio recording. (Ok & Rao, 2019)

UDL Principle III: Provide Multiple Means of Engagement

Digital tools are inherently engaging for students, and teachers leverage on this for instructional purposes by considering when and how these tools can connect students to others and to authentic, engaging, and relevant purposes. The three UDL guidelines under Engagement focus on providing options for:

7. Recruiting interest	• Online resources provide a source of authentic and engaging information and materials to use in classroom activities. Using internet-based tools and social media, teachers can go beyond textbook learning to increase relevance and help students make connections.
8. Sustaining effort and persistence	• Collaborative documents allow students to create and develop information collectively. For example, using Google Docs or Google Slides, students can build a classroom book with each student taking ownership of one page/slide.
9. Self-regulation	• Video self-modeling (VSM) is a technology-based strategy that can be used to support self-regulation of students. VSM can be used to foster self-efficacy around academic, behavioral and social objectives. (Hitchcock, Dowrick, & Prater, 2003)

Although digital tools continually evolve and change, the core features that make them assistive learning tools will remain. By considering the features of the tool in the context of UDL, teachers can integrate technology with the lens of good design, focused on creating learner-centered and inclusive learning environments. ▲

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EXPERT PIECES

Video Games Are Not *Educational Technology*

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Keywords

- Video Games
- Educational Technology
- Constructionism
- Game-Based Learning

Abstract

Well-designed video games create meaningful experiences for players (Culyba, 2018; Fullerton, 2018; Isbister, 2016); good educational video games balance player actions with learning outcomes (Groff, Clarke-Midura, Owen, Rosenheck, & Beall, 2015). Balanced design video games engage by increasing in task complexity, but may not emotionally resonate with players. This paper argues that focusing on designing balanced design may have had unintended consequences, such as the reinforcement of notions that video games can also be used as transactional teaching machines. Several frameworks are shared that can marry the design goals of teaching and games that seek to create meaningful player experiences. Ideas about extending learning to other contexts are also shared.

Introduction

In 2017, the United States Department of Education's Office of Educational Technology added video games to its National Education Technology Plan (NETP). The NETP presented video games as all-in-one teaching machines that could instruct, engage, and assess learners. It concluded by recommending further research into "how embedded assessment technologies such as simulations, collaboration environments, virtual worlds, games, and cognitive tutors can be used to engage and motivate learners while assessing complex skills" (National Education Technology Plan, 2017, p. 90).

As it happens, **recent research about educational gaming has suggested efficacy in the alignment of core mechanics (repeated actions players take) with learning outcomes** (e.g., Groff, Clarke-Midura, Owen, Rosenheck, & Beall, 2015; Klopfer, Osterweil, & Salen, 2009; Hapgood & Ainsworth, 2011). Instead of using playful interactions as reward, balanced design video games embed learning into the tasks of gameplay. For instance, in the tablet game DragonBox Algebra (We Want to Know, 2012), players learn algebraic thinking through core mechanics of cancelling and balancing playing cards that appear on two sides of a digital box. In other words, players learn algebra by doing algebra.

While engagement, motivation, and learning outcomes from playing games like DragonBox Algebra have been observed, transfer of knowledge from the game to other contexts (e.g., solving actual algebra problems from a textbook) has been less evident (e.g., Long & Aleven, 2017). Further, reports like NETP, which focus on psychometrics, reinforce notions that video games are educational technology tools that can be harnessed as transactional teaching machines, used to augment, or replace, textbooks—not experiences that can transform learning. Of course, we want increased learning outcomes, and not glorified digital worksheets. However, video games can be used for more than transmitting knowledge.

Students can also analyze and design games for learning which can boost social emotional learning competencies such as social awareness and self-awareness

This paper argues that video games can support transformational learning. For instance, project-based learning can be married to game-based learning, thus deepening student understandings of abstract concepts. *Students can also analyze and design games for learning which can boost social emotional learning competencies such as social awareness and self-awareness* (CASEL, 2019).

Transforming Students

Educational games—including those that are balanced in design—tend to be teaching machines because they focus on explicit purposes of teaching content or skills to students. Commercial games, however, are designed differently: Player mastery of tasks is part of an overall experience. For instance, when playing Assassin's Creed: Odyssey (Ubisoft, 2018), players become immersed in ancient Greek philosophy, geography, and history; but, learning about classicism is secondary to the players' experience in that world.

Herein is the difference between educational games and commercial games: *good learning games that are balanced show efficacy in teaching can become quickly boring or rote, as they do not consider player experience as primary.* In commercial games—games created for entertainment purposes—the player's experience is often the focal design goal (Culyba, 2018; Hunicke, LeBlanc, & Zubek, 2004; Schell, 2008); all of the core mechanics, rulesets, and goals exist to create an emotional experience (Fullerton, 2018; Isbister, 2016).

The Mechanics Dynamics Aesthetics (MDA) Framework (Hunicke et al., 2004) is a widely adopted model for designing and analyzing games (e.g., Ralph & Monu, 2014; Schrier, 2019; Walk, Görlich, & Barrett, 2017). This framework is systems-based, recognizing that games are not transmissive forms of media; rather, games are artifacts, as their underlying systems alter based on player decisions (Hunicke et al., 2004).

Using the MDA Framework enables game designers to select mechanics that create a dynamic system which evokes aesthetics, or emotional responses from players. Playing games can be fun and/or competitive, but also can evoke nuanced emotions such as feelings of fellowship, discovery, complicity, guilt, shame, or pride (Hunicke et al., 2004; Isbister, 2016).

When analyzing games, Hunicke et al. (2004) suggest starting with mechanics, then dynamics and aesthetics. Using the analog (non-digital) party game Happy Salmon (North Star Games, 2016) as an example, the game is played as players stand in a circle and draw cards with physical actions (i.e., "fist-bump," "high-five"). **The goal of the game is to discard all cards in a player's hand, which can only be accomplished by calling out the action and then performing that action with another player who has that same card (call out fist-bump, then fist-bump another player).** Through MDA, Happy Salmon's mechanics are all of its components, which are the decks of cards, and its rules. These mechanics are static until gameplay begins, which then creates a dynamic system. The result of that system are player emotions such as frivolity, and happiness.

Happy Salmon teaches matching concepts through a balanced design framework (Groff et al., 2015). However, this game was not designed to be a transactional teaching tool: it is a party game. While matching cards is how players win, it is also the action that creates the dynamic system that evokes the aesthetic goal of happiness.

When designing games, Hunicke et al. (2004) suggest using the framework backwards: Consider desired aesthetics, or player emotions, as the design goal. Building on this notion, the Transformational Framework (Culyba, 2018) similarly can be used to design games. Transformational here refers to games designed with the intention to change players in some way" (Culyba, 2018, p. 7).

When designing transformational games, Culyba (2018) recommends centering on the player, making the goal of the game both assessable and achievable so that any transformation can be compared to the player's initial state. In other words, when making a game that teaches reading, player emotions around feeling positive about reading should be the desired goal; fluency and literacy then follow.

Games + Constructionism

While playing video games can be seen as constructivist, or learning by doing (e.g.; Gee, 2007), some games present learning as constructionist (Kafai & Burke, 2015; 2016). Constructionist gaming blurs playing games with the design and prototyping games that often is followed by sharing within communities of practice (Kafai & Burke, 2015; 2016; Papert, 1980). Kafai and Burke (2015; 2016) observed that beyond learning from playing games, making games can be part of larger ecosystems where players become designers.

Constructionist gaming platforms include Minecraft, a sandbox of exploration and construction that can be transformational to learning (Karsenti, Bugmann, & Gros, 2017). Playing Minecraft can boost a child's creativity, innovative thinking, and problem-solving abilities, while at the same time teaching necessary content and skill knowledge (Butler, Brown, & Críosta, 2016; Karsenti, Bugmann, & Gros, 2017). Microsoft purchased Minecraft in 2014, and then published an educational modification, Minecraft: Education Edition in 2016. In this version, students record and document their own learning using blocks unique to the Education Edition such as camera blocks and digital chalk boards.

Sandbox games like Minecraft use digital objects (i.e., blocks and resources in the player's inventory) as "objects-to-think-with" (OTTW; Papert, 1980; Brady, Holbert, Soylu, Novak, & Wilensky, 2014; Holbert & Wilensky, 2019). Holbert and Wilensky (2019) suggest that in addition to balancing game mechanics with learning outcomes, embedding OTTW in the player experience can be transformative to how children learn in educational games.

Not all sandboxes are transformational to learning, as teachers may encourage students to follow specific recipes to create to their desired outcomes, rather than promote playful experimentation

and tinkering (Resnick, 2017). Restricting play with OTTW can restrict learning, as it can turn open-ended play into digital equivalents of fill-in-the-blank worksheets. (This may be evident in some science, technology, engineering, and math (STEM) kits, which can be assembled in only one "correct" way.)

Conversely, just as some teachers adapt textbook materials to drive constructionist learning, some transactional learning games may be used by teachers in transformative ways. In schools, games can be used intentionally, embedded within a larger set of curricular goals and learning objectives, as well as surrounded by a variety of activities to foster deeper learning. For example, after an extensive literature review of existing frameworks and digital games about ethics, Schrier (2015) proposed the Ethics, Practice, and Implementation Categorization (EPIC) Framework, which included educational goals and strategies. Ethics in games can help players cultivate social and emotional skills such as responsible decision making.

As the field of game-based learning evolves and matures, it should focus not just on balanced design and embedded assessments. Balanced design educational games align learning outcomes with core mechanics, while commercial games are often designed with player emotion as its desired outcome.

Schrier (2015) recommended open-ended activities and student reflections that can help promote transfer of learning from the game to real-world contexts. Further, constructionist tenets that undergird project-based learning, such as student voice and choice, authenticity, public product, and reflection (Gold Standard PBL, 2019), can follow playing educational, as well as commercial, games. This builds on Kafai and Burke's (2015) notions around constructionist gaming to broaden to "games + constructionism." Here, students design and share personally meaningful external artifacts, which may not necessarily be games at all. After experiencing a game, students can then write reflections, as well as create projects that extend learning from games to the real-world.

Conclusion

As the field of game-based learning evolves and matures, it should focus not just on balanced design and embedded assessments. Balanced design educational games align learning outcomes with core mechanics, while commercial games are often designed with player emotion as its desired outcome.

Transformational game-based learning means that the student-as-player's experience is primary. To be transformational, all games—including balanced design educational games—must start by considering the player experience as paramount. ▲

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Schools Must Prioritize ***Fostering Learner Agency***

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Abstract

In this essay, an argument is made for the importance of transformative agency as a core competency for students. Transformative agency emerges from educational research on agency and resistance as a form of action and orientation rooted in Freirean notions of critical consciousness and praxis. Transformative agency lies at the center of justice-oriented educational projects, such as education for peace and human rights. To meet the challenges of the 21st century, educators must foster the transformative agency students as a core civic function along with conventional objectives of education, such as literacy and numeracy. A holistic framework for transformative agency is reviewed and examples are given about how educators can support the cultivation of student agency.

The concept of "agency" lies at the core of many liberatory forms of education that draw from Brazilian philosopher Paulo Freire's theories of education raising learners' critical consciousness and equipping them with the knowledge, skills, and networks to act for positive social change (Freire, 1970). The term agency is utilized widely across disciplines to refer to a variety of behaviors and actions. This essay explores the concept of transformative agency (Bajaj 2009, 2018; Hays, 1994), which lies at the center of justice-oriented educational projects, such as education for peace and human rights. In the opening example from Tamil Nadu, India, learning about human rights led to students collectively organizing for change through a catalyzing of their transformative agency. To meet the challenges of the 21st century, educators must foster the transformative agency of students as a core civic function along with conventional objectives of education, such as literacy and numeracy.

Agency in Educational Research

In educational research, two groupings of agency/resistance emerge through ethnographies of schooling and examinations of social inequalities in education: (1) oppositional resistance, and (2) transformative/strategic resistance (Aronowitz & Giroux, 1993; Giroux, 1996 & 1997; Solorzano & Delgado Bernal, 2001; Willis, 1977). Scholars have asserted that individual consciousness and community resistance through collective action have some role to play in transforming schools from serving only the dominant class to serving the interests of other sectors in society as well (Apple, 1982; Foley, 1991; Freire, 1970; Aronowitz & Giroux, 1993; Noguera & Cannella, 2006). Through the cultivation of an individual and collective consciousness based on a critique of social inequalities, belief in one's present or future agency may ensue. Departing from traditional resistance theorists who see agency primarily as opposition (Willis, 1977; MacLeod, 1995), critical theorists Aronowitz and Giroux assert that "the concept of resistance must have a revealing function that contains a critique of domination and provides theoretical opportunities for self-reflection and struggle in the interest of social and self-emancipation" (1993, p. 105). Freire (1970) argued that education must heighten students' critical consciousness as they come to analyze their place in an unequal world, and that resultant from this elevated critical consciousness is a transformative sense of agency that can lead to individual and social change (Bajaj, 2009; Noguera, Cammarota & Ginwright, 2006; Giroux, 1997; Noguera, 2003).

Transformative agency can be fostered among students in various settings and more recent empirical research in the United States and globally has identified such agency-enabling factors as participation in activist-oriented afterschool programs

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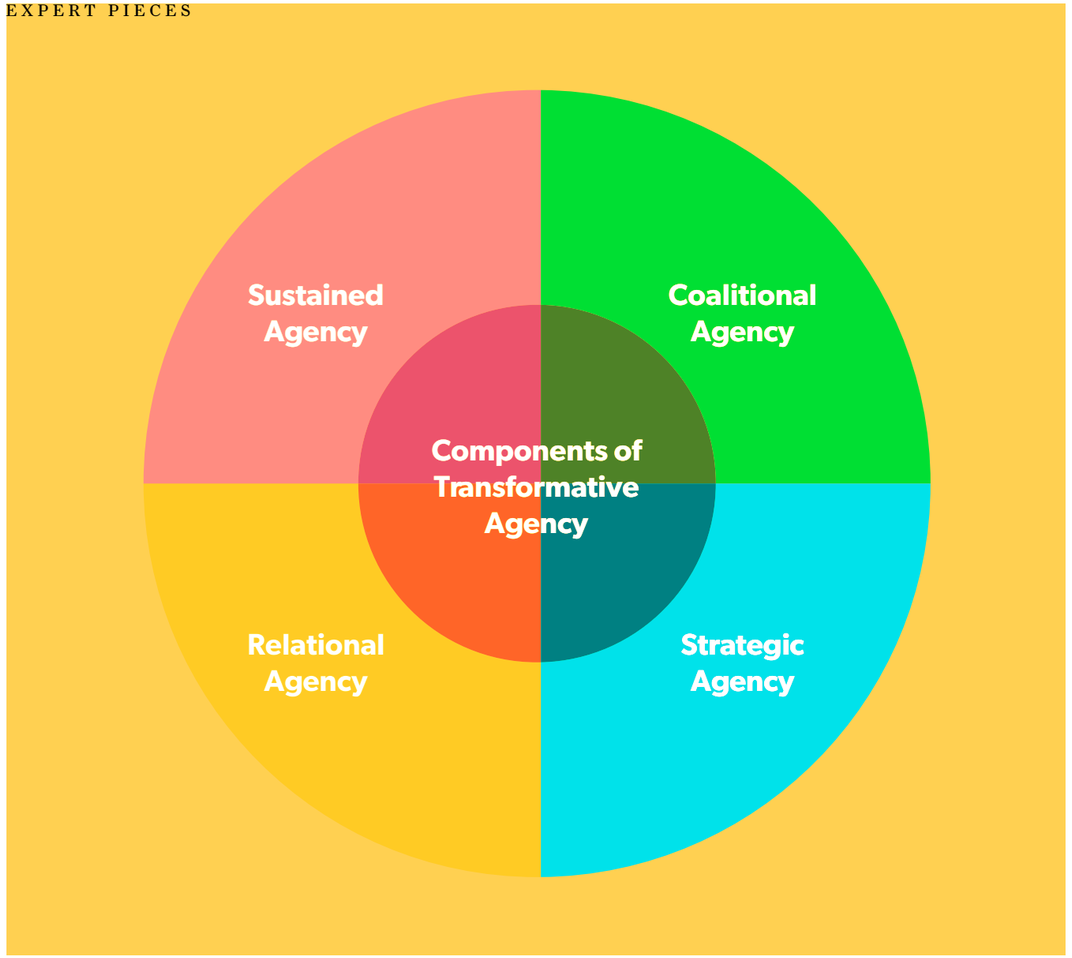

From Bajaj (2018)

What are ways that this comprehensive form of transformative agency can be fostered in classrooms? Some examples include leveraging human rights, peace, or environmental action clubs that can take action in schools and communities.

enabling factors as participation in activist-oriented afterschool programs (Bajaj, 2009 & 2012; Kwon, 2006), knowledge of and personal contact with those engaged in collective struggle (O'Connor, 1997) and deliberate efforts to foster agency through school discourses and practices (Bajaj, 2009, 2012; Miron & Lauria, 1998; Shah, 2016).

Transformative Agency

In conceptualizing transformative agency, I present four dimensions explored in scholarship from various fields to offer a framework that is elaborated more fully in Bajaj (2018). In this model, transformative agency is constituted by (1) Agency that is sustained across contexts and time, (2) Agency that is relational and enacted with others; (3) Agency that attends to the bounded-ness of peoples, histories, cultures, and contexts (Chavez & Griffin, 2009); and (4) Agency that is strategic with regards to analyses of power, long-term consequences, and appropriate forms of action. Taken together, these dimensions can ultimately better equip learners to interrupt and transform unequal social conditions and, I argue, constitute the four necessary components of "transformative agency."

What are ways that this comprehensive form of transformative agency can be fostered in classrooms?

Some examples include leveraging human rights, peace, or environmental action clubs that can take action in schools and communities. Students can also participate in international events such as the recent global youth-led climate strike in which millions in the past months have taken to the streets to demand attention to climate change and its impact on communities around the world. Other examples include children's parliaments and student government that exhibit leadership in decision-making. Students can also be supported to engage in community efforts for social change ranging from public service projects to advocacy and activism for social justice. Such forms of learning can support how students can live in the world as civic actors who know how to engage productively for the social good. **Justice-oriented education that fosters transformative agency can begin at an early age, with more ability of young people to explore systemic inequalities and violence usually by ages 12 and above.** There are many forms of integrating rights issues into existing programs in ways that deepen the learnings of participants, in a variety of subjects. Many sports programs even integrate socio-emotional skills or peacebuilding lessons (such as Soccer without Borders, Border Youth Tennis Exchange, and the Hope through Hoops Program of the Hi5 Foundation). Courses and afterschool/summer programs related to social issues and action, the arts, and leadership—such as programs like Global Kids, The Brotherhood/SisterSol or the Bay Area Solidarity Summer—would all be well-suited to greater integration of the components of transformative agency to better enable a more holistic approach to its cultivation.

By fostering a sense of transformative agency—informed by insights from diverse scholarship on sustained agency, relational agency, coalitional agency, and strategic agency—educators, youth, and families can explore gaps between rights and realities, and the necessary individual and collective work that can help achieve a more just society. ▲

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Kids Want to Play Video Games, but ***Do They Want to Play Educational Video Games?***

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Keywords

- Educational Video Games
- Edutainment
- Serious Games
- SEL
- Play
- Video Game Industry
- Developers Game Design

Abstract

A fifty-four-year-old history has taught us that video games are very powerful tools for learning. As developers of educational video games, we want to share what we have learned in the past ten years; especially around the experience of creating games for socio emotional learning, such as "Chuka", a game on violence prevention developed for UNODC. We hope it might be useful for those who want to develop or promote the use of games for SEL.

When speaking about video games, it's quite common to listen at first, the impressive numbers around this industry: 2.2 billion players, almost one third of the population worldwide; and an annual revenue of $137.9 billion dollars in 2018 (Newzoo, 2018). "The commercial appeal and success of video games is often a part of an argument promoting the use of video games as learning tools" (Schrader, 2010), but let's take it with a grain of salt. There are many strategies

When speaking about video games, it's quite common to listen at first, the impressive numbers around this industry: 2.2 billion players, almost one third of the population worldwide; and an annual revenue of $137.9 billion dollars in 2018

to embrace games into schools: gamification, game based learning or use of commercial games within learning processes are some approaches. But what about developing a whole video game specifically for one learning objective? Here we will focus on some affordances and drawbacks of educational video games, especially for socio emotional learning (SEL) games.

Educational video games aren't something new: The Sumerian Game/ 1966, Logo Writer/ 1967; The Oregon Trail/ 1971; are some initial examples. Fifty-four years have gone past and whilst trying to understand their potential, terms such as "Serious Games" appeared, created by Clark C Abt's in 1970; or "Edutainment", previously used to define educational TV shows. The 80s and 90s was the golden age of educational video games industry. Many games were launched by the big industry companies, such as the Mario's educational series: Mario Teaches Typing, Mario is Missing; Sonic's series; Reader Rabbit series; Math and Reading Blaster series, etc.

But, why did the big companies withdraw? Was there something wrong with those educational video games? Weren't they appealing enough? Or was is it that the children were too lazy to learn? If you enter any gamer blog, you will find plenty of answers. For example, regarding Mario Teaches Typing, Meowkie comments: "As a kid, I was always really sad that the typing material wasn't Mario related :/" (YouTube, 2008) Or this blog title in thegamer.com: "29 Ridiculous 90s Educational Video Games That Taught Kids Nothing" (Jurkovich, 2018). Most of the games back then had problems with their game design. Many of them were actually, drill sheets, multiple choice tests, drag and drop interactives, all disguised as video games.

The clearest term to define this is: "Chocolate-covered broccoli." The term coined in 2001 by author Brenda Laurel in her book Utopian Entrepreneur, speaks to the idea that many forms of edutainment poorly integrate the entertainment part of the equation—leading to a result that still tastes pretty bad, even though it has something really sweet right on top. (Smith, 2017)

Big companies desisted from developing educational commercial games as they wanted revenue and educational products were not the golden goose. Nowadays, most educational video games are not really a subgenre of this bigger industry; they have more to do with the educational services industry, with academic research within universities, or NGOs and foundations strategies, rather than with the multi-million investment of the entertainment world. **Who funds educational video games and on what purpose is sometimes the clue to understand how much they can**

Literature has clearly shown that video games are very powerful tools for learning: they are great problem-solving tools where children can learn by trial and error, practicing in a risk-free virtual world.

impact learning. Big commercial companies not only invest in the production, they also invest in distribution, advertising and maintaining the games, which is an unaffordable proposition for agents such as game developers.

Fortunately, life is not only about money, and even if educational games are not as profitable, we should definitely look at ways to develop them. **Literature has clearly shown that video games are very powerful tools for learning: they are great problem-solving tools where children can learn by trial and error, practicing in a risk-free virtual world.** Children learn by doing and they can advance at their own pace, receiving immediate feedback to guide them. Kids can immerse emotionally in fantasy worlds and learn from distant realities, past and present. Video games are great motivating tools: "long, hard, and challenging… Of course, designers could make games shorter and simpler. That's often what schools do with their curriculums. But gamers won't accept short and easy games" (Gee, 2007).

Researchers espouse the educative properties of games (e.g., Gee, 2003; Schrader & McCreery, 2007; Squire, 2006; Steinkuehler, 2006; Young, Schrader, & Zheng, 2006). However, developers do not necessarily leverage the current knowledge base when creating games even though researchers' arguments are abundant, convincing, and pervasive (Schrader, 2010).

Evidence from game based learning literature exhorts us to keep exploring ways to create good educational games. Here are a few useful insights to consider when making one:

1) **We shouldn't underestimate kids/players** and try to trick them with either "Chocolate-covered broccoli" or easy, non-challenging games. Games should be "pleasantly frustrating" as Gee calls them, and very fun.

2) **We need to think about implementation** before educational games are even developed — who will really use them and why would they use them? How will they receive the game? Are there lesson plans, implementing team, alliances with ministries of education, schools, teachers or parents?

3) **Video games are not diagnostic tools,** unless they are really mindfully designed to be one and players are aware. Even if we can record all children's moves, right and wrong answers and have all these data in beautiful dashboards with graphics, kids tend to play within the game.Therefore their answers might not correspond to what they would actually do in reality or what they would like to do, they are probably only testing a game mechanic or trying out to see what happens.

4) **We should try to create new mechanics,** new game structures for educational games. Sticking a commercial mechanic into an educational game feels disjointed. The educational objective should be the game mechanic itself, let's move away from chocolate covered broccoli.

5) **We shouldn't be trying to copy commercial discourse** if we can create peaceful, collaborative, inclusive video games. For example, "there are many game worlds where the highly "marked" or marginal, or altogether absent, gender is female" (Carr, 2006). Developers of educational videogames should avoid reproducing such gender stereotypes, even though they may be pervasive in popular games, as it may unfavourably affect their perception about gender roles and identity, among other things.

6) **We shouldn't be trying to copy commercial games look** in their scope and graphics, to be as appealing, especially if there are not enough resources to do so. For example: it's better to have a good 2D than a terrible 3D animation.

7) **We should be very conscious about access to connectivity and hardware** to avoid making technology another means of reinforcing privilege and inequity. We should know that in most school computers it's very challenging to run heavy graphics and RAM demanding games.

Socio emotional learning video games are part of all we have mentioned, however there are some special affordances and considerations to mention exclusively for this genre:

1) **Immersive narratives can create empathy towards the unknown.** Educational games are a subgenre of "serious games", which is a huge term that basically comprises all those games that have an extra interest beyond pure entertainment, such as political, social, climate awareness, etc. Many of these serious games share emotional personal experiences, as literature has done for centuries: stories on migration, gender discrimination, war experiences, living with a disability, etc. are a glimpse to the game themes we can find. Some serious games might not be intended as learning video games but they are definitely useful for SEL, as you get to step into someone else's shoes and feel their emotions and experiences.

2) **Video games are excellent simulators for practicing.** Trying out your own emotions without having impact on real life is one of the great affordances of SEL video games. In the game we developed we've seen kids trying out all sorts of emotional reactions towards violence, sometimes breaking some gender stereotypes: boys letting themselves feel like crying or girls being physically violent.

3) **Role playing and avatars have shown to be very powerful tools for self-awareness.** "The sense in which the player both is, and is not, the avatar, is central to the experience of the game" (Burn, 2006). I can be someone else and me at the same time; which allows me to explore how much of me is in the avatar, therefor who am I and who I'm not. "Yet, on the other hand, there is a sense in which players merely accept and play out the roles determined for them by the game texts devised by global corporations, dominated by patriarchal narratives" (Burn, 2006). When designing educational video games, we should be aware of not reproducing this "male-dominated power rhetoric's of combative play" (Burn, 2006).

4) **Games are rules systems which enable understanding and practicing rules and limits within society.** Following the game rules is an intrinsic part of video games, if you don't follow them you're out of the game, and thus will miss out on all the fun. .

5) **Games are always a simple version of reality.** Even with the most advanced AI, we should always remember that games have been programmed and are limited to their design. This is very important when speaking about SEL, as choices, human reactions and emotions are simulated and limited to what has been programmed; it still doesn't have the richness, randomness or complexity of life.

6) **Online multiplayer games have shown to be super powerful for collaborative learning.** Although this is not the case for educational video games, except Minecraft edu, as developing this kind of games for educational purposes is very complex and expensive. However, collaboration versus competitiveness is something to be considered in the design of educational video games.

7) **Easier software with less need on coding is now available.** It is now possible for teachers to use simple software for developing video games. Even better, having kids do their own educational video games could be very powerful.

"You cannot play a game if you cannot learn it" (Gee, 2007). Games are exceptional tools for teaching.

However developing a video game is a complex, expensive and time consuming process. *So the question still remains, should we invest in developing educational games or should we stick to what commercial games offer, hoping something as useful as Civilization appears?* And who should invest? Does it make sense to give tools to teachers and students to create their own? Does it complement or contradict the learning and curriculum demands? Schools invest in buying all-inclusive platforms. Can developers make unique games profitable and in which contexts? Although there are examples of profitable educational games that really take into account the affordances of the media, such as DragonBox, Fruit Ninja, etc.; but they are few and far between. The fact remains that most of what passes off as educational games are actually edutainment apps in the mobile stores, that make conventional teaching "fun" by adding colors and animations. Having said that, this shouldn't discourage us from exploring the wonderful possibilities video games offer, especially now that mixed reality is almost about to become part of our daily lives, offering possibilities to expand. ▲

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Reimagining Science Teaching for ***Low-income Children***

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Keywords

- Low-income Children
- 'Slow Learner'
- Science Education

Abstract

Indian school education fails to equip students with critical thinking and problem-solving skills. Lack of such training stymies holistic social, economic, and cultural development. Hence, there is a dire need to develop approaches for critical thinking and problem solving in the current reality of the Indian classroom which includes poverty, poor pre-service and in-service teacher training, vast and burdensome syllabus, inadequate facilities, geographic diversity, and so on. This paper explores possible approaches for addressing this need for low-income children in Grades VI - IX in the context of science learning. It is shown that even within the constraints of the current education system, children with significant conceptual and language gaps are capable of assimilating and applying complex science concepts. By constructively involving teachers in developing and refining these approaches, it will be possible to harness children's innate ability to imagine, explore and innovate for the benefit of the nation and the world.

1. Introduction

This article summarizes preliminary observations which show that children from low-income backgrounds often labeled as "poor performers" or "slow-learners", when given a structured environment where they are allowed to explore and construct their understanding in a scaffolded manner, are capable of assimilating, creatively applying and communicating science concepts at, or above, grade levels in short periods of time.

1.1. Status of Indian School Education

India has one of the largest school going populations in the world, with approximately 340 million children of school going age ("C-13 single year age returns", 2011). About 70% live in rural areas and a similar number attend Govt. schools. While the school enrollment rate (~97%) is at a record high, the quality of education is abysmal. It is estimated that approximately 27% of children in Grade VIII cannot read Grade II text, and 56% of the children in Grade VIII cannot perform 3-digit-by-1-digit division ("Annual Status of Education Report", 2018). India is also far behind in cultivating critical thinking, problem solving and communication skills in children. For instance, India was second last in a group of 73 countries (Singh, 2019; Chappia, 2012) in the 2009 round of Programme for International Student Assessment. Such continued dismal performance will have negative repercussions on economic, cultural, social, and technological development.

India has one of the largest school going populations in the world, with approximately 340 million children of school going age

1.2. Challenges Faced by Children and Teachers in the Classroom

It is beyond the scope of this article to discuss the complex web of issues which lead to poor learning in the majority of Indian classrooms. However, there are several common concerns raised by students and teachers across multiple geographic locations.

1.3. Common issues raised by children

1. **Lack of voice and activity in the classroom** - often articulated by students as teachers "talk too much", or by saying that they do not like the "lecture method" of teaching.
2. **Hectic schedule. Packed, rigid "timetables" prevent children from engaging in play, exploring and applying their learning. Children often articulate this issue by saying that they have "hectic" schedules and lack "breaks" between classes.**
3. **Onerous syllabus and lack of conceptual understanding.** Voluminous textbooks and burdensome syllabus do not give students the time and space to understand and apply concepts. These issues coupled with poor reading and numeracy skills lead students to complain that they are not able to "understand questions or answers in their exams."

1.4. Common issues raised by teachers

1. **Non-academic workload.** Teachers often voice their frustration about being burdened with non-academic duties which take away time from working with students.

2. Socioeconomic stressors. Children in poverty are often subject to abuse, neglect, undernourishment, unstable homes, migration, crime, exploitation, and other challenges which lead to a host of behavioral and cognitive issues in the classroom. Pre-service and in-service training fails to equip teachers with the requisite skills to deal with these extremely challenging issues.

3. Academic Issues. Poorly thought through or executed policies and processes often stymie the work of well-intentioned, hardworking, and creative teachers. Issues raised by teachers under this category include curricular overload and misaligned assessments which test for recall, deputing teachers not trained in subject areas for teaching science, large classroom sizes, a single teacher having to teach multiple grades in multiple subject areas, mandatory professional development which does not align with teacher needs, school management and government education system focusing on "exam performance", and lack of effective support.

4. "Slow-learners." Teachers often complain of "slow learners" to describe any child who is not able to "pay attention" or "perform" in classroom. The indiscriminate use of this term traditionally used to describe children who have lower than average intelligence quotients (IQ between 70 and 85) but do not have intellectual disability (IQ less than 70) ("Slow learner FAQ", 2020).

There is a dire need to devise approaches which will help teachers support students' learning within the constraints of the current education system in India.

This misconception stems from a lack of understanding of how children learn, and correspondingly low awareness of the spectrum of learning difficulties and disabilities. Therefore, there is a strong possibility, as discussed below, that many children labeled as "slow" or "poor performers" may in fact be highly intelligent, but are not inclined to learn by the "paper and pencil" approach.

In summary, there are host of issues which even well-meaning teachers face in helping children learn. Therefore, **there is a dire need to devise approaches which will help teachers support students' learning within the constraints of the current education system in India.** The rest of this article provides an outline of the principles and their application which will help children develop critical thinking and problem solving skills in Indian classrooms.

TABLE 1: LIST OF 'DIFFICULT' TOPICS (GRADE VIII), BY SUBJECT AREA, COLLATED FROM STUDENTS AND TEACHERS

PHYSICS	CHEMISTRY	BIOLOGY	MATH
Earthquakes, winds, storm, cyclone, lightning	Mole, metals and Non-metals	Classification	Geometry Problems, Mensuration
Light, Light as Energy, Why we see only one side of the moon?	Chemical Formulae and Equations	Diversity	Comparing Quantities, Factorization
Sound	Ionic Reactions	Nitrogen Cycle	Linear and Alg. Equations, Identities, Polynomials
Chem, Effects of Electric Current, Flow of Charge		Cell Structure and Function, Tissues, sexual reproduction	Fundamental integer operations, Exponents, Rational and Irrational numbers, Compound Interest

2. Meaningful Science Learning in the Context of the Indian Classroom

2.1. Core Principles

The following core principles underlie the preliminary work with children and teachers discussed in the following pages.

a) Scientific "method" and "real-life" connect. Through discussion and practice, help children understand that science is a process through which they can iteratively construct and apply sophisticated conceptual understanding using simple day-to-day life experiences and materials.

b) Children discover and construct concepts. With textbook as the basis, provide opportunities for children to construct, test, and evolve their conceptual understanding in the classroom through structured, scaffolded questions and child-driven demonstrations. The instructor's role is mainly focused on guiding the thought processes of the students.

c) Peer-learning. Tap into peer-learning mechanisms and provide diverse opportunities for children to communicate their understanding.

2.2. Rationale

Connecting everyday phenomena to textbook conceptual content enables children to organically see connections between seemingly "difficult" and "esoteric" concepts and their daily life. Children also implicitly understand the complex connections between different concepts and learn to apply them using simple everyday materials thereby increasing self-motivation, confidence, communication skills, and concept retention. Since the concepts are textbook-based and involve peer-learning, it reduces the effective teaching time and burden. Since children pick concepts of their choice, the difficulty level is "pegged" to a level sufficiently interesting and challenging for the children. Also, by giving children a free hand on how they choose to construct their knowledge, children with different modes of learning are effectively able assimilate and apply concepts.

2.3. Student Groups

The "Core Principles" outlined above were used in different contexts with approximately ~250 children, including:

a) Group 1: approx. 30 tribal girls (Grades II - XII).
b) Group 2: approx. 65 orphaned and destitute children (Grade VI).
c) Group 3: 40 low-income rural children from residential schools (Grade IX).
d) Group 4: approx. 120 urban low-income children (Group VI).
The work with the above groups of children was done in different geographical locations between June 2018 - June 2019.

Fig 1: Kaleidoscope made of by children without using mirrors.

Fig 2: Gadget built by children to illustrate effects of forces.

Most of the children had significant literacy, numeracy and conceptual knowledge gaps, and Group 3 children (from rural residential schools) were in fact labeled by their teachers as "slow learners" who were "average" or "below average" in classroom "performance." While the instructional approach varied based on context, the core principles and patterns of learning remained same across groups. In the interests of brevity, a brief summary of the work done with Group 3 children is discussed below.

2.4. Application of core principles for "slow learners"

Group 3, Grade IX children, considered as "slow-learners" were spread across three independent two-day workshops held in different locations in India - Bengaluru, Karnataka (20 students), Lucknow, Uttar Pradesh (12 students), and Dist. Kamrup, Assam (8 students). On Day 1 the children, along with their teachers, discussed their perceptions of science and what they felt they "liked" and "did not like" about learning science and math. Teachers and students were also asked to list "difficult topics" in these subjects (see Table 1) from Grade VIII.

On Day 2, students and teachers were split into groups, were assigned one "difficult" topic per group and were given ~2 hours to develop their ideas on specific concepts of their choice within the topic. To simulate resource constraints, the groups had to develop and present their ideas with a limited number of low-cost locally available items given to them. Textbooks were available and everyone was free to talk to their peers. Students and teachers were not allowed to talk to each other. The student groups were asked structured, probing questions to help them focus their thought process, and elicit answers from them. In general, no conceptual or design help was provided.

2.5. Results

Across all three locations students classified as "slow learners" did an outstanding job of creating, demonstrating and presenting "projects" on "difficult" topics with limited materials and only 2 hours of time. Few highlights are given below.

a. Demonstrated "proof" of laws of reflection on plane and curved surfaces by using a protractor, the polished metallic leg of a chair and a laser pointer.
b. Fashioned a kaleidoscope with plastic sheets, waste cardboard, and an LED (Fig 1).
c. Developed a creative way of showing that force causes an object to move. The students fashioned wheels out of cut paper cups, an axle with post it notes and pasted plastic bottle caps on the axles so that when water falls on one of the caps, it causes the axle and wheels to rotate (Fig 2).
d. Inferred: (i) that sound is caused by vibrations, (ii) relative speed of sound in different media, (iii) basics of acoustic impedance and dampening.

2.6. Conclusions

Given a structured environment, where students are allowed to explore and construct their understanding in a scaffolded manner, children from low-income backgrounds, and diverse geographic locations often considered as "slow learners" or "poor performers" consistently show outstanding creativity and ability to assimilate and apply science concepts at, or above, grade level. By co-opting motivated teachers in low-income schools, it will be possible to help children learn and apply science concepts in challenging environments.

3. Acknowledgements

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EXPERT PIECES

UNESCO MGIEP TECH 2019 - CASE STUDY 42

OLIVIER CROUZET

Head of Pedagogy
42

Abstract

42 is an information and communication technology (ICT) school that first became operational in Paris, France, and has now expanded across ten countries. It is tuition free, with no degree requirement, it targets anyone above 18 years old with an ICT talent to train them and lead to the labor market as an ICT professional. 42 is based on the peer-learning approach, where students are posed with software development challenges which they need to resolve without the help of any teacher, lecture or any MOOC. Learners seek information, learn how to filter and then use it to co-create software. Collaboration is a key element of this process. With a gamified approach that encourages a try-and-fail experimental model, 42 develops both technical and soft skills required by companies. In a labor market which is driven by a high demand of skilled ICT professionals, 42 brings its students to a successful and sustainable career.

The Project

42 was created in 2013 by Xavier Niel, who is the owner of one of France's four big telecom companies. **The main purpose of School 42 is to support the French e-economy by providing more ICT trained people and bridge the skill gap.** As our French public education system is failing to close this gap, and has not been successful in developing the new expected skills for this 4th industrial revolution, 42 chose a unique pedagogical model which allows students with an aptitude for ICT to be trained,

independent of their origin, their personal situation or their past academic performance.

The peer-to-peer learning model is inspired by the works of Swiss psychologist Jean Piaget, French pedagogue Celestin Freinet and Italian educator Maria Montessori. Our approach is a blend of practice, project-based learning and collaborative learning. There are no teachers, no lectures or any online video. The students are posed software development challenges where they need to create pieces of software. But they do not receive any hints or recipe. It is each student's job to search for information and then filter this information. Indeed, there could be some doubt regarding information they find, whether it is true or false, relevant or irrelevant. Testing all these small elementary bricks allows them to select the correct ones for the task. Usually, this cannot be done alone and demands the students to debate, collaborate and exchange ideas on how they understand the subject, and how to resolve it. The emphasis is on creating collective intelligence, and bring in new hypothesis. At the end of this trial and error approach, the project is completed.

Then comes the peer evaluation. *Every project is evaluated by five other students. In case the project could not be completed, the project is retried, and registers no progression. In case of success, the next project(s) is/are unlocked to allow moving forward in the curriculum.* Also, each successful project yields some points for experience that add up to the general level of a student, allowing the student to meet eventually 4 out of 17 skills defined by

In traditional education, there is stigma attached to failure. In a gamified approach, however, students can try, fail and try again multiple times until they get to the next level, which legitimizes trial and error learning.

the curriculum. This is part of a larger gamification mechanism: just like in video games, students start at level 0 and with more than 200 projects available all along the curriculum, they progress up to level 21. The gamification also includes coalitions (houses like in Harry Potter), quests, achievements and badges. It is a motivation lever for the students and encourages employing the trial and error method. *In traditional education, there is stigma attached to failure. In a gamified approach, however, students can try, fail and try again multiple times until they get to the next level, which legitimizes trial and error learning.*

Therefore, the peer-to-peer learning model not only develops ICT skills but also their key soft skills such as adaptation, problem solving, collaboration, self-learning, critical thinking and creativity. In five or ten years, our students will face new technology, new problems, and they will need to adapt to keep their job. The learning context created in 42 is similar to the project culture in many startups, and encourages an agile mindset necessary for thriving in an unpredictable age.

Selection Process

The selection process gives equal opportunities to all applicants irrespective of their backgrounds. The selection process is rigorous and inclusive, and allows anyone to test their ICT aptitude, regardless of their educational or social background. The selection process is divided into two parts in progressive order. First there are two online games that are similar to coding. After clearing the first part, applicants can proceed to access the Piscine sessions which consists of 4-weeks-long immersive test that allows the applicants to discover coding and whether the peer-to-peer learning pedagogical model is for them. It includes some very basic C programming exercises to discover and learn the essentials of programming: functions, variables, loops, conditions, recursivity, simple string and memory management.

The Curriculum

The first part of the curriculum is standardized across all the 42 campuses, which covers a minimal set of ICT skills and soft skills that is required of an entry level professional experience such as internships. This also leads to possible campus exchanges, and cross campus projects.

Students learn about the C programming language and develop simple software using classic algorithms such as recursivity, linked lists, sorting, memory management and string manipulations. The POSIX API allows file system access, while Unix processes management, network coding and threads. They learn about simple network and system administration approach such as IP, subnet, DNS and Docker. Object oriented programming is introduced, completed by a client-server project. This first part of the curriculum ends with a complete web project using a random framework among classics such as Rails, Symfony, Django, and so on.

During this first part, students can progress at their own pace. This is designed to allow students to do a part-time job to earn a livelihood, as well as allow slower students to fully develop their skills. However, students have a maximum of 1 year and a half to complete this first part. Failing to meet this deadline, nicknamed the Blackhole, has serious consequences. The student is then required to leave the school. However, in actual cases, with the help of a unique tool, students have the option to freeze the curriculum, up to three times, for a maximum period of six months.

The second part of the curriculum covers classic ICT topics such as Artificial Intelligence, security, graphics, functional programming, networking & cloud, system

The first part of the curriculum is standardized across all the 42 campuses, which covers a minimal set of ICT skills and soft skills that is required of an entry level professional experience such as internships.

administration, advanced Unix/Posix programming, advanced web programming, mobile development, data management, Kernel programming and gaming. Each student is free to choose his or her specialization in two or three topics, or to have a more general ICT knowledge. Students can also opt for internships, side projects with companies, entrepreneur program, partnerships with students in business schools, arts and design schools and so on. This part of the curriculum emphasizes several soft skills such as teamwork through group projects, adaptability and professionalism required to work in companies, so that students remain relevant and productive even as they become experienced professionals in their fields, 5 or 10 years down the line.

Once students have become gainfully involved in the labor market, they can decide when they want to end their course and become alumni. Even in case they do not progress enough in 42, they will automatically become alumni after a period of inactivity.

The Outcome

Internships have been a key quality indicator. **Many companies have used our platform to offer jobs and internships to students who reach the requirement for a professional experience.** The demand is twice as high as the supply, which reflects not only the high demand for such professionals in the market but also assures high quality of our trained young professionals.

The alumni network provides access to events, services and connections that support all 42 alumni in their professional life. It also promotes 42 among the companies, explaining the possible output profiles of the students, based on an overall level achieved and skills developed though the curriculum, to facilitate recruitment. Those alumni who want to keep a strong connection with 42 can be involved in specific pedagogical activities as well. Finally, the alumni network compiles statistics on salary growth in the course of the careers of our former students.

Conclusion

Today, School 42 has 14 campuses across several countries beyond France namely, USA, Belgium, Netherlands, Finland, Russia, Morocco, Spain, Brazil, Japan, Korea and more to come. The high scalability of the peer-learning model allows for an easy setup and deployment of the full system. Over the years, School 42 has created a worldwide community of learners and alumni. While promoting a different educational approach for a digital revolution, the 42 Network aims to become one of the largest networks of IT campuses and learners in the world.

We strongly believe that, like every other field of economy or society, education must change its paradigms and undergo a digital transformation. 42 is a working example of what can be done, and many others schools, in all the learning topics, should exist and offer new approaches. Ultimately, a fully individualized learning path, fitted to everyone's needs, time, capabilities and talents, where you will cross other learners' path and interact to co-create — that is our vision for the future of education. ▲

The Ludic Century: How Games and Play might ***Help Dismantle the People Factory***

PAUL DARVASI

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Abstract

In the past decade, games have emerged as a potent social and economic force. The video game industry's annual revenue now surpasses film and music, and we are currently experiencing a global explosion of board games, card games, role-playing games, and mobile games. Far from a fad, games are a direct cultural expression of our computer-centred world. Computers have cultivated a climate of interactive and individuated participatory media emblemized by games, which stand in stark contrast with passive spectatorial media such as film and television. Games, then, are characteristic of our current cultural paradigm and game-like dynamics will have a growing influence and shape social institutions and practices, including schools. Schools were designed and largely continue to operate according to an industrial template that has fallen out of step with a rapidly changing society. However, as games and game-like dynamics become increasingly woven into the social fabric, we can anticipate that schools will also follow suit and transition to approach learning in a manner that is individuated, choice-based, participatory, playful, and dynamic: all features of a good game.

The Ludic Century is upon us, where games and game-like experiences increasingly permeate our lives. *Global video game revenue now surpasses that of the film industry, board game cafes are cropping up in cities all over the world, and gamification is infiltrating everything from corporate training to airline loyalty programs.* In his "Manifesto for a Ludic Century",

renowned game designer and scholar Eric Zimmerman forwards the notion that culture and society will increasingly operate according to game-like paradigms. But, why now? Why games? And, more pertinently, how does this bear on the future of teaching and learning?

Before we advance the proposition of a world infused by games, let's step back for a brief historical detour. Since the inception of the industrial revolution three hundred years ago, the factory has occupied the symbolic, economic, and material centre of the modern world. Look around: most of the objects in our midst and their attendant economies are the product of factories. The engines of industry not only produced an abundance of goods, but also shaped some of our most important institutions. French philosopher Michel Foucault argues that prisons, hospitals, and schools were all designed to function with the logic of a factory. In schools, students are annually conveyed along the assembly line and, at each stage, they receive a program of uniform instruction. Critiques of schools are nothing new, and are well warranted, but it's also important to remember that we are indebted to the imperfect industrial systems for mass education and widespread literacy. However, **as we endure the environmental and social fallout of mass-produced consumer culture and are confronted by the structural limitations of school that have barely inched forward in 150 years, it is clear that we are long overdue for a change.**

As we endure the environmental and social fallout of mass-produced consumer culture and are confronted by the structural limitations of school that have barely inched forward in 150 years, it is clear that we are long overdue for a change.

As the factory continues to chug along, its heir apparent, the networked computer, has efficiently grown to occupy the center of culture, society, and production. Much as the factory's imprint molded so many modern institutions, the computer will also reshape the world in its own image. Unlike the uniform, large-scale material replication of its predecessor, computers are dynamic information systems that are personalized, interactive, participatory, rule-based, and flexible. Now, substitute the word "games" for "computers" in the last sentence and their affinity becomes strikingly apparent. In his brief manifesto, Zimmerman even ascribes causality with the notion that "computers didn't create games; games created computers." It's intriguing to think that chess and senet may be early ancestors of the modern microprocessor, and that the pebbles for the first abacus were the very same the Greeks used for a round of petteia.

Whether or not games gave rise to computers is certainly debatable, but what is clear is that the two are intertwined expressions of this moment in history. Our zeitgeist is coloured by computers and games, and this is by no means limited to digital games, as we witness an explosion of board games, mobile games, card games, escape rooms, LARPS, alternate reality games and countless other manifestations of ludic entertainment that are enjoying unprecedented popularity. Games are also used to incentivise health, personal finance, productivity management and even to motivate kids to brush their teeth. Far from fads, these may be harbingers of a historical shift that will increasingly weave the functions and dynamics we associate with games into the socio-cultural fabric. The effects could touch every aspect of life, but my interest here is only a brief sketch of how this might look for education.

I have experimented extensively with integrating all types of games - including commercial video games - in diverse instructional settings. The results are promising, to say the least, but the meaningful change will occur when the instructional settings themselves transcend their industrial constraints and restructure according to more gameful dynamics. The spectatorship that characterizes industrial media also informs industrial education. Much like newspapers, film and television, professors and teachers lecture for the passive consumption of their captive audience. It's no coincidence that lecture halls and movie theaters share almost identical designs. However, largely due to computers, we transitioned to what media scholar Henry Jenkins terms 'participatory culture', where, rather than merely spectating, we also interact and produce. This is the case with social media, YouTube, online forums and, most notably, games. Like computers,

Can we imagine a future where grades by age-grouping are desegregated and each person follows their own learning path as they level-up at their own pace?

digital and analog games are necessarily participatory. We learn best by doing, and a pedagogy of participation underpins the maker movement and popular student-centred initiatives like inquiry-based learning; however, much work remains to reconfigure school systems to align with the participatory ethos.

Interactivity and engagement often involve choice and, in games, players make choices which differentiate their experiences and outcomes. Similarly, the availability of meaningful choices and options offers a vision of learning that surpasses the constraints of the assembly line and genuinely caters to the strengths, interests, and abilities of the individual. *Can we imagine a future where grades by age-grouping are desegregated and each person follows their own learning path as they level-up at their own pace?* Rather than being dragged along the conveyor belt of classroom instruction, they might instead have the opportunity to detain themselves on concepts, passions, and skills to be more deeply explored and mastered. **Choice can also be exercised in how one will be assessed, how one's learning might be reported, how learning can be tailored to specific communities, and how one might design a unique but flexible learning path.** This vision may seem idealistic, but no less so than a school today would seem to a nineteenth century child working 60 hours a week in a mill.

In Homo Ludens, Dutch cultural historian Johan Huizinga reminds us that even animals learn through play. However, coercive and economically enforced labor is a prominent feature of industrial production; the human body bends to become a component of the manufacturing machine. Likewise, schools also grew to employ tactics of enforced labor to condition minds and bodies. Tight schedules, bells, and concentric circles of discipline optimize the efficiency with which we cram information into the supple minds of our youth. What is often lost in the grind of the learning machine is nature's preferred methods of learning: play and exploration. Play can be hard work, but it doesn't feel that way. Where labor pushes, play draws and invites. Play accommodates a ranging mind to a ranging world, where hard laws are replaced by soft rules. The ancient Romans so connected play and instruction that their schools where called ludi from singular ludus, a word which means play and learning. Games are designed play, and some of their structuring characteristics could be grafted to redesign instructional environments to channel the power of play.

Media philosopher Marshall MacLuhan maintains that technologies do not disappear in obsolescence, but are absorbed and live concurrently with their successors. Books were absorbed by radio that was absorbed by television and film and, in turn, they were each absorbed by the Internet. In every case, each medium not only amalgamated, but continued to co-exist. Likewise, industrial labor and the mass production of learning will not completely disappear, but persist in conjunction with the emerging paradigm. Scholar Julian Kücklich's portmanteau term playbour captures an ethos that marries play and labor and, with the proliferation of computers and AI, we can hope for a genuinely individuated forms of mass education. **Factory schools are starting to buckle under the pressures of the Ludic Century, and the sooner they succumb, the sooner we can save the legion of youth from a grinding system that is rapidly descending into irrelevance**. ▲

THEME III :

Data, Learning & Education

Role of AI

DATA SCIENCE, in general, & **MACHINE LEARNING,** in particular, has caught the imagination of the world and the field of education too has seen widespread utilization leveraging 'narrow' (specialized) AI such as automated grading, adaptive learning, individualized content discovery at scale. AI could instantly help discover an astounding amount of information, curate supplementary learning resources to meet individual student interests and needs, provide teachers with a virtual teaching assistant, and allow students to connect with peer learners as well as a virtual peer or tutor wherever and whenever needed. The collective wisdom of teachers and students could be garnered to expand the realm of possibilities for education.

KEYNOTE:

- Common Sense in the Age of AI by Michael Witbrock, Cycorp

CATALYTIC SESSIONS:

- Individualized Learning at Scale - Oxymoronic or Utopian Reality (Computer Human Interaction)
- Technology with Emotions - But we are talking about Bots right?
- Big Entry Barriers - Battle of Perceptions (Data Privacy & Ownership)
- Is Technology Socially, Educationally & Culturally Agnostic?

CATALYTIC SPEAKERS:

Amit Goyal,
Head edX, India & South East Asia

Christopher Piech,
Professor of Computer Science at Stanford University, USA

Ehsan Hoque,
Asaro-Biggar Family Assistant Professor of Computer Science at the University of Rochester

Harri Ketamo,
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Shadi Abou-Zahra,
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Stuart McNaughton,
Professor of Education at the University of Auckland and Director of the Woolf Fisher Research Centre/ Te Pūtahi Whakatairanga Hapori Ako Angitu

Cathleen Norris,
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Dan Shefet,
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Gregoire Borst,
Professor of Developmental Psychology and Cognitive Neuroscience of Education, LaPsyDE, France

Michael Witbrock,
Cycorp

Shane O'Connor,
Versatile facilitator, trainer and educator

CATALYTIC SESSION 3

Individualized Learning at Scale

Oxymoronic or Utopian Reality (Computer Human Interaction)

Individualized learning in itself is a complex task. It presents even greater challenges when we intend to scale globally. The only way till now scaling has been achieved is through standardization and the same seemingly is paradoxical to individualization. To create truly inclusive learning environments, ability to acknowledge and express learner's individuality in a virtual environment is paramount. Adapting virtual environments to the learning needs of an individual has traditionally been the domain of experts, making it expensive and logistically challenging to do at scale. The same in the past has led to inequity in educational outcomes. This session invited speakers to share role of emerging technologies like reinforcement learning, semi-supervised learning, natural language processing, computer vision etc. that may be critical to provide personalized education at scale. The session focused on sharing of real-world scenarios where this gap between seemingly paradoxical concepts has been bridged leveraging technology.

CATALYTIC SESSION 6

Technology with Emotion

But We Are Talking About Bots right?

In this new world, a combination of human and computing intelligence has the potential to deliver a higher quality education, where human responses and emotions are pivotal. Thus, understanding a learner's affect throughout the learning process is crucial for understanding motivation. New developments in cognitive science are unravelling the mysteries of emotions; the findings have much to teach us about how students do—or do not—learn. This session focused on exploring the role of affective computing in the context of virtual learning environments. The session also delved into some practical considerations to alleviate concerns over how technologists can prove efficacy and safeguard student privacy.

CATALYTIC SESSION 9

Big Entry Barriers

Battle of Perception (Data Privacy & Ownership)

It's impossible to determine the success of technology in the learning context until it is finally integrated and used effectively in the classroom. The root cause of the same is less of a technical issue than it being an issue of perception. Technology giants too haven't helped their case by blatantly violating basic user data privacy, as recent media coverage suggests. This has resulted in educators being hesitant in incorporating technology into their teaching plans, demonstrating that technology integration is still facing a great deal of resistance. Without utilizing these excellent tools to their maximum capabilities, educators can't be sure what technology, especially AI, can offer to learners or where it truly falls short. This session brought to light the various non-technology factors that are affecting the adoption of technology within the education ecosystem. Panellists explored factors such Data ownership, Data privacy, Data localization, Transparency in monitoring competency and performance from both educator and learner's points of view to ensure that technology can be leveraged to reduce our mechanical workload and make us think deeply as to what makes us truly 'human'.

CATALYTIC SESSION 12

Is Technology Socially, Educationally & Culturally Agnostic?

One of the barriers inhibiting adoption of technology globally is the perceived inability of technological tools and systems to understand contextual nuances like that of culture, geography, language etc. In the highly nuanced world of education, can technology be truly leveraged for in-depth changes in the way learners learn? Can there still be certain best practices that can be shared across various contextual silos that help learners globally learn from each other's triumphs and failures? The session delved into the state of the art technological advancements that hold the promise of doing just that including deep dive in the field of Machine Translation, Natural Language Processing, Universal Design of Learning (UDL) in context of breaking culture, geography and language silos.

A Vision of AI for Joyful Education: ***Research Goals to Avert Danger and Maximize Benefits***

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Abstract

Artificial intelligence (AI) has great potential to improve learning globally. But, is the contemporary direction of research building towards the useful, joyful education that we dream of for the next generation? The ultimate goal of research into AI for education is often imagined as the creation of a truly intelligent autonomous tutor – and the AI research community has been making steady progress towards this goal. However, as we get closer, it seems apparent that we haven't fully engaged with the potential harms AI tutoring could cause and rarely raise the question of how AI tutors would support communal learning. In this paper we outline key dangers and desiderata in AI education research. We then put forth a set of short-term challenges for the research community that we believe maximize benefit and minimize risks of applying AI in education. We open this conversation up to the AI research and policy community, broadly imagined.

Introduction

In 2013, Facebook launched an initiative to provide free, basic internet to the world and thus spread opportunity and interconnection [1]. However, the Human Rights Council reported that in Myanmar this program accelerated hate speech, fomented division, and incited offline violence in the Rohingya genocide [2]. Free, basic internet now serves as a warning of the complexities of technological impact on society. For Chris, an AI researcher in education, and Lisa, a student of cyber policy, this example gives pause: What unintended consequences could AI in education have?

Many look to AI-powered tools to address the need to scale high-quality education and with good reason. A surge in educational content from online courses, expanded access to digital devices, and the contemporary renaissance in AI seem to provide the pieces necessary to deliver personalized learning at scale. However, technology has a poor track record for solving social issues without creating unintended harm. What negative effects can we predict, and how can we refine the objectives of AI researchers to account for such unintended consequences?

For decades the holy grail of AI for education has been the creation of an autonomous tutor: an algorithm that can monitor students' progress, understand what they know and what motivates them, and provide an optimal, adaptive learning experience. With access to an autonomous tutor, students can learn from home, anywhere in the world. However, autonomous tutors of 2019 look quite different from this ideal. Education with auto-tutors usually engages students with problems designed to be easy for the algorithm to interpret – as opposed to joyful for the learner. Current algorithms can't read motivation, and are far from engendering long-term learning gains, instead focusing on engaging students for the short-term. The technical challenges are enormous: building the ideal auto tutor could be as hard as reaching true General AI. The research community has seen this as a challenge: we simply need to overcome our technical shortcomings to achieve the utopian dream.

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But is the auto-tutor utopia a dream worth building toward? In this paper we offer some dangers that arise from use of artificially intelligent systems such as auto-tutors and call for research into approaches that harness the potential good from application of AI in education, while mitigating the risks. We believe our vision of thoughtfully developed AI systems working in tandem with naturally intelligent humans can support a broad community of learners around the world.

Three Dangers of Integrating AI in Education

1. Undermining socio-emotional connections and skills

Students go to school for many reasons outside of rote knowledge acquisition, including development of socio-emotional skills, human mentorship, and human community. For all the potential inadequacies of human teachers and traditional classes, displacing these structures has costs. Many of us remember learning from teachers whose mentorship and guidance extended far beyond the subject they were charged with teaching. Might AI displace these interactions?

Furthermore, loneliness is on the rise, with younger generations lonelier than older generations [3]. One study found a relationship between depression among adolescents and screen time, compared to youth who spent time on offscreen activities such as in-person social interactions, sports, or homework [4]. Decreased screen time could lead to significant gains in empathy levels [5]. As UNESCO considers reorienting goals of education to emphasize development of socio-emotional competencies that allow for peaceful and sustainable societies, compelling children toward screens may undermine those goals [6].[1]

Students go to school for many reasons outside of rote knowledge acquisition, including development of socio-emotional skills, human mentorship, and human community.

Yet AI systems tend to be designed to maximize the time students spend online. Even executives who develop addictive technologies understand these risks, as many send their children to expensive screen-free private schools for "the luxury of human interaction," while poorer students are pushed toward cheap technological solutions [7]. Even as these solutions become more sophisticated, they could hurt students. For example, personalized learning modules powered by AI could undermine vital meta-learning skills such as the ability to self-regulate, as students might adapt to machines doing the work of regulating their attention and fail to cultivate their own capacity to do so. Likewise, students might lose the ability to adapt independently to creative tasks in the real world that do not provide immediate feedback or guidance.

Meanwhile, the disruption AI introduces in the classroom could extend into homes and communities. Authority figures including teachers and parents may not adapt easily to a curriculum ported entirely onto digital devices, no matter how much "humanity" such technologies display. This resistance could be stiffest in traditional communities living in poverty, where some see the greatest potential impact from AI technologies, as families unaccustomed to children spending time on screens may resist the shift from human mentorship to AI tutors.

The tradeoff between increased knowledge acquisition in exchange for less human-led learning is especially negative if it turns out that the tools are not as good at improving knowledge as we hoped. Given the vital role that motivation plays in learning and the technical challenges we have yet to overcome, that is a distinct possibility.

2. Misuse of AI in education to extend power

We must also consider the possibility that malevolent actors will harness newly powerful and motivating educational tools to teach violent subject matter. In the same way Facebook's rise amplified both destructive and democratic organizing, newly effective teaching tools could help terrorists scale trainings about acts of destruction. Moreover, the goal of developing human-like empathy in AI-tutors will require processing deeply personal data on the learners' emotional and psychological states. Will oppressive governments use troves of psycho-emotional data on citizens from the time they are school children for persecution or power consolidation? Or, seemingly more benign: will the rich just get richer?

While advocates tout the potential for AI-enabled educational tools to democratize education globally, researchers must consider how these tools can perpetuate or increase inequality. Privileged groups with access to digital tools become the source of training data for current AI algorithms. When machine learning algorithms train on a certain data set – perhaps one in which white students from the United States are overrepresented – the result might be biased against groups from other backgrounds and therefore might be ineffective or even discriminatory when used on a different group.

Furthermore, scaling education by means of a centralized model reduces the number of voices who decide what is taught. Given that teaching is also a good learning tool for those who teach, this choice of who gets to teach becomes a choice of who gets to learn. Yes, providing new tools in communities that barely have access to textbooks will offer access to knowledge. However, scaling centrally advocated curricula can enforce homogenous learning goals and disempower local knowledge-providers. It is possible that communities will simply reject the technologies altogether. As Taskeen Adam put it, "As technology penetrates communities globally, so do neoliberal values, . . . where local, cultural or religious values are given second place, if they fit in at all" [8]. Failing to take into account local voices into account will render technologies irrelevant, or even useless to communities where education gaps are the greatest, who may reject the technologies altogether, thus increasing the inequality they seek to correct.

3. Infringement on children's rights: lack of data privacy and cyber security

The challenge of how to use vast amounts of personal data for personalized learning while protecting individual privacy and preferences rise to dangerous levels when AI targets young learners who cannot yet consent to collection of their personal data, and learners of highest need who may not understand the risks of sharing their personal data or interacting with anonymous strangers online. Platforms that connect learners around the world are no utopia to those who spend time moderating online interactions. "Everywhere there is online exchange and children, there is child exploitation," says Alex Stamos, Facebook's former Chief Security Officer [9]. Security researchers colloquially call this the "Lego penis problem," referring to a Lego MMO (massively multiplayer online game) that allowed users to create and share Lego structures. Users started building penises from Legos and shared these with other players. Workers at the company lamented their inability to "detect dongs" at a rate fast enough to prevent the sullying of their child-friendly brand. Ultimately, content moderation that remained compliant with the U.S. Children's Online Privacy Protection Act proved too expensive and may have played a role in the game's shut down [10].

According to Stamos, every platform from Lego to Roblox to Fortnite experiences various types of child exploitation, and exploitation will likely be exacerbated in communities less familiar with the internet. To fulfill the promise of online education supporting least developed countries, researchers must account for security of new users of online tools against malicious actors expert at taking advantage of even the most sophisticated users.

Towards a Better Vision

The presence of risks does not need to remove our optimism; instead it can be a force for developing a more mature goal. Many have painted a vision of a better education system [11]. We call on the AI research community and the education policy community to collectively imagine a set of grand challenges in AiEd that better align with our dreams for education and better take into account risks. We offer six goals for discussion, and invite the public to join the conversation.

We will crowd source new ideas here (with authorship credit): http://bit.ly/aiEdVision

[1]Goal 4.7, a subset of Sustainable Development Goal 4, advocates for education that promotes sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

01 **AI to facilitate more (and higher quality) human learning interactions** AI could be developed to support educators and the education system through automation of tasks and development of exciting problems, rather than by replacing teachers. Teachers and tools can work in tandem: with teachers filtering useful suggestions from AIs, and tools supporting teachers in grading and tracking students [12].

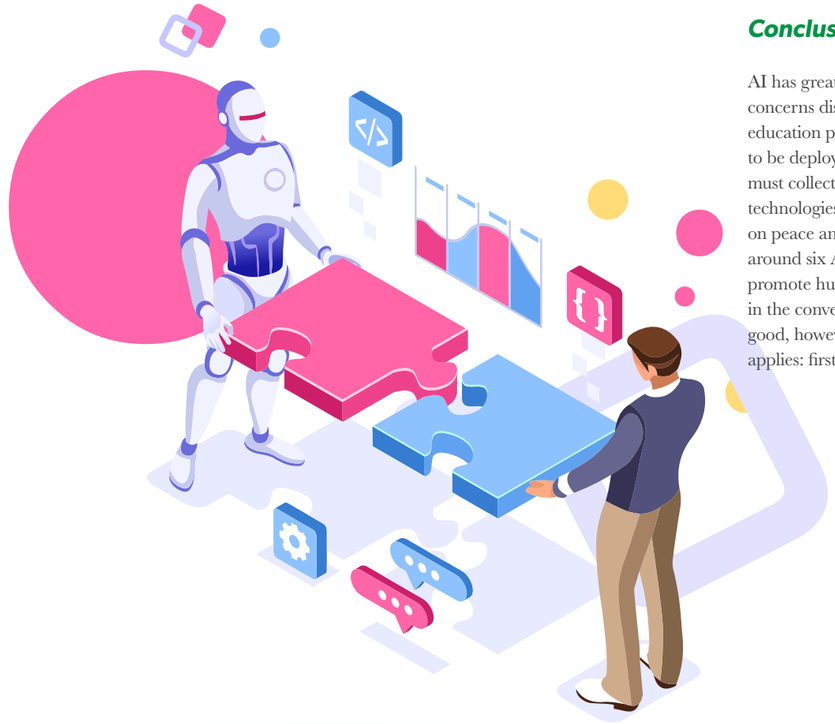
02 **AI to generate inspiring problems** AI can also help with the creation and dissemination of interesting problems in local contexts [13]. Machine learning can create paintings that look like works of Rembrandt. Can we also use algorithms to create engaging, personalized activities? This synthesis could establish a rich eco-system of teaching and learning with social and emotional interactions bolstered, not replaced by, technology.

03 **Low data feedback for inspiring problems** Inspiring, open-ended assignments provide opportunities for exploration and creativity. However these problems are expensive to incorporate and scale in education. It is time consuming for teachers to provide feedback. AI can assist teachers if designed to support and provide feedback for these sorts of questions, however, current methodologies require datasets of trillions of students to enable meaningful AI-driven feedback on open-ended work. We need to learn to do so without consuming massive amounts of student data. This is both practical and risk minimizing. Low- data AI seems promising and lowers risks of data abuse [14]. Low-data is practical in that solutions wont have to wait for millions of students to act as guinea pigs on each assignment to train our algorithms.

04 **AI to understand process** AI currently is most effective in teaching rote, structured lessons rather than supporting the creative, open-ended, team-based learning necessary to flourish in the modern world. A current line of research focuses on understanding process and ability to learn rather than merely the final product [15]. It is impossible for a teacher - especially in large classroom - to keep tabs on every student in the way a piano teacher provides feedback on a student's hand positions. AI-powered tools could work in tandem with teachers to monitor process, while the teacher remains the coach, averting the dismantling of schooling environments that allow for social-emotional learning. A hybrid model of artificial and human intelligence could help teachers gain insights about student process, elevating the teacher as a coach and mentor.

05 **AI for translation of educational content** Distribution of content has been uneven, especially for low-resource languages. Natural language processing, a branch of AI, is well-positioned to support translation which could help provide inclusive education in locations that need it most and encourage development of relevant educational technology built with communities from the ground up rather than imposed by the West.

06 **AI-powered detection for child safety** A healthy amount of energy should be put into devel- oping content moderation tools that scale, so online spaces of learning are safe for all learners (e.g. from malicious images), especially children and those in vulnerable contexts.



Conclusion

AI has great potential to further joyful learning, but only if the concerns discussed are appropriately addressed. Jointly, the education policy community and researchers developing AI tools to be deployed on a massive scale have a serious responsibility. We must collectively consider the range of possible applications of our technologies, including harmful ones, and the effects they will have on peace and human development. We proposed a vision oriented around six AI-challenges to mitigate these potential harms and promote human flourishing through AI, and invite the public to join in the conversation. Education AI may seem like an unmitigated good, however in this field, as in medicine, the Hippocratic oath applies: first, do no harm. ▲

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Moment-by-Moment *Measures of Affect and Cognition in Learning*

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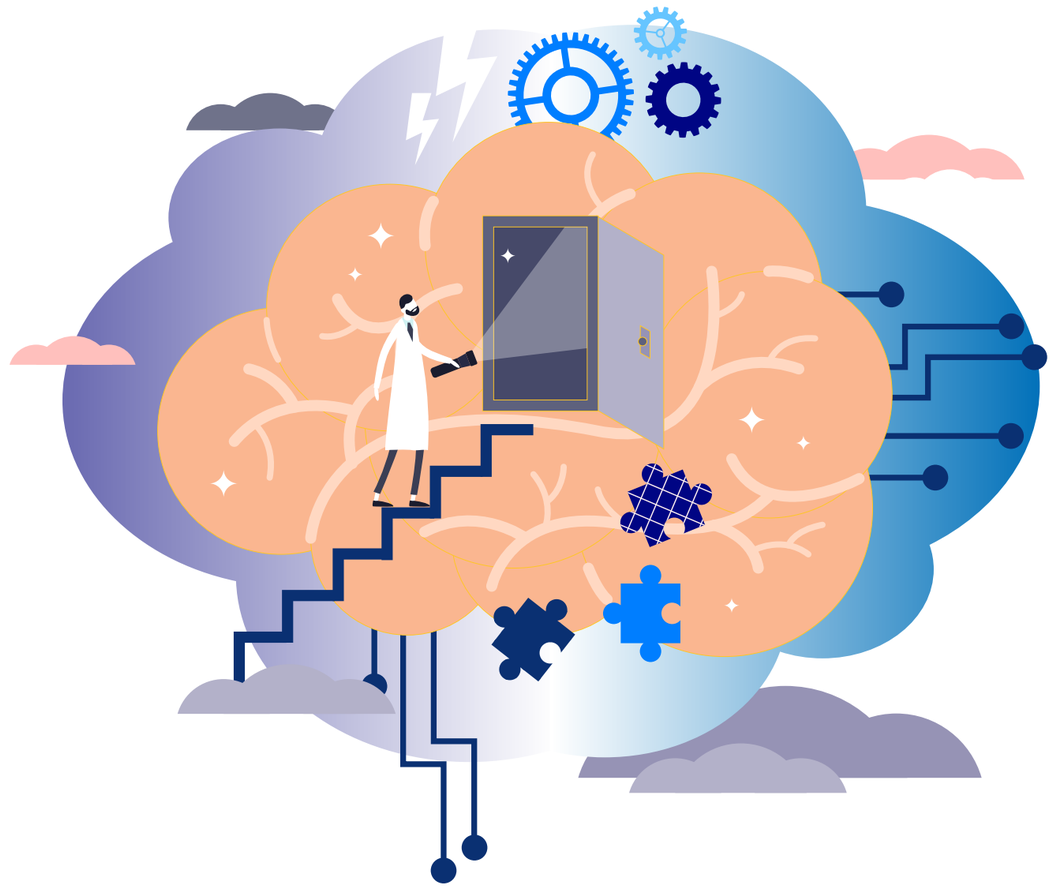
Keywords

- Cognitive Science
- Data Science
- Cognition
- Affect
- Learning
- Pedagogy

Abstract

Learning more in less time is a pervasive goal in educational research and practice. We argue that more fine-grained, moment-by-moment information about the learner and its context is currently the best way to move education forward. This paper discusses the potential and pitfalls of this approach, along with the state of the art with respect to key elements. Whereas technology for data acquisition and analytic procedures are available, the relevant theories are relatively thin, and the generalization of experimental results remains a major issue. Interdisciplinary work is a necessary precondition to this approach and therefore an important outcome is moving towards transdisciplinary work, and thus cross feeding other fields.



Why trying to reach the 1-second threshold?

The goal of educational research in the perspective of cognitive science is the optimization of learning, that is, learning more in less time. Since the 1950's, the promise of cognitive science in education is that a complete specification of the mechanisms of learning is the best way to engineer the most efficient supports for learning. This specification is achieved through data and methods which evolved with their parent scientific disciplines (observations of behavior, classical computer simulations, think-aloud protocols, stimulated recall, next-generation computer simulations including artificial intelligence and psychophysiological information including brain imaging). **Key to this endeavor is obtaining data about the mechanisms of learning as they occur, from the briefest and simplest to the most complex and slow, in order to reconstruct the learning experience in its entirety from underlying "building blocks" (see Anderson, 2002).**

The goal of educational research in the perspective of cognitive science is the optimization of learning, that is, learning more in less time.

Obtaining moment-by-moment information about the learner and the learning context aims at establishing causality from empirical

evidence. The idea is to go beyond the pretest-posttest inferences in traditional experimental work in education, which are limited to attributing learning gains to an intervention comprised of many elements typically implemented over a long period. By finely examining and extracting the active ingredients within a learning activity, the approach can unveil more causality, and points directly into the examination of temporal causality through an emphasis on sequential information. The potential of this approach is best exemplified by decades of research on intelligent tutoring systems (ITS). In his synthesis of this research, VanLehn (2011) has shown that a 1-second reactivity from a tutor leads to better learning. Whereas work on ITS focused on cognition in a relatively closed context, the current challenge is to capture more of the learning experience by including all relevant aspects of affect and cognition in more natural contexts. Consequently, modelling the learning context with that same level of detail becomes necessary. **With so much potential, the question is: do we have the prerequisites for using this approach in educational research?** The following sections examine the required technology, methodology and theory. In conclusion, some insights are offered based on our years of intensive work to develop this approach.

Do we have the technology to get the data?

Getting information every second means going beyond self-report questionnaires and tests, think-aloud protocols and observations. Usually, data points at sub-second measurement frequencies need to be collected. To this end, brain-imaging techniques such as electroencephalography (EEG) and other psychophysiological sensors (electrodermal activity, electrocardiography, blood pulse, skin temperature, pupillometry) as well as eye-trackers provide low-level (in the sense of bodily) objective signals indicative of cognitive and emotional processing (Holmqvist, Nyström, Andersson, Dewhurst, Jarodzka, & Van de Weijer, 2011; Boucsein, 2012; Potter & Bolls, 2014) . This technology has been around for years, but progresses very rapidly, especially with respect to low-cost equipment (see Sazonov & Newman, 2014).

The five components of emotions constituting major theories of emotion identified by Sander (2013) are amenable to 1-hz data.

It is worth mentioning that for the time being, costly high-end EEG equipment is warranted for research purposes. Low-cost EEG devices come with their proprietary algorithms for decontamination and interpretation (usually in the form of metrics referring to psychological constructs) which are usually not fully disclosed and open to peer review; raw data are hardly available; data quality is generally a problem due to idiosyncratic and tricky setup methods; electrodes positioning is usually not standard (i.e. 10-20 international system) or not guaranteed because of the physical design of the device. It can be concluded that the technology necessary to reach the 1-second threshold is available, but cost and scientific credibility are issues. With appropriate equipment, standard setup and data-preparation procedures must be followed, along with the most stringent criteria, in order to cope adequately with limited movement (in contrast to no movement) and experiments that are more prolonged (hours instead of tens of minutes).

Do we have the methodologies for analysing the 1-hz data?

Firstly, multiple data streams must be synchronized, the precision being set by the most frequent data stream (for example, 1000 Hz, or the millisecond). Computer systems can be engineered to be pre-synchronized, or alternatively, data streams can be synchronized manually after data collection.

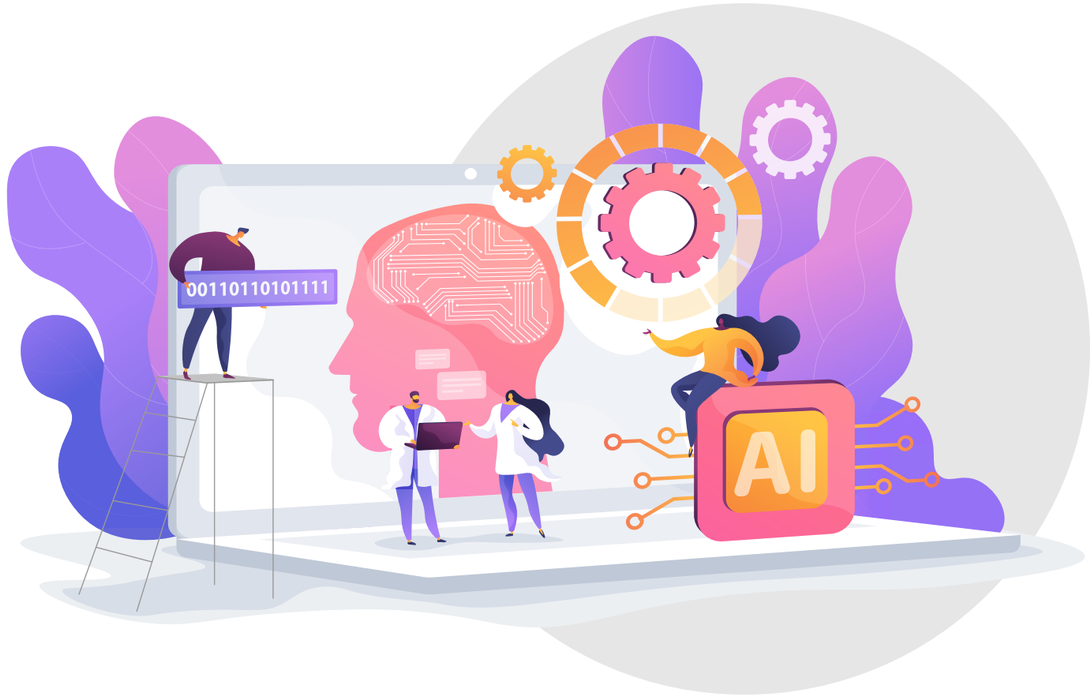
Then, data preparation includes decontamination and rejection according to the state of the art as well as transformation from the native format of the device into a format appropriate for an integrated database.

The operationalization of psychological constructs can be either bottom-up (starting with patterns in the data) or top down (starting from theory). A bottom-up approach can be realized using common machine learning algorithms, especially those that remain robust despite lower number of observations, such as long-term short-term memory (LSTM). The top-down approach is currently limited in the number of constructs available in the literature, but the interest of these constructs in education is tremendous (e.g. cognitive load, valence, arousal, visual attention)

An aspect that is more an issue than a problem is that reactivity, in the sense of rate and amplitude of variation of the constructs measured, must be maintained. Usually, data are downsampled during the operationalization of constructs. Some procedures will take as input data in 1-hz epochs. Additionally, some procedures use a moving average window ranging from a few seconds to tens of seconds in length (see Holm, Lukander, Korpela, Sallinen, Müller, (2009) and Pope, Bogart, & Bartolome, 1996 for widely used examples). Therefore, researchers must be careful in preserving, assessing or reporting the final time scale of the data.

Do we have the theories to interpret the data?

The answer is yes and no. The current theories of affect, cognition and learning were essentially developed using data



differently from 1-hz data. While theories exist to explain part of affect, cognition and learning, models linking objective bodily reactions to a more subjective experience are scarce, despite compatible modern theoretical views in cognitive science, such as extended cognition (Kiverstein, 2018). Moreover, theories linking affect, cognition and learning, in ways appropriate to formulate theoretically-sound and testable hypotheses are non-existent.

Affect. From psychophysiology to subjective. **The five components of emotions constituting major theories of emotion identified by Sander (2013) are amenable to 1-hz data.** Among them, autonomic reaction, expression, and action tendency are clearly captured by the approach, whereas appraisal and feeling may require more subjective data.

Cognition. From cold and isolated to hot and embodied (4 E).

The integration of the science of affectivity within cognitive science or as a complementary discipline is still open to debate; nevertheless, cognition is now seen as constantly interacting with affect (Sander, 2013). Thus, methodologies (namely computational modelling) to study affectivity or cognition have converged, so that theories merging both can be postulated and tested. The field is ripe conceptually but the operationalization of constructs and the analysis of data still need to evolve.

The Learning Context. **Irrespective of the pedagogical approach, a learning context can be characterized as a hierarchical decomposition of more or less fine-grained transactions between a learner and aspects of the context.** These may include learning tools (materials, computers) or agents (teachers, peers, computer tutors, games, reactivity or interactivity).

Lessons Learned from Trying to Teach the 1-second Threshold for 5 Years

Data quality is paramount

Continuous data is always interpreted by relating multiple channels. As such, missing data in only one channel in a given period of time means not being able to consider this episode (in other words, missing data on one channel means unusable data on all concurrent data). Moreover, establishing the causality of how events unfold in time requires a complete record of events. An incomplete recording could mean excluding all the data for this unit of analysis.

Synchronization during data collection is better than post hoc synchronization

Technically, it could seem that putting the effort in engineering a system is a huge, one go task and that post hoc synchronization is a recurring, smaller burden. In practice however, and despite being conceptually rather simple, synchronization is a very complex technical problem, which is prone to human error. Thus, one has to be very careful of hidden problems, which can be quite subtle. It was found that engineering an integrated system and constantly monitoring its performance leads to reduced costs in data preparation, (minor) cumulative improvements in addressing idiosyncratic sources of asynchrony (offsets and drift), and a sense of reduced doubts regarding hidden problems through slow evolution and frequent cross-checks of a stable suite of diverse pieces of equipment (hardware and software).

Interdisciplinarity is key

Psychophysiological and brain-imaging data are complex signals that require highly qualified personnel for: (1) the mathematical transformation of data and the programming of scripts (computer science), (2) the theorization of research questions and interpretation of the results (cognitive psychology and cognitive neuroscience), (3) the orientation, contextualization and knowledge transfer of applications to optimize learning (learning sciences and education), (4) integration into the state of the art in a specific field (domain experts).

Interdisciplinarity is hard

Although the cross-fertilization across disciplines fosters innovation, this potential comes at a cost. The prioritization of research objectives, the conceptual clarity across fields, diverging assumptions about the value of empirical research and criteria of scientificity, as well as the unequal tradition or capacity for translational research subsume a constant need for clarification, negotiation and operationalization at every step of the research. Because of this, "highway research" is not possible. However, we have not found a better way to train the next generation of researchers: students graduate with a broader expertise and above all, are sensible to the merits and pitfalls of the state of the art in many related disciplines.

Generalization of results is intricate, not even firmly conceptualized

In principle, generalizing involves an empirical appreciation of spurious results (obtained by chance) and a conceptual assessment of the correspondence between the context in which the results were obtained and a new context of application of those results. Fine-grained information about learning presents challenges with respect to these two considerations, sample sizes are limited because of the labour-intensive data preparation and is highly contextualized to a specific situation. In addition, the statistical inferences go beyond the traditional analysis of variance techniques: the nature of the data both permits and require additional techniques to fully capture relevant information. Among those that were tried, sequential analysis, chaos analysis and machine learning approaches blur the traditional trilogy of sample size, power, and effect size used to understand the generalizability of statistical inferences. As a discussant told us once (Pekrun, personal communication, August 2017): Is this approach limited to quantitative case studies?

The compromise between experimental control, ecological validity and data quality is complex and not ideal

This is especially true when aiming to publish in the best journals. Many popular low-cost devices were tried in hope to go beyond the lab, that is, getting data in natural contexts for prolonged periods of time (imagine a lecture) with certain amount of mobility (a teacher moving around or students sitting at their desk). Eye-tracking studies with mobile equipment (costing $40,000 a piece) are feasible if the researcher is prepared to work (both conceptually and technically) with dynamic regions of interest. EEG studies, however, are always affected by missing data due to movement (typically 50% + or – 10%) and a relatively thin conceptualization (analysis of synchrony or use of proprietary algorithms opaque to scientific scrutiny). In short, working with EEG requires good, costly equipment, tethered to a computer.

Take Home Messages

- Dynamic research field attracting a lot of interest: Holy grail of the learning sciences
- Focus on continuous, uninterrupted fine-grained objective measures detrimental to a consideration of the subjective experience
- You will get tons of data, tons of ideas for data mining, not many means for interpreting empirical results
- Obtaining scientifically-valid data means that you will care about your costly equipment
- Beware of the mind-reading business
- This kind of research is not cheap both in terms of equipment and manpower
- This field needs interdisciplinary because of obvious challenges, but is also a catalyst of interdisciplinarity

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AI to Improve ***Unique Human Abilities***

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Keywords

- AI
- Emotion
- Human Ability
- Soft Skills

Abstract

This article describes new technological systems that may process and analyze rich streams of real-time nonverbal information – including facial expressions, intonations, and gestures – and provide personalized feedback to learners. The technology may be customized in order to help individuals improve and enrich the quality of their nonverbal and collaborative communication. The system we propose and present can operate in the cloud in a highly accessible way that is scalable, yet protects the confidentiality of sensitive behaviors, allowing users the comfort and practice needed to advance their social skills.

Introduction

Recent advances in robotics, AI and machine learning are increasingly focused on mimicking or even surpassing human capabilities. This particular innovation has serious implications on our future workforce. Approximately 51% of the tasks done in the US economy can be automated (Bughin et al., 2017), and for each robot on the factory floor, some six jobs are lost (Acemoglu & Restrepo, 2017). This phenomenon will have worse implications in developing countries whose manpower is a significant part of their GDP. **The need for manual labor in predictable and repetitive work is declining, while the demand is soaring for expertise in creative tasks, problem-solving, and other social-cognitive avenues of soft-skills** (Alabdulkareemt al., 2018). Many of the critical and challenging tasks of the human civilization requires humans to collaborate with others (Milojevic, 2014), and perform creatively at both individual and collective levels. **Is there a room for technology to help sharpen these basic human skills?**

Let us consider the following scenarios:

Scenario 1:
JOB INTERVIEW

Madhu, a technically gifted college junior, worries about being declined from internship offers this year and believes he needs to improve his interview skills. After a 15-minute session with a career counselor, he receives recommendations to maintain more eye contact with the interviewer, conclude the interview with a friendly smile, and use intonation and loudness effectively to express enthusiasm. Madhu returns to his dorm room with an understanding of several behaviors that he can improve for his upcoming interviews. He wishes to practice with and receive feedback from a counselor, but due to scheduling conflicts and the counselor's limited availability, this is difficult. He is also unwilling to ask his peers for help in fear of social stigma.

Scenario 2:
PEER SOCIALIZATION

Bobby, a young teen diagnosed with social anxiety disorder, faces challenges when engaging in face-to-face communication. Bobby is unsure of various social "rules," such as deciding turns when to speak, making eye contact, and knowing when to smile in a conversation. His difficulties in social interactions have only been met with taunting, bullying and rejection from his peers. As a result, Bob decides to retreat into a virtual online world. Bob enjoys practicing conversation and making new friends online, but he still craves physical face-to-face interactions. He wishes that he could somehow practice nuances of social interactions in his own environment. He desires to be in a position where he may control the pace of the practice, train as many times as he would like, and still be in full control of the interaction.

Scenario 3:
PUBLIC SPEAKING

Mary is a graduate student who often attends conferences in order to present her papers to the scientific community. She is excited to talk about her work, but she feels incredibly nervous during public speaking. Despite practicing her talk with her research group, and receiving feedback from her peers and advisors, she ends up speaking too quickly for the audience during her presentation. She finds she is unable to accurately project her true excitement for research through her body language. She would love to improve her public speaking skills, but is unsure of how to seek help.

Scenario 4:
SALES TRAINING

Alvina is a sales representative who video conferences with 15 clients every week. During the last few months, Alice has not succeeded in achieving her sales quota in comparison to her colleagues. While she uses the same script as her colleagues during the sales call, her success rate is below average. Alvina is eager to take the necessary steps to improve her sales skills and would like to objectively understand what she is doing differently in comparison to her colleagues. She is afraid of being compared to them. At the same time, she would like to receive personalized feedback in order to improve.

The four scenarios share two commonalities:

1) A person desires help to improve his or her nonverbal behaviors
2) Limitations such as resources, logistics, and social stigma impede the person's ability to obtain the personalized support or training he or she seeks (Mohammed Ehsan Hoque & Picard, 2014). Is it possible to create a technology that could help individuals like Madhu, Bobby, Mary and Alvina improve their social skills using an automated, system that is available ubiquitously — where they want and when they want?

To address these challenges, we have developed a suite of prototypes that are standardized, repeatable and objective and can be deployed outside of the lab environment. In the paragraphs below, I provide brief descriptions of each of them.

ROC Speak to help with public speaking:

An early prototype that couples computer algorithms with human intelligence in order to automatically sense and interpret nonverbal behavior. Called ROC Speak (available at rocspeak.com), the framework is cloud enabled and ubiquitously available via a web browser and has been validated in the context of public speaking (Fung et al., 2015). The system automatically captures audio and video data in browser through the user's webcam, and then analyzes the data for smiles, movement, and volume modulation. The framework allows users to opt in and receive subjective feedback from Mechanical Turk workers ("Turkers") or any online users. ROC Speak synthesizes the Turkers' interpretations, ratings, and comment rankings with the machine-sensed data and enables users to interact with, explore, and visualize personalized and presentational feedback. Our results provide quantitative and qualitative evidence in support of our proposed synthesized feedback, relative to video-only playback with impersonal tips.

MACH to help with job interviews:

MACH—My Automated Conversation coacH—is a novel system that provides ubiquitous access to social skills training (Mohammed E. Hoque et al., 2013). The system includes a virtual agent that reads facial expressions, speech, and prosody and responds with verbal and nonverbal behaviors in real time. This paper presents an application of MACH in the context of training for job interviews. During the training, MACH asks interview questions, automatically mimics certain behavior issued by the user, and exhibit appropriate nonverbal behaviors. Following the interaction, MACH provides visual feedback on the user's performance. The development of this application draws on data from 28 interview sessions, involving employment-seeking students and career counselors. The effectiveness of MACH was assessed through a weeklong trial with 90 college undergraduates. Students who interacted with MACH were rated by human experts to have improved in overall interview performance, while the ratings of students in control groups did not improve. Post experiment interviews indicate that participants found the interview experience informative about their behaviors and expressed interest in using MACH in the future.

LISSA to help with individuals with autism:

Understanding and exhibiting appropriate social behavior is difficult for individuals diagnosed with autism spectrum disorder (ASD). Many people with ASD are in the average range of intelligence (that is, high-functioning) and often want help in improving their conversation skills. LISSA was designed as an exploratory experiment, undertaken to determine the feasibility of using an autonomous conversational agent to help teenagers with ASD to practice and eventually, to improve their conversational skills. The fully automated conversational agent that we employ

is a version of LISSA(Ali et al., 2015), adapted to help those with ASD. Using the automated version of the system, we ran a pilot study with five teenagers with ASD. Our study shows that a virtual agent can appear human-like and engaging in its dialogue behavior, from the perspective of teenagers with ASD. Our system conducts a natural conversation with the teenagers, while at the same time providing both continuous feedback about the appropriateness of the user's prosodic and nonverbal behavior and post-session feedback in a simple, easy-to-interpret format. Based on the information collected from the users through interviews and a questionnaire about the system, we gained some initial insights into the strengths and weaknesses of our approach for the target population as well as some sense of the variation in user reactions to a system of this type.

a) MACH System (Mohammed E. Hoque et al., 2013)
b) Rhema system for live feedback (Tanveer et al., 2015)
c) LISSA system(Ali et al., 2015)(Zahra et al., 2016)

Figure 1. Examples of prior systems developed by the PI and his students that can provide live and post feedback for job interviews, public speaking and helping individuals diagnosed with autism.

I argue that while developing AI that to mimic or even surpass

Figure 1. Examples of prior systems developed by the PI and his students that can provide live and post feedback for job interviews, public speaking and helping individuals diagnosed with autism.

a) MACH System (Mohammed E. Hoque et al., 2013)

b) Rhema system for live feedback (Tanveer et al., 2015)

c) LISSA system(Ali et al., 2015)(Zahra et al., 2016)

With the growing trend of automation taking over much of the manual labor, there will be need for a workforce with more creative ability, teamwork, storytelling, and empathy.

human intelligence is an excellent technical challenge, the better (and more difficult) goal is to design AI that improves human ability/intelligence. **With the growing trend of automation taking over much of the manual labor, there will be need for a workforce with more creative ability, teamwork, storytelling, and empathy.** In this article, I provide some examples of early work targeted to improve some unique human ability. With these examples, we hope that more applications of AI improving human ability may emerge. ▲

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Should Tech be Held ***Accountable for the Forseeable Misuse***

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Paris

Has the frantic pace of technological progress caused us to arrive at a junction where we need to develop a new philosophical, ethical and legal standard to measure and attribute accountability for the nefarious consequences of tech and especially the internet?

Who is responsible for harmful content and for the use of the net's infrastructure to peddle illicit goods, facilitate incitement to violence and exchanges between perpetrators of criminal acts?

Who is responsible for societal harm caused by unfettered use of AI (leading to bias, inequality and societal disruption)?

Obviously authors of iniquitous content and acts are responsible, but what about the companies that develop and commercialize (monetize) the technology enabling and facilitating such crimes?

Should Tech be held accountable for the foreseeable misuse of their products?

What does this mean in terms of development responsibility for algorithms and applications?

To what extent should Tech be held accountable for war crimes or crimes against humanity if their technology abets incitement to genocide?

Should we include advertisers and other funders in the ambit? Should we, the users, be held responsible for not flagging patents lawlessness? Is there a moral obligation to discontinue the use of reprehensible technology - in other words a moral boycott obligation ? These are some of the pressing questions we need to address urgently. The net was and tech have enjoyed unrestrained celebration for the last 25 years. Unfortunately had the above questions been raised at the inception of our current tech revolution the world would most probably have been a much safer and egalitarian place.

Should Tech be held accountable for the foreseeable misuse of their products ?

It is not too late however, but the conversation can no longer be put off.

Due to the net's unique combination of scale and third-party use nefarious content involves at least a triangle: The author, the infrastructure provider and the victim. As mentioned above we could also include advertisers, government and users (not exhaustive list).

Infrastructure providers may be divided into platforms, telecommunications operators and infrastructure owners.

Search and bespoke applications may be included in this category for the purposes of addressing the questions raised.

For each actor specific accountability standards need to be developed.

In addition, accountability as such should also be broken down into moral, civil and penal liability where different intentional elements apply.

One the most important and challenging problems facing net and tech accountability is that of complicity. When are the different parties in the triangle complicit in the crime originally committed by the author/perpetrator?

Complicity may be willful and thus associate the accomplice with the nefarious objective sought by the perpetrator or it may be knowledge of the crime, willful ignorance, recklessness or negligence in terms of the use made of the means put at the disposal of the perpetrator (for instance a call for violence or harassment made on social media).

Finally third party accountability (complicity) may be based on a duty of care.

When confronted with demands for accountability Tech typically respond with two lines of arguments which are deemed to justify immunity.

The first line of argument is what we may call the "quantity argument", it goes like this: We cannot be held accountable for what our users post and how they utilize our technology. There are simply too many users and too much content for us to be able to follow let alone properly analyse

and block (if necessary).

This argument is then combined with the second « justification » which is the protection of free speech:

Tech taken it upon itself to evangelize unrestrained speech to the extent of even - almost -proclaiming that they are not in the business of making money, but bringing speech to oppressed peoples around the world allowing them to attain the highest level of human fulfilment and societal nirvana (in the shape of course of western democratic ideals which in Tech's self erected role of crusaders of « good » just happens to coincide with their insatiable business model based on big data and absence of compliance cost and legal consequences).

A closer analysis of these "justifications" will however expose the inherently falacious reasoning: First of all artificial intelligence can already achieve astound success in proactively intercepting hurtful content and not only block it before it reaches dissemination and virality, but also identify accounts (if not authors themselves) which repeatedly generate such content and which could easily be closed down.

In addition the quantity argues is essentially flawed because success can never justify harm!

Imagine if it was the drug industry. There would be a public outcry in case toxic drugs was sold by any manufacturer who in its defense would argue that its quality control system could not keep up with the enormous demand.

Success could never justify harm.

As far as the second one of argument is concerned ("The Knights of Free Speech") Tech has been very successful in manipulating public opinion by spinning a narrative that free speech necessarily means that they should be shielded against accountability by strong immunity laws.

Clearly this is but mythology void of any intrinsic truth: Free Speech has become the one single human right is must often trampled upon in order to attain political or economic control.

Free Speech was never meant to allow incitement, defamation and manipulation.

Free speech deserves better than Tech's self anointed messianic role. It is one of our most critical foundational human rights and Tech's dilution of it is shameful.

The time has come for the international community to develop a comprehensive standard of accountability which will allow us all to reap the benefits of the empowerment and inclusiveness promised by Tech at its nascency.

How can the dogma of Free Speech ever justify doing harm with "actual knowledge". Time and again do we see the Tech Titans acquire actual knowledge of toxic content (either because they intercept it themselves or because it is flagged by users or governments), but they rarely take appropriate action.

They even often decide not to take it down, arguing that they are not the judge and in any case immune to such obligations (thereby invoking especially shield under US law – the infamous Communications Decency Act section 230 C).

It is intolerable that anybody – whether "immune" or not – should be allowed to continue to cause harm when acquiring actual knowledge simply by referring to some sort of law which from a technical point of view may shield them against civil or criminal action.

Actual knowledge amounts to an intention to associate yourself with the crime if action against it may be easily taken - yet not taken. ▲

Learning Workflow Reimagined: ***AI-powered Learning Solution Approach***

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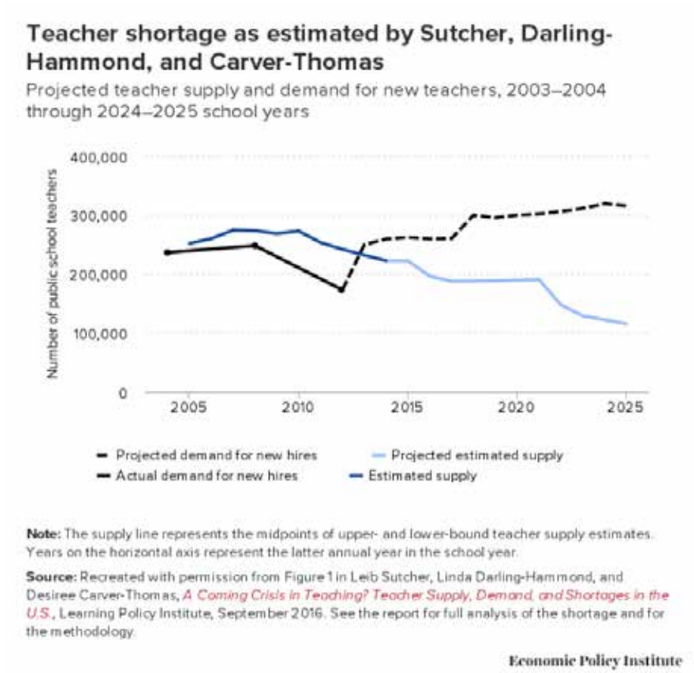
Abstract

This paper explores the current challenges in current K12 education systems globally that covers problems like dearth of quality teachers or sharing of best practices across contexts of language, culture or geography. The solution approach suggests leveraging already information rich internet for credible web resources that are qualitatively and complexity parsed & vetted leveraging AI (semantic analysis) and combining established link-analysis quality judgments with text-based judgments. Ontology-based User and Subject domain models are leveraged in the backend to create common knowledge sharing protocols and annotating various concepts to cluster related knowledge repositories. Further work may be required to study the societal impact of such a radical solution approach potential implementation and key considerations around end users especially minor learners' data privacy & ownership issues.

Challenges in global K-12 Education ecosystem

Lack of Quality Teachers

The 'Economic Policy Institute' (epi.org) recently came out with its first report in 'The Perfect Storm in the Teacher Labor Market' series that highlights the gravity of the problem of Teacher shortage affirmed by all available qualitative as well as qualitative indicators.[1] **In the age, when lack of qualified and well-trained teachers in both Global-South as well as Global North geographies is acknowledged and reported,**



search for alternatives with each passing generation of learners can't be delayed any further. There is overwhelming evidence confirming the high cost of Low-Performing Teachers even if measured in very basic economic terms of dollars in lost income and productivity each year that 'low-performing' teachers remain in the classroom. [2]

Lack of access to Knowledge repositories

The problem is further complicated by the knowledge repositories' silos that are still rampant globally and these silos range from language, geographical, cultural or sometimes even intentional blockades created by unwilling subject matter experts through content copyrights or technological safeguards. The position this paper takes is concerning the knowledge sharing of content that has recorded explicit creators', publishers' or distributors' consent to share rather than concerning with protected content by intentionally created anti-sharing safeguards laid out for commercial, content sensitivity or any other thematic reasoning.

Lack of common knowledge sharing protocols

Many times, the problem arises due to differences in knowledge corpus of words arising due to contextual differences. This leads to learnings from one context not being mapped to the problem scenarios from other context in the absence of common understanding of concepts across contexts. Following web protocols (http(s)) analogy, universally accepted protocols are needed to be derived and agreed upon to be able to draw meaning across contexts between course creators. Further a shared taxonomy or ontology regarding the knowledge domains is also of essence to pool related topics together across contexts.

Lack of quality, age-appropriateness scoring of web resources

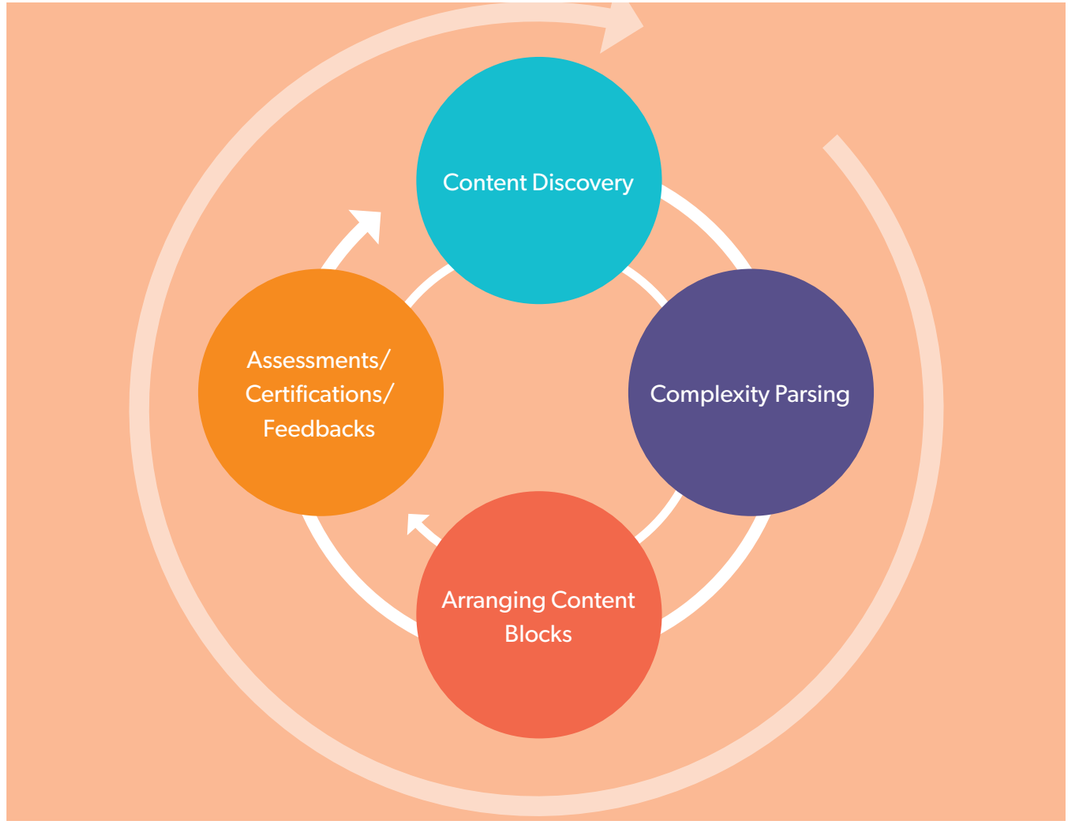
Even though technology and modern search engines have made content discovery and searchability extremely easy in today's age, the sheer volume of web resources that are made available without much regard to quality, credibility, content semantic relationships and age-appropriateness creates new problems especially in the realm of education and learning. In the era of fake news rocking the world of geopolitical systems, the threat of link/text spamming, cloaking, quality evaluation inadequacy [3] is extremely potent demanding further research in rethinking content discovery mechanisms that are better suited to the educational ecosystem.

Proposed Solution Approach for Current Global K-12 Education Ecosystem

The above challenges require a radical new approach to how we approach education and learning in general. Through various global interactions with various socio-economic background learners, the new 'Learning Process' could comprise of the below components:

Content Discovery

In an information overload era when there is no dearth of information and this year we are already on track to create 1.7MB of data every second for every person on earth [4], the need is to make sense of the information in a meaningful dynamic way for learners to feel empowered to learn by creating courses. **Technology, AI in particular, can help learners discover meaningful information through making connections that current search engines don't seem to be making.** For example, current search result is heavily reliant on evaluating the anchor text quality that annotate hypertext link in their scoring function [Craswell et al, 2001] which is easy to manipulate by spammers. The alternate to this approach could be to combine established link-analysis quality judgments with text-based judgments. Further, collaborator's reputation indexing and immutability of information custody chain could be considered to counter problems related to link exchange programs [3] that are currently rampant where web page authors agree to reciprocally link in order to improve their rankings. Also, through 'Human in the Loop' approach user feedback can help distinguish links included primarily for business or manipulative purposes from those included primarily for editorial purposes.



Technology, AI in particular, can help learners discover meaningful information through making connections that current search engines don't seem to be making.

Content Complexity

Assessing the complexity of the knowledge concepts is of importance for learning resources indexing, to provide useful recommendations and helping define the learning path for learner's topic of interest. **Higher-order concept is defined as a more abstract concept that has multiple inheritance relations exist between classes and allow to structure the concepts they express in terms of orders of abstraction.** [5] An ontology (or knowledge graph) is a powerful model to represent concepts and their relationships in a standardized manner. With the growth of research in the semantic web, cross-domain description of the world became available, and one of the most known is DBpedia that is a crowd-sourced project to provide an open knowledge graph based on the information available in several Wikimedia projects. It provides thus the description in a structured and linked way of various concepts (e.g.: persons, places, organizations, etc.). The solution approach recommends leveraging DBpedia and its ontologies to capture conceptual entities from a text (we leverage Latent Dirichlet Allocation (LDA) for topic modelling), build a concept graph that includes entities and their higher-order concepts, and transforms the graph into a vector of features. Thus, the solution approach proposes complexity scoring of each concept leveraging models that go beyond current syntactical & lexical features, and are based on the text's semantic

analysis, that gets tagged in content discovery panel with each extracted concept.

Content Blocks rearrangement

The next critical step in the proposed learning process is the ability of arranging various discovered content blocks, labeled with respective complexity scores, in an order that makes sense to the individual learners. The solution approach helps provide each learner an individualized learning experience that accommodates learners of different abilities, initial knowledge level, and learning styles. With traditional teaching styles in the traditional classroom, such individualized attention is often not possible. In contrast to the linear learning models where all learners follow a rigid path, nonlinear or non-sequential learning designs shift the responsibility for mastering a particular subject to the learner. The transformed role of teachers may involve providing guidance to the learner and determines the level of competency. However, the learner is responsible for mastering the subject through a self-determined path and rate. Such a learner-centered pedagogy will ultimately be more effective than the instructor-centered pedagogy [6]. Design of proposed nonlinear learning environment should enable learners to select any entry point in the subject and directly move to any other point in the subject at will. Ideally, learning is individualised because each learner designs their own learning path and learning speed by the choices the learner makes. Knowledge concepts are divided into blocks instead of sequential pages. The information blocks could be connected in a coherent manner so that ancillary information that is necessary for learning (definition, images, audio, video, etc.) can be accessed directly. This design should be able to accommodate linear and nonlinear learning styles, novice to advanced learners, and a path and pace set by the learner – not as predetermined by the instructor. [7]

Acknowledgement - Feedback/ Assessment/Certification

Final step in proposed learning process is the learner's need to receive feedback, share the learning progress or to get assessed and certified. The solution approach proposes continuous student assessment over standardized high-pressure assessments. The Learner evaluation could leverage the semantic analysis. Checking mistakes is not enough to assess the writing skills of a learner; one also needs to measure the ability to express more complex thoughts, with the use of precise concepts [8]. The complexity assessment is text simplification, a process that aims at providing a simpler version of a text by reducing its complexity, without removing its substantial content [9]. As a formative tool, continuous student assessment informs feedback, remediation, and/or enrichment targeted to a student, a group of students, or a whole class. It may also help to identify the need for specific professional development objectives for a teacher or group of teachers and inspire related steps. [10]

Key considerations

There are few considerations that require further deliberations, research and monitoring to ensure that the proposed solution indeed holds true to the promise the approach holds while fixing current education system blind spots.

Removing Power Hierarchies

The proposed solution approach if implemented in mainstream education systems, would definitely change the hierarchies between students and teachers. In the proposed approach, Learning by Teaching takes a step further in increasing fluidity in the conventional role definitions of teachers & students. The effects of a change like this needs to be explored further on societal and learning levels as this kind of hierarchical construct instilled a sense of implicit trust between parents & teachers. So while the proposed solution approach empowers learners, the same could dilute interpersonal relationships that in-person interactions offers in the current era.

Societal Acknowledgement

One of the key goals of education, at least in the current educational paradigm, is the acknowledgement of education assessments/accomplishments by Higher Educational Institutes, prospective Employers, Member State Governments' immigration policies, etc. Without parallelly getting acknowledgments from such key stakeholders that view educational assessments as an indicator of individual capability, the new flipped approach could remain in the fringes instead of ever becoming part of mainstream K-12 education ecosystems.

Governance Structure

Finally, the proposed solution approach could fail or get riddled with familiar flaws very soon, if proper governance controls are not embedded in the solution architecture and solution design. Key solution design considerations that provide proper auditability of the AI models & related Datasets and explainability behind each AI production ready models that serves consequential decisions is paramount. Questions regarding Data privacy and Data ownership need to be continuously asked and irrespective of the Governance authority, the solution design should ensure that the Digital platform that follows the suggested approach implements Human Rights by Design itself. United Nations, UNESCO in particular, could play a pivotal role in implementing such a solution and ensure that the changes are brought into effect from top policy levels to bottom field levels. ▲

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Scaling Social Emotional and Ethical Learning to Meet Global Challenges: ***Compassionate Integrity Training Moves to the Internet***

SHANE O'CONNOR

Versatile facilitator, trainer and educator

What is CIT?

Compassionate Integrity Training (CIT) is a multi-part training program that cultivates basic human values as skills for the purpose of increasing individual, social and environmental flourishing. By covering a range of skills from self-regulation and self-compassion to compassion for others and engagement with complex systems, CIT focuses on and builds towards compassionate integrity: the ability to live one's life in accordance with one's values with a recognition of common humanity, our basic orientation to kindness, and reciprocity. Unlike some definitions of integrity that focus on mere consistency with one's values, without examining what those values are, compassionate integrity insists that consistency with one's values is not enough if those values promote harm to oneself, others, or the world. Instead, maintaining and increasing consistency with one's values is most beneficial when they are values that promote one's own well-being as well as that of others. As to what those values are and how we understand

Compassionate Integrity Training (CIT) is a multi-part training program that cultivates basic human values as skills for the purpose of increasing individual, social and environmental flourishing.

them, this is arrived at by investigating and examining things for oneself, using common sense, common experience, and science. Compassionate integrity is, therefore, not something achieved merely as a result of wishful thinking or force of will, but rather as the result of building up knowledge, understanding, and a set of concrete skills. Because compassionate integrity is what guards against actions that compromise the well-being of oneself and others, cultivating it in one's life and in one's community directly impacts individual and collective flourishing.

CIT is based on cutting-edge developments in the fields of neuroscience, psychology, trauma-informed care, peace and conflict studies, and contemplative science, and builds off of work done by Daniel Goleman (author of the book Emotional Intelligence) and Peter Senge, initiatives in Social and Emotional Learning (SEL), and other areas. Its development has been aided by the collaborative work of a team of experts with both academic and applied backgrounds in these areas. CIT begins with the foundational concepts that set the stage for the entire program, and then moves through a series of 10 modules, each focusing on a particular skill. These modules are organized into three series, each corresponding to a domain.

Series I: Self-Cultivation
1. Calming Body and Mind
2. Ethical Mindfulness
3. Emotional Awareness
4. Self-Compassion

Series II: Relating to Others
5. Impartiality and Common Humanity
6. Forgiveness and Gratitude
7. Empathic Concern
8. Compassion

Series III: Engaging in Systems
9. Appreciating Interdependence
10. Engaging with Discernment

Current Implementations

To date, CIT has been implemented for participants in over thirty countries through a network of over fifty facilitators based in fourteen countries. These facilitators deliver CIT both in-person and online. A traditional course takes place over ten weeks, with one skill taught per week for two hours. Between sessions participants are encouraged to read the CIT Participant Manual, listen to podcasts, follow guided audio practices, and complete contemplative journaling questions, all specific to each skill. Online courses are essentially delivered in the same way, but rather than gathering in person every week, participants gather online via video teleconference. Most recently, we have also developed hybrid options of some skills being delivered online followed by some in person facilitated sessions.

Through these two modalities, **CIT has been implemented for a wide variety of populations, including civic leaders, educators, individuals experiencing homelessness and substance addiction, incarcerated persons, university students, social justice workers, youth leaders and**

the general public, particularly through our partnership with the Charter for Compassion. While the impact of the program has been positive as measured by self-report, qualitative surveys, as well as early self-report quantitative measures for social, emotional and physical well-being, growth is limited by the number of facilitators who are currently certified and the limitations on training and certifying new facilitators. As a young program, there are only so many individuals qualified to lead facilitator training courses, although there is increasing demand. This limitation will necessarily diminish the impact of the program as it will limit the number of individuals who can be reached by CIT. Although we have been contemplating how to scale the program since its inception, the recent alliance with UNESCO's Mahatma Gandhi Institute of Education for Peace and Sustainable Development has brought this challenge to the forefront. As such, we have begun creating a fully self-directed, online version of CIT, code named Lucy.

Many portions of Compassionate Integrity Training port easily to a self-directed platform. Content traditionally delivered by lecture, text, and writing or audio practice can easily be ported directly to an online platform or transferred to video or recorded audio.

Challenges and Opportunities of Lucy: Can AI Be the Solution?

Many portions of Compassionate Integrity Training port easily to a self-directed platform. Content traditionally delivered by lecture, text, and writing or audio practice can easily be ported directly to an online platform or transferred to video or recorded audio. Some critical elements of CIT, however, do not so easily transfer to an online environment. Two critical components of CIT, as currently delivered, are Mindful Dialogues and Accountability Partners. Mindful Dialogues are opportunities during each session for participants to pair with each other to discuss the skill they are learning in that session based on a series of guiding questions. In today's hectic world, filled with increasing distractions, people rarely take the time to engage in meaningful, uninterrupted conversations. The best conversations allow us to connect deeply with others around subjects that matter, helping us explore our thoughts, feelings and emotions in a safe space while being present for another to do the same. Because these opportunities are so rare, yet so important, Mindful Dialogues can be a vital component of Compassionate Integrity Training, even if they only last ten minutes. These dialogues are easy to facilitate in person and can even be done effectively online via videoconferencing technology. Finding ways to replicate these dialogues and their effects in a self-directed course is a challenge for which we have yet to come to a satisfactory conclusion. In some instances, Lucy will be offered in cohorts who will all be taking the course at the same time. Perhaps there are ways to pair individuals up during the course for purposes of Mindful Dialogues? In rare cases, people in Mindful Dialogue dyads do not do well together. In smaller in person or online courses, facilitators can help participants find a new partner. With Lucy, however, there could be thousands of individuals in a cohort, and managing any issues that arise in these dialogues could be prohibitive. As a resiliency-informed program, we are particularly sensitive to not placing participants into a situation where they could feel threatened or unsafe. This sensitivity makes organizing these dyads even more precarious. Could artificial intelligence provide a solution to this challenge? Mindful Dialogues are designed for participants to voice their thoughts and emotions in an environment where the listener does not hijack the conversation. We instruct listeners to not ask questions or give advice. They are simply to listen with engagement and interest. Given this design, would artificial intelligence be capable of being in dialogue with a participant in a way where the participant could vocalize their thoughts and feel as if "someone" was listening to them and validating them?

We face a similar challenge with Accountability Partners. The dyads formed during Mindful Dialogues are used for creating peer accountability within CIT. Ongoing, regular practice is an important component of CIT, and having a system of accountability for these practices helps ensure the success of the program. We currently do this within CIT by asking participants to complete a reflective written self-assessment after each session and to check in with their Mindful Dialogue partners a few times between sessions to share these reflections and see how they are doing with the practices. This check-in is another opportunity for peers to encourage one another to practice CIT daily or as often as possible in order to allow the content to sink in and affect their mental and behavioral habits. Like Mindful Dialogues, we have yet to determine the best way to encourage this same level of accountability and connection in an SDL version. Again, we are exploring whether AI is a reasonable solution to this challenge.

In partnership with UNESCO MGIEP, we are hoping to answer these important questions. Partnerships with organizations like UNESCO MGIEP and the Charter for Compassion are vital to continuing to cultivate a world that builds on our innate capacity for kindness, compassion and integrity. Together, with UNESCO MGIEP along with their networks and partnerships, we will build the capacity to reach out to young people throughout the globe, exploring how CIT can be utilized within areas like the prevention of violent extremism, alternative means of challenging and preventing substance abuse, directly engaging with key issues of global citizenship, sustainable development and, of course, mental health and resilience. The question remains, how can artificial intelligence make these aspirations all the more possible. ▲

UNESCO MGIEP's TECH 2019
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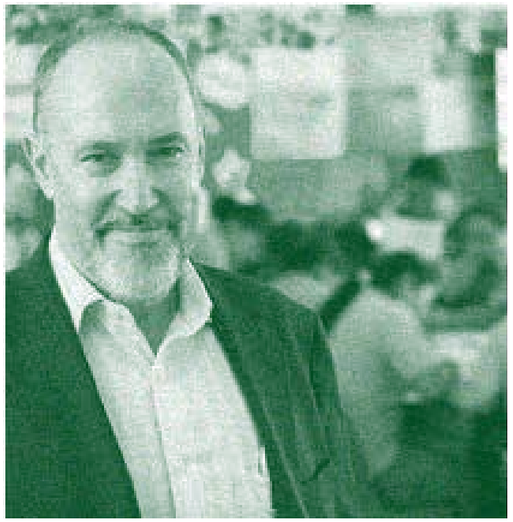
Transformative Pedagogies and SEL: *The Challenges for Education and Digital Citizenship in Aotearoa New Zealand*

STUART MCNAUGHTON



Chief Education Scientific Advisor
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Abstract

Two recent events in Aotearoa New Zealand have focussed a spotlight on educational policy and practices relating to cognitive and social and emotional skills for citizenship in digital worlds. One, the immanent drop in immunisation status for measles following some parents rejection of scientific evidence, raises the challenge of building critical literacy. The second, a terrible terrorist attack raises the challenge of building critical literacy plus social and emotional skills. Despite knowing much about how to promote these skills in non-digital environments in schools, jurisdictions including Aotearoa New Zealand are not very effective. New digital tools, in the form of games and digital platforms provide possible ways of advancing schools' effectiveness, and examples from Aotearoa New Zealand illustrate the potential. Three big challenges to developing these tools locally are identified: connecting with and building on cultural frameworks; scalability to embed in business as usual; and research and development infrastructure.

Keywords

- Digital Citizenship
- Critical Literacy
- Social & Emotional Skills

Introduction

From time to time countries experience catalytic events that are wake up calls. Two recent events in Aotearoa New Zealand have focussed a spotlight on educational policy and practices relating to cognitive and social and emotional skills. The skills are essential for our children's and young people's resilience, as citizens in digital worlds.

Event 1: The measles outbreak in Aotearoa New Zealand

A drop in full immunisation status for measles and the loss of herd immunity in some communities is immanent in Aotearoa New Zealand www.sciencemediacentre.co.nz/2019/09/03/aucklands-ongoing-measles-outbreak-expert-qa/. While access is an issue for some, there are increasing numbers of parents who are hesitant to immunise (perhaps up to 6% of parents), or who are some staunchly anti-vaccination (1-3%) https://interactives.stuff.co.nz/2019/09/parent-trap-vaccination-measles-immunisation/

Not immunising when possible flies in the face of the consensus of scientific evidence and reflects an increasing vulnerability to misinformation. Social media will be major sources of information for our children, the next generations of parents (see www.who.int/news-room/detail/28-08-2019-who-director-general-statement-on-the-role-of-social-media-platforms-in-health-information). And they are increasingly exposed to possible manipulation with misinformation, and untruths amplified through smart social-media platforms.

Critical thinking with literacy

Digital worlds create risks to citizenship as well as opportunities for citizens who can navigate around sources of information confidently, and be able to engage critically with the knowledge and information that impinge on everyday lives (see www.pmcsa.org.nz/wp-content/uploads/18-04-06-Digital-Futures-and-Education.pdf).

Countries can respond in three ways by :(1) legislating (eg restrict schooling to those vaccinated or with exemption); (2) regulating (eg require social media platforms to limit results of searches to those from internationally recognised health organisations); and (3) educating.

We know a lot about how to promote these skills, (Abrami, Bernard, Borokhovski, Waddington, Wadwe, & Persson, 2015; Goldman, Braasch, Wiley, Graesser, & Brodowinska, 2011). In Aotearoa New Zealand there are enablers including the relatively open curriculum, and generally high levels of reading literacy, which would allow innovation and impact. However, evidence from several countries indicates educational systems are not good at promoting these skills (McGrew, Ortega, Breakstone, Wineburg, 2017; National Literacy Trust, 2018), including innovative digital interventions in Aotearoa New Zealand (Jesson, McNaughton, Rosedale, Zhu & Cockle, 2018). The evidence is that knowledge per se does not change this picture, but more skills in critical literacy do (Kahne, & Bowyer, 2018).

There is an emerging technology of serious games that can add to our pedagogies. Although most games have focused on knowledge acquisition (Boyle, Hainey, Connolly, Gray, Earp, Ott, Pereira, 2016) early examples of games for more complex cognitive skills suggest possible effectiveness, given they share the features shown to be well-designed games.

Games for critical thinking with literacy

An example from Aotearoa New Zealand uses these features, such as a highly motivating problem scenario (an imminent asteroid collision threat), and real world solutions for collaborative activity in immersive experiences. **The quest element of the game, means players search for information to solve the problem and they have to identify bias in the information they gather, the credibility of sources and whether particular statements can be classed as "facts" or not.** Initial testing has shown that the Astria educational game with teacher augmentation can support critical thinking, critical literacy, and technical vocabulary skills for both upper primary and lower secondary students (years 7-10). https://developingindigitalworlds.blogs.auckland.ac.nz/astria-countdown-to-impact/.

Event 2: the Christchurch terrorist act

The second event was the terrible mass shootings by a terrorist on 15 March 2019. It is hard to prevent acts of violence coming from the outside. But a degree of prevention and resilience is possible.

Like the measles case it was followed by legislative responses (semi automatic weapons were banned and a buy back scheme instituted), and regulatory responses (proposals like those in the EU to hold social media accountable for promulgating hate speech). This event also underscored the educational need for critical literacy; for children to know how on line communities and media can manipulate stereotypes and prejudice. But it added the further need to build social skills, with the Prime Minister asking for scientific advice about how to build social inclusion and empathy https://www.pmcsa.ac.nz/2019/05/31/pm-briefing-re-christchurch/.

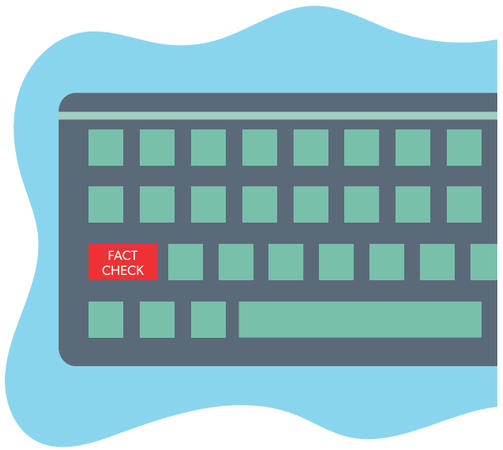
Again there are enablers. For more than a decade schools have had a mandate to promote such skills. **The curriculum (New Zealand Ministry of Education, 2007) identifies such attributes as "relating to others" and "contributing and participating" as valued key competencies.** But it is left to individual schools to consider how they might promote the requisite skills such as perspective taking, empathy and being prosocial, as well as those of self-control and self regulation. It is expected that schools will do this in different ways (New Zealand Ministry of Education, 2007, p.37).

Not surprisingly, classroom observations show a low focus on these skills other than self regulation. This is despite knowing a lot about how to promote these skills too and the need to embed them in everyday teaching in subject areas Durlak, Weisberg, Dymnicki, Taylor, & Shellinger, 2011). And despite a societal concern to do better because various national and international measures, which include bullying, indicate New Zealand is less successful than other jurisdictions in promoting the needed skills (Webber, 2019).

Social and skills and Digital citizenship

Digital worlds add urgency to this need because social media increases threats to social and emotional development (Courage, Bakhtiar, Fitzpatrick, Kenny, & Brandeau, 2015; Reid Chassiakos, Radesky, Christakis, et al., 2016). Users of social media tend to have reduced capacity to judge the appropriateness of their own behaviour and new vehicles for bullying are created (Aiken, 2016; Foody Samara Carlbring, 2015; Gardella, Fisher, & Teurbe-Tolon, A. R., 2017).

Digital technology can have positive effects in this domain too. The implementation of digital tools in classrooms generally is associated with increased engagement (less distractibility, persistence, and independence) and increased agency or self-efficacy (Karich, Burns, & Maki, 2014; Zheng, Warschauer, Lin, & Chang, 2016). But consistently producing benefits for the needed range of social and



emotional skills requires much more deliberateness at a whole school level with specific instructional designs for classrooms (Winters, Greene, & Costich, 2008).

Digital platforms for social and cognitive skills

A cross country collaboration has been testing a digital platform for developing these citizenship skills in urban schools in Aotearoa / New Zealand serving indigenous (Māori) and Pacific Island families from low SES communities. The context has been a multi-site initiative that has one-to-one devices, and community-wide wireless capability, for digital use at school and in homes http://www.manaiakalani.org/home.

Their combination of school wide practices for digital citizenship with research informed digital pedagogy for academic learning is associated with increased achievement and also increased student ratings of self-control (Jesson, McNaughton, Wilson, Zhu & Cockle, 2018). But despite this students are very aware of difficulties in regulating use at home and also worried about negative impacts with social usage (McNaughton, Zhu, Rosedale, Teng, Jesson, & Oldheaver, (in press)). Face to face and online mediation of collaboration is part of the pedagogy but there is little specific teaching for the social and emotional skills required, especially perspective taking and consideration of others.

A digital platform, which provides an instructional tool, is being tested to increase social and emotional skills. The argumentation (critical reasoning) tool requires critical thinking skills as well as perspective taking and aspects of cognitive and emotional empathy (Kuhn, 2005; Rapanta, Garcia-Mila, & Gilabert, 2013). In well-designed (but non digital) classroom communities, skills are generalizable across curriculum areas, from oral to written modes and from peer to peer (eg Reznitskaya, Anderson, McNurlen, Nguyen-Jahiel, Archodidou, & Kim, 2001; Kuhn, 2005 Rapanta, Garcia-Mila & Gilabert, 2013).

As with critical literacy, low levels of argumentation and weak skills generally have been reported across grade levels and disciplines (Litma & Greenleaf, 2017; Kuhn, 2005), largely attributed to the absence of explicit instructional designs and deliberate socialisation. **This was also the case with the schools in the digital initiative and testing with the tool showed students typically adopt a single perspective mostly trying to argue for that position rather than considering the merits of other perspective(s) and/or weaknesses in their own perspective (Rosedale, McNaughton, Jesson, Zhu, & Oldehaver (2019).**

A co-design process was used to develop the tool resulting in three versions with different content, in two formats for younger (aged 7 and 8 years) and older students (aged 9 years and above) (Rosedale et. al. 2019; https://developingindigitalworlds.blogs.auckland.ac.nz/tools/online-argumentation/). An authentic topic serves as a provocation, setting up a complex social, cultural or scientific problem. Testing with this tool shows higher order argumentation can be increased using the tool (McNaughton, Zhu, Rosedale, Oldehaver, Jesson, & Greenleaf, C. (in press)), and augmented by teachers (McNaughton, Rosedale, Jesson, Hoda, & Teng, 2018). However, while awareness and acknowledgement of the others' position can be boosted, students find it very difficult to identify weakness or flaws in their own reasoning. Combining 'criticality' with perspective taking is a major challenge.

Three caveats to 'waking up'

Wake up calls are defining moments only if we wake up. There are (at least) three considerations in developing critical literacy and social and emotional skills using digital tools in Aotearoa New Zealand. The first is explicit recognition of and connection with cultural frameworks. The curriculum documents already do this. But a risk with digital technology is an undue focus on what it can do for individual agency and personalisation, without also an equally strong emphasis on empathetic group relationships and collaboration with others.

The second issue is not peculiar to digital interventions. All educational interventions suffer from issues in scalability and sustainability. How to embed evidence informed instructional designs with digital tools nationally is a major challenge for local implementation science.

The third issue is the infrastructure needed to develop tools and designs. In Aotearoa New Zealand the funding for research and development in educational sciences generally, is very limited comparted with other areas of science. ▲

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Education - *Today's Challenges, Concerns and Wishlist for the Future*

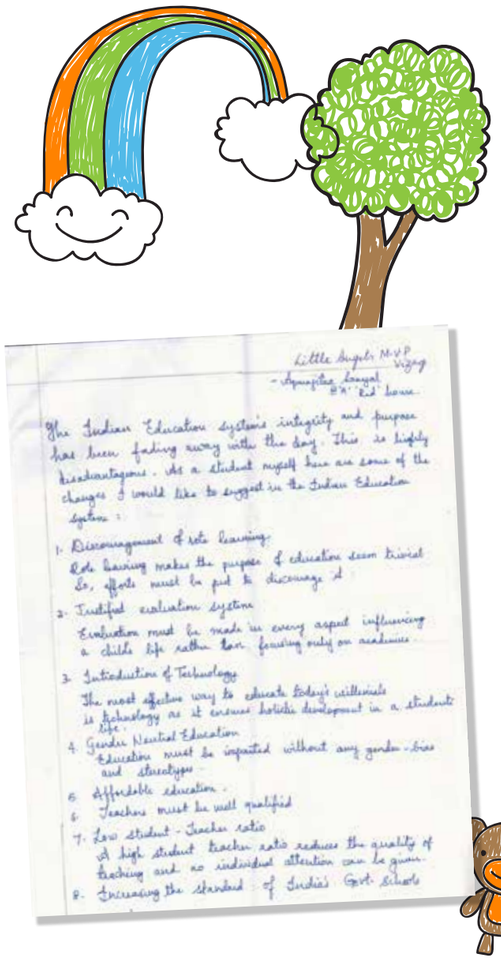
Five young students ranging from ages 5-15 from the Little Angels Schools, Visakhapatnam City, were the Chief Guests at TECH 2019. The session, which was part of the opening day, was designed to elicit honest and spontaneous responses from the central stakeholders of education -the young, developing, creative minds, who will drive and chart the future of humanity.

Nandini Chatterjee Singh, who leads the Rethinking Learning Programme at UNESCO MGIEP, chatted with the students on what they thought was the purpose of education, how education met their expectations and satisfied their needs, what their greatest concerns were about the present day education system and how the students would like to see education transform.

The children were spontaneous, bold and extremely articulate, and were not hesitant to declare that they wished their teachers were nicer and did not have biases in the classroom, that the class sessions did not exceed 20 minutes and most importantly that the sessions should be fun, playful and engaging. The students desperately requested for more hands on learning, more experiments, as well as learning content that was relevant and would have an application in their daily life. Some very insightful, thought provoking and mature comments that came out of the discussion were: the need for education and particularly assessments to prepare students for life and not just for academics; and for education to endow students with skills that they could use in the future.

The discussion was extremely humbling and demonstrated wisdom and thought far beyond what is attributed to children in that age group. The biggest takeaway was the simple and honest view of humanity - that of being kind, collaborative and happy, which is apparent to a child, however, seems lost to an adult. It is perhaps our greatest loss as we progress from childhood to adulthood.

Then, to design education for children, we should become children once again.



Education today

Challenges, concerns and wishlist for the future.

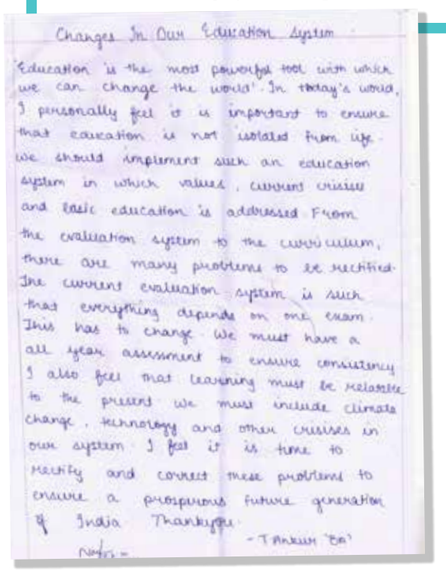
Rudrasai Mukkavilli
CLASS 5F, LITTLE ANGELS SCHOOL, *Vishakapatnam*

Concerns

1. Rigid classroom syllabus - *if each kid is different, then why the same syllabus for every kid?*
2. Lot of rote writing.
3. No use of technology.
4. What if I am bored?
5. Write, write but why?

Wishlist

1. Colorful classrooms
2. Colorful boards
3. Better use of technology
4. More water breaks
5. Gamification and playful learning


Changes In Our Education System

Education is the most powerful tool with which we can change the world. In today's world, I personally feel it is important to ensure that education is not isolated from life. We should implement such an education system in which values, current crisis and basic education is addressed. From the evaluation system to the curriculum, there are many problems to be rectified. The current evaluation system is such that everything depends on one exam. This has to change. We must have a all year assessment to ensure consistency. I also feel that learning must be relatable to the present. We must include climate change, technology and other crises in our system. I feel it is time to rectify and correct these problems to ensure a prosperous future generation of India. Thankyou.

- Tanmay 'Ba'

Note:-

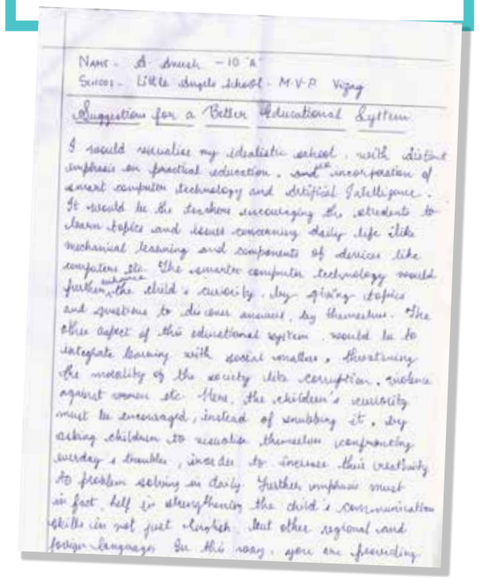
Vaishnavi Mukkavilli,
4TH E, LITTLE ANGELS SCHOOL, *Vishakapatnam*

Concerns

1. We need teachers to be more friendly so that we are not scared.
2. Rigid seating in classroom decided by others.
3. Too much writing and copying

Wishlist

1. Shorter duration of the periods. 20 minutes.
2. Teachers should be flexible, kind and soft
3. Flexible seating for children
4. More practicals and experiments
5. Start school late


Name - A. Anusha - 10 'A'
School - Little Angels School - M.V.P Vizag

Suggestions for a Better Educational System

I would visualise my idealistic school, with distinct emphasis on practical education, and incorporation of smart computer technology and artificial intelligence. It would be the teachers encouraging the students to discuss topics and issues concerning daily life like mechanical learning and components of devices like computers etc. The smarter computer technology would further enhance the child's curiosity. By giving topics and questions to discuss amongst, by themselves. The other aspect of this educational system would be to integrate learning with social matters, threatening the morality of the society like corruption, violence against women etc. Here, the children's curiosity must be encouraged, instead of snubbing it, by asking children to visualise themselves encountering everyday troubles, in order to increase their creativity to problem solving on daily. Further emphasis must in fact, help in strengthening the child's communication skills in not just English, but other regional and foreign languages. In this way, you are providing

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SEL *for Everyone*

Explore UNESCO MGIEP's blog on Social and Emotional Learning (SEL), titled 'SEL for Everyone', in which we are changing the way people converse on SEL. SEL for Everyone aims to ignite ideas and invite conversations between individuals invested in the field of SEL.

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