The BlueDot

Exploring new ideas for a shared future

Digital Pedagogies *for Building Peaceful & Sustainable Societies*

Discovering how *Digital Technologies can Transform Education Systems and Shape a Better World*

Features

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The Blue Dot

Exploring new ideas for a shared future

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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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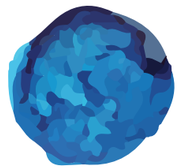


"Look again at that dot.
That's here. That's home. That's us.

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

ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING FOR ALL

The United Nations Sustainable Development Goal (SDG) 4 calls for countries to "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all".

If we are to analyse each of the key words in SDG 4, we will quickly come to realise that the resources required to achieve this goal are enormous if we follow the present modus operandi of our education systems. 'Inclusive' would suggest catering to all kids in a personalised manner - the ever-elusive personalised learning that all educators advocate as the best way to learn. 'Equitable' would imply that all students get access to the same education irrespective of their social, economic and or geographical situation. 'Quality' would indicate using the latest research results to guide the future of our education and learning systems. *Last but not least, learning has to be seen as a lifelong process.* This means accommodating learning material and tools to the broad age spectrum of learners.

Technology: *A Game Changer in Education*

The big question here is how do we achieve these ambitious goals with limited resources. *The present educational system relies heavily on teachers and conventional tools such as textbooks, standardised curriculum, traditional exam-based assessments and large classrooms.* To scale this up to achieve the SDG 4 will require huge investment in the educational sector. This is seen by the demand by educators for governments in a majority of countries to increase spends on education.

But there is a cheaper and more effective option. *Technology can be a game changer in the education sphere.* Presently, technology is seen as a delivery platform and one that is much costlier than the existing delivery pathways. However, two trends will dictate otherwise. First, the cost of technology is falling exponentially. Second and more importantly, technology if seen as a transformative pedagogy has the potential to deliver on the very challenges we face today with higher rates of return. Some of these transformative digital pedagogies are:

i. The advancement of Artificial Intelligence (AI) can be instrumental in providing the personalised learning that has been the holy grail of education. A teacher having the benefit of experiences of thousands of other teachers and students is an invaluable resource that is worth tapping to improve the learning of each learner.

ii. In the same vein, digital games offer an immersive experience while learning. They also offer a non-threatening environment for students to learn, make mistakes and progress. Additionally, games allow an informal approach to assessment, wherein children do not have to undergo exam anxiety when being assessed on their learning outcomes. They provide a natural approach to learning by making it fun and relevant to the learner.

iii. Virtual reality offers an immersive environment whereby learners can actually "feel and experience " the topics they are learning.

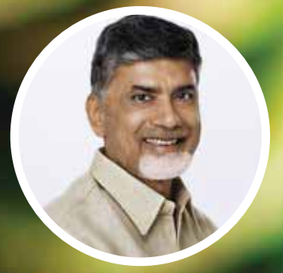
In this issue of The Blue Dot, I am happy to see some of the most prominent experts in the field of digital pedagogies share with us their views and perspectives in this growing field for education. The Foreword by the visionary Chief Minister, Honourable Nara Shri Chandrababu Naidu of the State of Andhra Pradesh, India, pretty much lays the ground for the future of EdTech and the way he sees its role in his state as well as for the global community. The second foreword by the Global Head of Education, Unity Technologies, one of the world's largest provider of game engines, demonstrates the willingness of the private sector to engage with educators to provide the platform to develop learners as creative explorers.

Last but not least, I wish to take this opportunity to invite you to our annual TECH conference which will be held this year from November 15 to 17 2018 at the beautiful coastal town of Visakhapatnam City in the State of Andhra Pradesh, India.

I wish you happy reading and, as always, look forward to your comments and suggestions on how we can improve our publication.

ANANTHA KUMAR DURAIAPPAH
Director, UNESCO MGIEP

Digital Pedagogies for a Better World



SHRI NARA CHANDRABABU NAIDU
CHIEF MINISTER, STATE OF ANDHRA PRADESH, INDIA

The sunrise state of Andhra Pradesh believes that the ultimate goal of a holistic and sustainable approach to its development is creating happiness for its people. Among the critical growth drivers identified by the state, early childhood development focused on cognitive, emotional and physical development; lifelong learning and skills building; and the creation of gainful opportunities for the youth are priorities for the government. The state aims to be the 'Skill Capital' of India by skilling more than 1.3 crore people by 2020, upskilling teachers and striving towards becoming a fountainhead of global talent. In order to achieve this, the state government has enthusiastically embraced the opportunities offered by technology in transforming the education landscape and tying up with knowledge powerhouses to address these challenges.

Effective education opportunities in the 21st century need to be designed with the learner at the centre of the system. Accessibility and equitable education can be achieved through the digital medium to empower personalised learning. The State Government of Andhra Pradesh has collaborated with the UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development (MGIEP) on numerous projects related to technology and education. The first is the annual Transforming Education Conference for Humanity (TECH), the first edition of which was held in December 2017. The Conference saw 1,700 delegates from 75 countries coming together to present the best technologies of the world for education. This conference will now be held annually.

Another initiative on which we have collaborated with UNESCO MGIEP is the setting up of a Games & Digital Learning Hub in Visakhapatnam. This will be one of the first in the region and will service the needs of not only the state but the entire Asia Pacific region and the globe. This unique initiative will position Andhra Pradesh as the intelligence hub for education technology. The pedagogically rigorous products from the hub will be used in schools to facilitate the building of 21st century skills among learners and enhance learning outcomes. These skills will enable the State of Andhra Pradesh to lead in the development of a highly sought after talent pool required for future jobs and employment, and create the necessary traction to seed an entrepreneurial, research-driven ecosystem for answering the demand for well-designed EdTech pedagogical tools for the global market. The Government of Andhra Pradesh has a vision to transform the State and education technology will play a critical role in achieving the Sustainable Development Agenda for the State in line with Andhra Pradesh Vision 2029.

The transformation brought about through education that builds intellectual and emotional intelligence using digital pedagogies will be transformational in impact for Andhra Pradesh and recognising this opportunity, the State of Andhra Pradesh will lead the way through such innovative and deeply engaging initiatives. The state of Andhra Pradesh applauds UNESCO for the establishment of MGIEP in India. The Institute has shown how relevant Gandhi is for the contemporary world and I am confident that the Institute will play a key role in establishing peace in the minds of all people.

The Role Of 'Creators' in Shaping a Sustainable World

JESSICA LINDL
GLOBAL HEAD OF EDUCATION, UNITY TECHNOLOGIES

The creators of tomorrow will shape many of our global experiences. They will create across multiple industries - including Virtual Reality (VR) / Augmented Reality (AR), Machine Learning and Big Data - impacting individuals, organisations, and environments. *Therefore, how we choose to nurture and cultivate the power of creativity in our learners will have exponential effects on global peace and sustainable development.*

At Unity, we believe the world is a better place with diverse creators and thus everyone should have the opportunity to become a creator. This belief mandates that our learning principles support all types of backgrounds and learning styles; they are as follows:

Motivation is one of the greatest factors of learner success. Creators should be provided learning opportunities with the right amount of challenges along with support from a community.

Engaging Projects are the basis for creators to build a concrete understanding of the technologies and the components that help them achieve desired goals. With engaging projects, creators learn how they come together to form a project and how components can be reconstructed in ways that are meaningful to creators and their visions.

During learning experiences, creators will Decide and Do. While acquiring skills and knowledge, creators are encouraged to apply what they are learning to projects that are individually relevant. By deciding and doing, creators also move their newfound skills and knowledge from short-term to long-term memory which will be utilised in the creation of the next great digital experience.

Equally important to the creative learning process is Practice and Feedback. Learning opportunities should give creators the practice they need to ideate, craft, evaluate, and assess how they are doing and where they are going.

As the Global Head of Education at Unity Technologies, I am deeply optimistic about our future based on what I am seeing from the creators we enable. Consider "Antura and the Letters" and "Feed the Monster", both winners of the EduApp4Syria prize to help Syrian refugees learn to read and improve their psychological well-being. War Child Holland's Can't Wait to Learn programme provides education to over 30 million children denied school due to conflict. VR experiences such as The Last Goodbye build awareness and empathy by providing users an opportunity to listen to one of the oldest holocaust survivors. Programmes such as the Global Nomads VR distribute curriculum to generate youth-produced VR stories to "help incite curiosity and expand our perspectives."

Now more than ever digital pedagogies have the power to shape our world, let us as global leaders in education empower a future generation of creators to build a peaceful and sustainable world. I am pleased to note that the UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development has taken the lead in creating an ecosystem for games & digital learning to foster partnerships between a diverse set of stakeholders in order to develop digital pedagogies for a peaceful and sustainable world.

CONTENT

The BlueDot
ISSUE 8, 2018

Expert ***Perspectives***

Digital pedagogies for building peaceful and sustainable societies

Read about what academics, policymakers, practitioners and researchers have to say about digital pedagogies and their potential to build peaceful and sustainable societies. From mainstreaming games into education systems and teaching socio-emotional skills such as empathy through digital pedagogies to facilitating reading through mobile devices, enjoy reading diverse and contradictory views on how technology interventions in education can lead to societies that are more peaceful and sustainable.

OPINION

Learnification : Encouraging ***Learning Through Video Games***

ZIGOR HERNANDORENA JUARROS

Armed with a PhD in law, Zigor went straight into video games, helping to create the Third Party Development department at Ubisoft.

After joining Apple and then Handspring as Partnership Manager for Europe, he moved away from the tech industry and worked for 10 years as Art Director at Jeune Afrique, a French publishing group.

Back at Ubisoft since 2016, Zigor is Senior Project Manager of the newly created Fun Learning department and is in charge of developing games that will provide the player with actionable knowledge and/or expertise.

The EdTech market is soaring, and so is the amount of digital learning solutions that are released every year.

Among them, we can detect a strong trend towards the gamification of pedagogical content. To make it more fun. More appealing to a public used to electronic devices. More in-line with the world we live in than a chalkboard, a teacher and desks in a classroom.

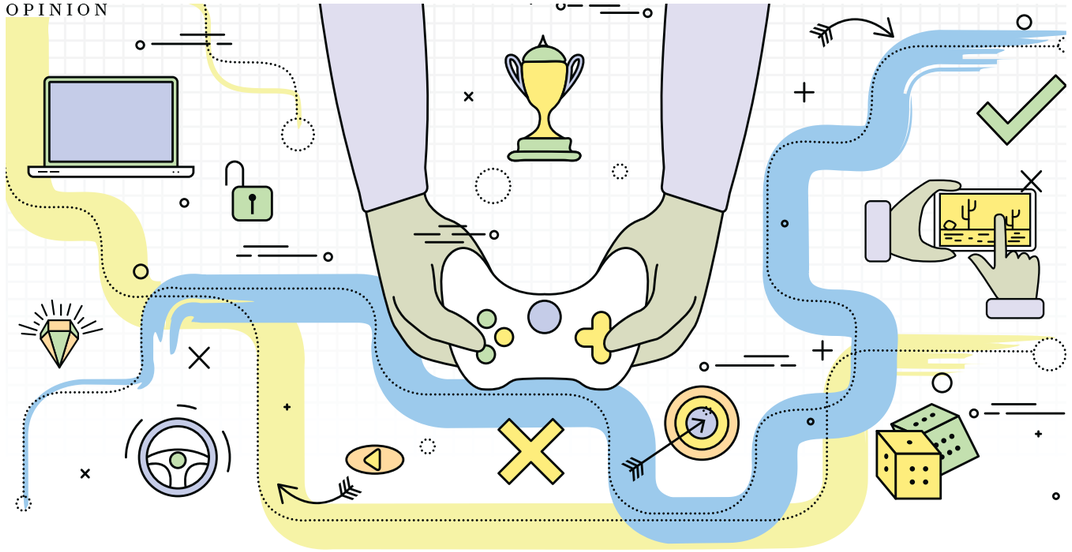
Unfortunately, despite great applications such as Dragonbow, Lightneer, Kahoot, Scratch, and a few others, more often than not, gamified apps merely consist in dressing traditional pedagogical content with more or less 'cute' graphics and sugar-coating the content with a thin layer of interactivity. There is no reassessment of the pedagogical method. Knowledge is still being delivered, out of context, the old fashioned way. The pill has just been made a bit easier to swallow.

There is no question that computers and communication technologies can, and should, be used by the education systems. But they have much more to offer than superficial gamification. And

Games are the most ancient and time-honored vehicle for education. They are the original educational technology, the natural one, having received the seal of approval of natural selection.
The question: Can games have educational value? *is absurd. Game-playing is a vital educational function for any creature capable of learning.*

Chris Crawford

since playing is the most natural, and fun, way of learning, let's have a closer look at how it would be possible to use the most perfect form of digital entertainment for educational purposes: video games.



It is common, even custom, to oppose video games and education. It drives teachers and parents crazy to see their kids, those same kids who are so difficult to motivate in the classroom, enjoying dumb video games when they should be doing their homework or playing outdoors with their friends. Even those of us who love playing video games have to admit that the vast majority of them are graphically aggressive, stupidly violent, intellectually poor, morally debatable and dangerously addictive. And yet…

The very first thing that a video game does, is teach. It has to. This first hour or so of playtime is usually referred to as the tutorial.

Long gone is the time when the players were confined to the limits of their screen, or when static backgrounds scrolled from top to bottom or left to right. By then, you hardly had to explain to the player how to play the game. Today, the players can evolve in vast real-time 3D environments. Some games have playgrounds of over 60 square kilometres. In the case of massive multiplayer online games, they can even be virtually limitless.

These worlds are made of all sorts of environments: plains, mountains, woods, cities, caves, or whatever the imagination of the creators allows. They are populated with Non Player Characters, either human, or animals, or aliens, or robots that can live their independent lives. Players can walk, run, crawl, swim, fly, and drive all sorts of machines.

More importantly, the evolution of hardware and software also permit increasingly richer interactions with the environment. It is possible to move or break objects, assemble them to create new tools, use their specific properties and combine them with the proper physics implemented in the game: set fire to a wooden door, use an iron tool to conduct electricity, use a piece of meat from an animal you just hunted to attract a bigger prey, etc. The designers' imagination is the limit.

And all this is created ex-nihilo. *Whether the world is meant to be a realistic environment or an alien planet, developers always start from scratch. Since it is impossible to reproduce all the laws of physics and all the systems governing a real world, the creators have to choose which ones are the most relevant for their game.*

Will there be a day/night cycle? How will it affect the player? Will there be climatic changes? Will rain affect the ability of the player to climb? All the surfaces, or just some? Which ones? Will snow oblige the player to find adapted gear? Can he/she break through wooden doors? Steel doors? Windows? Etc. Every game has its own world, with its own set of rules, its own lore, its own fantasy, its own story. In a sense, when the player starts a new game, he/she is like a newborn child: he/she discovers a brand new world. And he/she has everything to learn.

That's why the first thing that a video game does is to teach the player who he/she is, where he/she comes from and what his/her role in life is. It also teaches the player about the rules, the tools at disposal and their effects on the environment. Typically: you are the hero, you have to save the world (or the princess, or both) by killing everybody else, and here is the armory. Fortunately, it is often a bit more subtle than that.

The really interesting thing is how it is done. Of course, every game is different, and every development studio has its habits and idiosyncrasies, but it is fairly easy to distinguish some constants.

Usually, after one or a few short video sequences that immerse the player in the fantasy, tell him/her who he/she is and inform him/her of his/her final goal, the game guides him/her toward a set of missions.

These missions are increasingly difficult to achieve. The learning curve has to be challenging, but not to the extent that it gets annoyingly difficult, since it is crucial to keep the player in the flow.

The sequence of a mission is quite invariable. The player is first confronted by a concrete problem. He/She will probably have to explore his/her surroundings to find additional information. He/She will then have to make assumptions and test them until he/she finds the solution. To do so, he/she will have to understand, assimilate and eventually reuse the skills and knowledge acquired in a previous mission.

This is nothing but project-based pedagogy in a digital form. If provided with the appropriate environment and narrative, the basic structure and systems of modern AAA action-adventure or RPG video games could be used to teach mathematics, geometry, physics, a foreign language… whatever, really. Even the Humanities.

Take a game like Assassins Creed Unity, set during the French Revolution of 1789, for example, and change the narrative. Say that a group of bitter royalists have found a way to come back in time and plan to disrupt the historical events in order to prevent the Revolution from happening. The player's goal is to stop them, and in order to achieve his/her missions, he/she will have to understand what the forces at play were, who were the key protagonists, their ideas and motivations, etc. The missions are considered a success when the historic events happen the way they really happened. The player is not told what happened: he/she is there. He/She is part of the action. He/She lives it. His/Her actions contribute to make history happen. Chances are the events will stay engraved in his/her memory for ever. And he/she would have had great fun in the process.

Science without conscience is but the ruin of the soul.

François Rabelais

One of the advantages of digital project-based learning is that it is much easier to set up multidisciplinary projects than in real life. Kerbal Space Programme is a good example. It is a space flight simulation in which the player impersonates the director of a space programme operated by small humanoid aliens, the Kerbals. He/She has to build rockets, rovers and all sorts of vehicles to explore the solar system. The game gives him/her missions such as escaping the atmosphere, reaching a stable orbit, landing on an asteroid, creating space stations, etc. While the simulation of reality is not perfect, the developers have paid special attention to reproduce the actual laws of physics as accurately as possible (as accurately as playable, in fact). While playing the game, the player will learn, literally, rocket science. And not only that. If the player choses the « career mode », he/she not only has to build a rocket and send it to space, but also has to deal with all the business aspects of it: find funds for his/her programme, build a reputation for himself/herself, deal with marketing issues, complete contracts, etc.

Kerbal Space Programme comes with interesting multiplayer functions, such as the possibility for the players to set challenges

The future ain't what it used to be.
Yogi Barra

for each other, or to organise tournaments. But the multiplayer capabilities of modern video games extend far beyond that and could be used to great advantage for learning purposes.

Imagine a game in which a robot has to be conceived and built. That involves acquiring knowledge on a broad set of disciplines: physics, mechanics, electricity, ergonomics, coding. Since it is unlikely that a player will be interested in all this he/she will have to find other players to create a consistent team and cooperate with them. The internet being global, his/her mates will probably come from a completely different socio-cultural or economic background, be of a different gender or age-group. He/She will have to deal with this diversity and find ways to effectively cooperate with them.

So not only will the player deepen his/her knowledge on his/her center of interest and broaden the scope of his/her knowledge on other fields than his/her own, he/she will also develop his/her creativity, critical thinking, communication and collaboration skills.

This, again, is « just » a matter of design. As it is to introduce and teach and train not only knowledge, not only skills, but also character qualities such as curiosity (the very base of access to knowledge), mindfulness, empathy, resilience, etc.

When conceiving that game in which the player has to build a robot, the creators will have to decide on a narrative: why does the robot have to be built? To what purpose? With what resources? Are these limited or unlimited? Are they all accessible, or will the player have to trade with other players? Or to steal them at gunpoint? Depending on how they answer these questions, the game can be violent and competitive, or constructive and cooperative. The ethics of the designers, and their intention to develop a game for learning instead of meaningless entertainment, will decide of that. Not their professional competence. Not the technology.

Communication technologies, along with the exponential growth of scientific knowledge, are profoundly affecting the traditional pillars of our societies. They are changing the way we socialise, the way we organise, the way we work, the way we think… And these economic and social changes are happening faster than ever before in human history.

There is growing evidence, from scientific studies, from employer surveys and from educators themselves that our current education systems do not properly prepare the new generations to thrive in our increasingly shifting, complex and uncertain world.

Education can no longer be mainly focused on reproducing content knowledge; it evolves too fast, and has never been so broadly shared and so easily accessible. *Educational success is now more about what people are able to do with what they know, how they adapt and how they behave.* It is more about being versatile, about constantly adapting and constantly learning and growing in a fast-changing, hyper-connected world.

A renovated education needs to balance content knowledge and understanding with skills that will help students extrapolate what they know, and with curiosity, motivation, and socio-emotional intelligence that will teach them to consider the wider implications of their actions, and to act mindfully.

Psychological and neuroscientific research consistently emphasises that active engagement leads to far better learning outcomes. Educational environments that encourage students' active implication, and self-regulation, that foster reflection, communication, and collaboration skills, and are socially relevant to the learner, greatly enhance learning, as well as the transfer of what has been learned to new situations.

Video games specifically designed for learning are definitely the way to use communication technologies at their best in order to transpose such learning environments into a digital form. They are not meant to replace good old schools, flesh and bone teachers, or real-world physical interactions. But they can help deploy active pedagogies to the greatest possible number of i.e. people, at a fraction of the cost of traditional educational infrastructures.

This is especially true when considering the long-life learning challenge. Students can no longer expect to build a whole career on what they have learned during their college or university years. They are going to have to learn through their entire lives, whether to get a job, to keep a job, to change jobs, or simply for the sake of it. People need a way to learn whatever they want or need to learn, whenever they want or can. That means an always-on, always-up to date system, able to provide at any time a personalized service to a constantly changing amount of people. It seems impossible to do in the brick and mortar world.

Such a platform is perfectly doable with the current communication technologies, though. As a matter of fact, video games developers have been doing exactly that for almost two decades, with massively multiplayer online games, and have acquired an unparalleled expertise in this field.

Also, sandbox games such as Minecraft, and now Roblox, have proven to be incredibly successful. More than games, these are social platforms that allow the users to freely imagine, create, socialize and play together in immersive 3D worlds. All the games and experiences present in Roblox, and there are about 30 million of them, have been created by the players themselves. This demonstrates that if provided with the right environment and tools, people are eager to implicate themselves, to share and to cooperate constructively.

As Artificial Intelligence, Virtual Reality, and Natural User Interfaces come to fruition, the access to digital content will become increasingly easy and natural . Blockchain, for its part, will certainly lead to original business models and innovative organisational models. These technologies could help make even more compelling digital learning apps or platforms. When not developing them itself, the video games industry is rapidly assimilating and mastering them.

All this expertise and know-how accumulated over the years by the video games industry to produce meaningless games could be used to develop and massively deploy extremely effective digital learning solutions, adapted to the 21st century.

Education needs to change in order to prepare the future generations not only to thrive as individuals, but also to take up the incredibly complex challenges humanity as a whole will face in the near future. We need a renovated education system to save the world. And, as counter-intuitive as it sounds, we might need video games to save education.

The current crisis calls for a worldwide concertration of all the efforts made towards a renovated education. In 20 years, education could transform the social order and establish a spirit of cooperation susceptible of finding solutions to our present problems.

Only an education that completely redefines the relationships with the children can start a new era, freed from the ruinous competitions, the biaises, the concerns and miseries so characteristic of our civilization, chaotic and worrisome. A new education is necessary, based on the following principles:

- Education has to help children understand the complexities of the social and economic life of our time
- It must respond to the intellectual and affective needs of children of very diverse nature and allow them to express themselves in their own way
- It must help the children to voluntarily adapt to the requirements of societal life and replace discipline based upon constraint and fear with incentives to personal initiatives and responsibility
- It must promote the collaboration between all the members of the school community by getting teachers and pupils alike to understand the value of diversity and critical thinking
- It must lead children to appreciate their cultural heritage and to welcome the original contributions of all other nations to the universal human culture. To ensure a peaceful and secure modern civilisation, the citizens of the world are not less necessary than the good citizens of their own country.

CONGRESS OF THE INTERNATIONAL LEAGUE FOR A NEW EDUCATION, NICE (FRANCE), 1932

Learning Empathy *by Playing Video Games*

MATTHEW FARBER, Ed.D.

Matthew Farber, Ed.D., is an Assistant Professor in the Technology, Innovation, and Pedagogy Programme at the University of Northern Colorado. He has been invited to the White House and to keynote twice for UNESCO, and has been interviewed about games and learning by NPR, Fox News Radio, USA Today, and The Wall Street Journal. With Karen Schrier, Ed.D., he co-authored the UNESCO MGIEP Working Paper, The Limits and Strengths of Using Digital Games as "Empathy Machines." Dr. Farber's books include Gamify Your Classroom: A Field Guide to Game-Based Learning — Revised Edition, and Game Jam Guide. His latest book, Game-Based Learning in Action: How an Expert Affinity Group Teaches with Games, has a foreword from James Paul Gee.

"A [good] game is a series of interesting choices."—

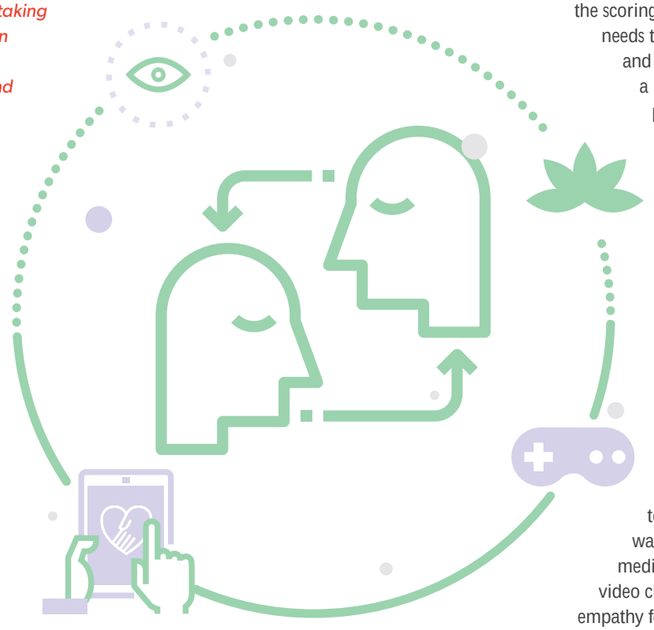
SID MEIER, *creator of the bestselling Civilization series.*

One of my earliest forays into using games to teach students about world issues was when I had children play Darfur Is Dying—a game from 2006 set in war-torn Darfur. At the time I was teaching United States and World History to 12- and 13-year-old children (currently I am an Assistant Professor of Technology, Innovation And Pedagogy at the University of Northern Colorado, in the U.S.). I learned about so-called serious games—games made to inform people about real-world issues such as health pandemics and the effects of war.

In Darfur Is Dying, players took on the role of a Sudanese person who had to forage for water for his or her family. The challenge was to get to the water pump, fill up the container, and then rush back home, all in a barren open desert landscape, and all without getting caught by the militia. After playing, I asked students, "Why was the game was so hard to "play?"

In an educational context, video games like Darfur Is Dying defy the bounds of what can be taught using traditional media, like books, or even in real life, like class field trips. Clearly, I could not take students to Sudan! Even more compelling than using games as impossible field trips is the emotions that these sorts of experiences can elicit from students. After all, outcomes in games are ultimately controlled by the agency players perceive to have over their experiences.

This ownership players feel from making a series of meaningful choices in game worlds can evoke interesting emotions. For example, playing a game like Darfur Is Dying can make players feel guilt, or even complicit, in their actions. Comparatively, one does not usually feel guilt over watching a protagonist make a decision in a film because the viewer is doing just that: watching the experience. *Perspective-taking through player agency in games, however, can create such emotions and can potentially drive empathetic thinking.*



Social Impact Games

Really good video games can be seen as spaces of meaningful inquiry, where players learn through experience. Games, like film, come in various genres. And like film, there are big budget productions and smaller, more intimate games created by independent designers. While some games are designed for pure entertainment, others are made with the intent of informing and teaching about serious topics. These sorts of games, sometimes called social impact games, put players into unique situations and often utilises the empathetic skill of perspective taking. This phenomenon framed and shaped some of the questions Dr. Karen Schrier and I recently explored in our UNESCO MGIEP Working Paper, The Limits and Strengths of Using Digital Games as "Empathy Machines."

One example of a social impact game is the Web-based Parable of the Polygons (http://ncase.me/polygons). About cause-and-effect relationships pertaining to segregation and discrimination, designer Nicky Case, along with researcher Vi Hart, created a fully playable blog post where polygon shapes, some frowning and others smiling, are dragged by players until all are smiling and are happy (no easy feat!).

Another social impact game of note is Papers, Please (http://papersplea.se), which has won multiple awards worldwide. Set in 1982, it is a dystopian social impact game about what it would like to be a border agent in Arstotzka—a fictional Soviet-era bloc country. In it, players are challenged to inspect immigration documents. Sometimes players are presented with bribes or forged items. Making a wrong decision can affect Arstotzka, but also the player's virtual family. Each "level" is a day, and the scoring system is money the player needs to heat his or her apartment and to feed dependents. As a result, the game presents players with a multitude of difficult ethical dilemmas.

Teaching with Social Impact Games

Some teachers have begun to adapt social impact games to help their students better situate content. For example, one colleague I spoke with struggled to teach about the Syrian civil war when using traditional media, like news articles and video clips, to espouse a sense of empathy for the horrors taking place. So, he developed a series of lessons to teach the Syrian refugee crisis. First, he used BBC's free text-based news game, Syrian Journey: Choose Your Own Escape Route (https://bbc.in/2loszrS). In it, readers click on choices, which then create different story branches, or threads. Often students replayed, or reread, passages, to discover many or all of the possible choices. As they played, students wrote journals from the perspective of being a Syrian refugee. His students also followed 8-year-old Bana Alabed's Twitter feed (@AlabedBana). Alabed, along with her mother, fled Syria for neighbouring Turkey, and each tweet spoke about realities about this ongoing refugee crisis.

In my recent book, Game-Based Learning in Action, I interviewed several teachers about how they adapted social impact games into their classrooms. One teacher, Norway-based Aleksander Husøy, has his students play This War of Mine, a game

set in a fictional war-torn European country. *Students become emotionally connected in the experience, as they make difficult decisions about the overall well-being of the characters in the game that they control.* In his classroom, Husøy will ask his students about what happens to the rules and norms of a civilised society when the fabric of that society breaks down, and there is no police or courts of law. Then he asks, "What is good—and what is evil—when there is no forces to punish or reward society?" The game, therefore, situates these otherwise abstract concepts in ways traditional teaching could not.

Another educator I interviewed was John Fallon, a U.S.-based English language arts teacher. Amongst the many commercial game experiences he uses in his instruction, he includes the educational game Quandary to teach ethical decision making and digital citizenship. *The game involves players in colonising planet Braxos, which comes with a unique set of problems to address issues like distribution of income, water conservation, and even digital privacy concerns.* As his students play, they write a Star Trek-inspired "Captain's Log" narrativisation of their fictional, mediated experiences. Students then support claims they make with in-game evidence. As a result, with reflective practices, Fallon is tasking his students to demonstrate their learning from within the game to spaces outside of it.

I, too, have adapted social impact games in my teaching practice: first with adolescent children, and currently with teacher education students at the university level. In my courses I use The Migrant Trail, a free game related to the documentary film The Undocumented (http://theundocumented.com). The game is about the migration of people who cross the Sonoran Desert from Mexico into the United States the game and can be played twice, from two perspectives: once as a U.S. border patrol agent, and again as an illegal migrant. National Public Radio (NPR) ran a story on how I used the game with children. Using Digital Games—And Empathy—As Teaching Tools can be streamed here: http://www.wnyc.org/story/using-digital-games-and-empathy-teaching-tools/.

Students Making Social Impact Games

In teaching, consider using games as spaces of experiential learning and inquiry, like a shared experience or digital field trip. Students should go through the process of playing a social impact game, then debriefing and reflecting on the experience. You can also have students use free game design tools, like Scratch (https://scratch.mit.edu) or text-based interactive fiction tools, like Twine (https://twinery.org) to extend and deepen their learning. In history class, I had a student play the game Mission US (http://www.mission-us.org), which teaches historical empathy (feeling how people felt in the past) alongside factual content. Following play, I challenged students to retell more historical events. One of my 12-year-old students authored a branched story set in the Valley Forge encampment during the American Revolution, in 1777, written partially in French (she used Google Translate), as well as English. She did this to intentionally confuse the player: in her story you become a 17-year-old who meets French General Marquis de Lafayette and become bewildered over the experience. This approach to teaching core mechanics to inform students continues. In my teacher prep course, one of my students authored an unwinnable Twine game about the black plague.

Working with Games for Change in 2016-17, we ran a series of social impact game jams across New York City. In game jams, participants design games based on themes or topics—all in a brief period of time. Game jams can be used in any classroom, too (ours were on weekends, in afterschool spaces, like museums and libraries). *This model of design creation inspires and engages deep learning about serious topics, as youth work collaboratively using iterative design thinking to create game experiences on social impact topics that others might play.* All of our work was documented and is freely available in a downloadable Game Jam Guide, published by Carnegie Mellon University's ETC Press (http://bit.ly/2z0DuBa). Sharing over 20 flexible lesson plans and new ideas from experts who led game jams in NYC, it is the culminating work of the four game jams that focused on three themes: climate change, smart cities, and immigrant history.

Consider having your students play social impact games, reflect on their experiences, and then make their own. By doing so you will boost your students' ability to perspective-take, which in turn will encourage them to contribute to making society more peaceful and sustainable.

Learning to ***Read on Mobile Devices***

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Wherever you travel on the planet, it seems that everybody has a phone. The ubiquity of mobile devices has changed the lives of people living in wealthy countries, but it has revolutionsed the lives of many of the world's poorest. From mobile banking to communications to agriculture, access to mobile technology has allowed many millions of people to be included in the modern world and improve their own economic and physical conditions. The technological revolution cannot skip education. Access to mobile phones represents an on-ramp to the Internet and all the free content and e-learning opportunities it provides. *These benefits are only open to children who know how to read and for almost 200 million children in the world, the best opportunity for gaining this skill will be through technology.* Can children teach themselves to read if they have access to a mobile device? By focusing on developing high-quality, mother-tongue content, many organisations are seeking to answer this question and improve the educational outcomes of children using mobile devices to learn to read with the hope that all children will become fluent readers.

The science behind learning to read is clear. Learners need direct and systematic instruction in the relevant sound-symbol relationships for the language they are most comfortable speaking. *Research shows that children who learn to read in their mother tongue are more successful in school and when they transition to learning to read in another language.* But children need more than exposure to the alphabet or characters of their language. They also need large amounts of easy-to-read and engaging text to practice their reading skills and expand their background knowledge of the world and of the academic language found in text. They also benefit from immediate and constructive feedback when their learning progress is monitored to ensure that they are progressing.

Many schools in low-income countries are not equipped to provide children with the quality or intensity of instruction required to master early literacy skills. Literacy rates among the bottom billion (defined as those who survive on $2/day) rose until 2000 to 54% and have flattened since then. *Speakers of non-dominant languages only make up 8% of the world's population but they make up 40% of the world's illiterates.* As many as 85% of children in Sub-Saharan Africa are being asked to learn to read in a language that they do not understand. As investments in education have declined and the number of teachers available reach dangerously low levels, alternative

Curious Learning has been conducting research in this space since 2011. In our studies, an example of which is published in the volume Children and Sustainable Development: A Challenge for Education, we concluded that children in remote locations in Ethiopia with no access to school learned early literacy skills in English equivalent to what is learned in the first year of a US Kindergarten. The children accessed the content with little guidance from adults. They played the games when they were not engaged in their normal activities, early in the morning and later at night. We also found that Kindergarten and First Grade learners in schools in South Africa with access to the devices for 2-3 hours per week learned letter naming and letter-sound skills faster than their peers with no access to devices. *Our work in 5 countries with 5000 children indicates that playing with the devices freely, guided by their own curiosity and interest, resulted in better than average learning outcomes.*

Like all such work, we see the limitations as well as the success. Each deployment highlighted the need for more and better content in the mother tongue. To go beyond letter knowledge and become fluent readers, a large quantity of engaging, mother-tongue content that teaches children the mechanics of how to read and provides them with many different opportunities to read material on many different topics is needed. We also discovered a set of consistent principles for designing such content to guide other developers in this field. These include creating discoverable interfaces, designing a strong connection between interactivity and the content to be learned, and building an app with assessments to monitor both usage and learning progress. The principles provide a framework for designing app-based experiences for children, but also form a basis from which to judge new content arriving on the market. What unites these principles is the primacy of children's learning behaviors outside of technology and the characteristics of the writing system that the child is learning. These principles have evolved from many decades of research into how children learn to read and more recent research into designing interactive experiences for children.

To provide such content for as many children as possible, Curious Learning has teamed with developers and international development and education organisations to develop sets of open-source apps to localise content. One app in particular shows great promise. Feed the Monster was developed by the Apps Factory, The Center for Educational Technology, and The International Rescue Committee and received the highest honors in the EduApps4Syria contest, sponsored by the Norwegian Ministry of Foreign Affairs. The app teaches children the relationship between the characters in the written component of their mother tongue and the sounds they are familiar with in their spoken language. Feed the Monster is easily adaptable to other languages. Curious

Learning took on the task of localising Feed the Monster to 25 languages so far with more to come over the course of the year. The app is in use among Syrian refugees and across many African and Southeast Asian countries. Early results show that after 3-4 hours of non-consecutive use, children became proficient in letter-sound correspondences and early reading knowledge. While these results are early and must be evaluated across languages and educational settings, the implication is that millions of children could become proficient in early literacy skills in their mother tongue within the first year of schooling. *Such a result is striking in light of the fact that in many low income countries 50% of children leave primary school without being able to read a single word.*

A crucial norm for education systems is that they are dogged in their determination that every child acquires basic literacy and numeracy skills. Such an assertion may seem trite, even naive. But we should be reminded of what the future holds for children and for the world when they do not become literate. Non-literate adults are unable to take part in or inform themselves about local elections or political issues, unable to read warning labels on medicines, unable to respond to warnings in the press of dangerous weather, conflict or health disasters. The World Health Organisation found that illiteracy was one of the chief barriers to preventing the spread of Ebola in West Africa in 2014-15. When children do not learn how to read they lack the necessary skills to further their own education and get employment that will change the lives of their family and future children. *Becoming literate is only the first step towards developing a population that can be active and healthy participants in their own personal social and political environment. Learning to read is also the necessary precursor to an active, engaged and peaceful populace.*

Education *is a Serious Matter*

CATHERINE ÉMOND, ALLIANCE NUMÉRIQUE'S EXECUTIVE DIRECTOR

Catherine Émond has a political science degree from the University of Montreal. Her career path led her to occupy various positions within cabinets of political representatives, both at the municipal and provincial levels. She has been active in public organisations within key sectors of Quebec's development plan and can handle economic affairs and integrate them into Quebec's public policies. She distinguishes herself by her keen sense of leadership and strategy, and by her ability to mobilise various people around a common project. Catherine's mandate includes the overall administration of Alliance Numérique. She aims to lead and carry out the various activities of the organisation, particularly by promoting its position and development, while paying attention to its influence on the community.

The power of play

The enrollment of the first digital generation in our schools makes gamification of education a necessity.
How do we make it happen?

Learning through play, especially video games, is a very powerful tool that can significantly improve our children's education.

Although video games are primarily perceived by most people as entertainment, nowadays they are often used as training tools in the marketing, health, financial services and education sectors. What typifies a serious game is that it incorporates an educational aspect to its playful and entertaining scenario.

Video games are effective at stimulating learning because they are particularly captivating.

We need to clarify the distinction between "educational games" and "pedagogical games". In the first instance, the learning objective is implicit and the pleasure of learning is almost accidental. Pedagogical games, on the other hand, address the learning objective explicitly, and learning becomes the fun part of the game .

The best games provide a fun experience throughout, and not simply when the player has achieved the goal. After all, this is the true power of play: having fun while learning enhances your motivation to further develop your skills.

Serious academic studies have demonstrated that play stimulates learning and positively affects motivation and tolerance.

In the best-case scenario, a game can even raise awareness about social issues and boost empathy. The game PeaceMaker, for example, provides players with the opportunity to take on the role of either the Prime Minister of Israel or the President of the Palestinian Authority. The goal of the game is to find a viable solution to finally resolve the conflict between both states. In order to reach that goal, a player must consider the opponent's situation as well as the needs of its own people .

This type of game not only imparts knowledge about the region and its history, but it also teaches lessons about empathy and the power of negotiations.

[1] Jeu Sérieux, Vicky Gagnon-Mountzouris, Marie-Michèle Lemieux, Jean-Philippe Pouliot, Groupe de travail de la promotion du développement des compétences infor mationnelles (GT-PDCI), Université du Québec, 2016, p. 4
[2] **Empathy, perspective and complicity: How digital games can support Peace Education and conflict resolution, Paul Darvasi, York University,** Mahatma Gandhi Institute of Education for Peace and Sustainable Development, November 2016

Why is serious gaming so powerful among youth?

And why is it so difficult for the digital generation to focus in a traditional educational environment?

The answer is simple: because they are digital natives. *The new generation's brain development evolves according to new parameters. Most of the social references are thus shaped by the technological tools and methods used on a daily basis.*

Gamification is therefore effective with them because it respects the pace and volume of information that typical members of this generation are used to.

A multimedia experience that includes spoken and/or written language, images, audio, animation or an immersive virtual reality simulation is becoming the norm of communication, and the standard for their recipients.

What about the human dimension?

Perhaps somewhat paradoxically, many jobs in the future will require purely human competence that cannot be handled directly by a computer. *More than ever, we will rely on emotional intelligence skills and strong ethics to lead our communities.*

Ethics, creativity and innovation are skills where human beings will always keep the upper hand, as opposed to technical and data management skills, which will be delegated to technological tools readily available.

Learning by simulation, however, can actually enhance the development of social skills. Immersive experiences can improve our understanding of multiple environmental, political and social dimensions in any given situation.

Serious gaming, then, becomes the perfect tool to develop key human skills such as empathy, judgement and fairness that will help us navigate through changes in data management, information and security.

Political power and the use of digital resources in education

If serious gaming should play a stronger role in our children's education, how effective are governments and public institutions at integrating new technologies? In many instances, they are clearly lagging behind since technology evolves at a much faster pace than legislation.

One of the issues we are facing has to do with the decision-making level. Typically, national or regional governments are in charge of public education. Success in the digital age, however, will often require the input of international institutions on one side, and local actions on the other.

International cooperation appears to be essential for addressing macro issues about data transfer. For example, whether we are talking about intellectual property, the protection of personal data or collecting taxes on digital services, individual countries cannot go at it alone. At the other end, new technology initiatives are often best implemented at the local level, where schools are free to make decisions according to the specific needs of their community.

Resisting change is part of human nature, and it is particularly true when it comes to something as important as education. On one hand, more conservative parents believe that having fun cannot possibly be part of studying because "studying is serious!" Education was quite strict in their days, and they turned out quite well. So why should it be so different with their children?

Teachers can also resist integrating these technological changes in their teaching methods. We already ask them to constantly change the content of what needs to be taught, so changing the tools they use as well can often seem a little much. Implementing new technological tools can also make them uncomfortable: not only do they sometimes have difficulty using these new tools properly, but children are usually better than them!

What we need to explain to them, however, is that a successful digital shift may be the best thing for a teacher as it can lead to more attentive students, a better understanding of subject matters on their part and, ultimately, better academic results.

The video game industry and our children's education

Video game studios are willing and able to help implement new technological tools and methods at various levels. The digital industry is well aware that the next generation will heavily depend on a mastery of technology to advance their career, and they take this responsibility seriously.

Making captivating games is a complex art that requires technological innovation, technical ability, coming up with an original plot and interesting characters. Adding an educational twist to it makes it even more challenging and often requires additional members to the development team and, therefore, significant financial investments.

Conclusion

The video game industry is becoming an increasingly powerful sector where many people now want to work. Games are already widespread in our society and they are here to stay. *This new industrial revolution – a digital revolution – requires new norms and codes, much the same as when cars revolutionised transportation at the beginning of the 20th century.*

The transition from horses to cars imposed a large number of changes. Nowadays, driving skills are evaluated in order to receive a driver's license, cars are now equipped with brakes and signaling lights, and drinking and driving is criminalized in many countries.

The city of Detroit, where the automotive industry took its roots, was the first city to use stop signs, lane markings, one-way streets and traffic lights. Who will play the role of Detroit in our current digital revolution?

We should all embrace this change and invest in our human, technological and financial resources to prepare for the future.

After all, what is at stake here is the ability of our children to fully play their role as citizens in the digital future. Much of the scientific, ethical, social and environmental future depends on it.

In the context of getting involved in public education, one is struck by how few studios have developed relationships with government and political leaders, apart from a few studios that truly specialise in "Edtech".

The gaming industry needs to do more by involving its designers and creators in more educational projects. The industry must accept that its business model will be transformed from a strictly B2C model to integrate a "B2G" component.

On the other hand, public leaders, educational institutions, the media and teachers should better appreciate the involvement of studios and facilitate their participation in the education ecosystem. Yes, this includes more funds to finance extra employees that studios must hire for these types of projects.

The Detroit News, 1900-1930: The years of driving dangerously, April 2015
https://www.google.ca/amp/s/amp.detroitnews.com/amp/26312107

L'éducation : un ***véritable (en)jeu de société***

CATHERINE ÉMOND, ALLIANCE NUMÉRIQUE'S EXECUTIVE DIRECTOR

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Le pouvoir du jeu

La présence de la première génération numérique dans nos écoles fait en sorte que la ludification de l'éducation devient une nécessité. Comment réussir cet important tournant dans nos sociétés?

L'apprentissage par le jeu, notamment le jeu vidéo, est un outil très puissant pour aborder cette pièce maîtresse de l'éducation d'aujourd'hui et de demain.

Bien que le jeu vidéo soit d'abord perçu comme une activité de divertissement, il est de plus en plus utilisé comme un outil de formation dans les secteurs du marketing, de la santé, des services financiers et de l'éducation. Ce qui caractérise le jeu sérieux c'est qu'il comprend un aspect pédagogique qui s'ajoute au scénario ludique ou divertissant.

Le jeu vidéo est efficace pour stimuler l'apprentissage parce qu'il est particulièrement captivant et stimulant.

Il existe une distinction entre « jeu éducatif » et « jeu pédagogique ». Dans le premier cas, l'objectif d'apprentissage est implicite et le plaisir lié au fait d'avoir appris est donc accidentel. Le jeu pédagogique quant à lui, aborde l'objectif d'apprentissage de manière explicite et le fait de performer dans l'apprentissage génère le plaisir inhérent au jeu .

Les jeux les plus performants demeurent ceux qui sont amusants tout au long de l'activité et non pas seulement qu'au moment de récolter le sentiment de réussir l'objectif d'apprentissage. Car voilà tout le pouvoir du jeu : s'amuser en apprenant nous pousse à aller plus loin dans le développement de nos compétences.

Plusieurs études bien documentées en ont fait la démonstration : le jeu provoque des apprentissages et affecte positivement la motivation et la tolérance.

Dans le meilleur des scénarios, le jeu peut même sensibiliser sur des enjeux sociaux et stimuler l'empathie. À titre d'exemple, le jeu PeaceMaker propose aux joueurs de se plonger soit dans le rôle du premier ministre israélien ou alors, du président Palestinien.

L'objectif du jeu est de parvenir à une solution viable entre les deux États pour résoudre le conflit. Atteindre l'objectif implique non seulement de faire les meilleurs choix pour répondre aux besoins et du groupe qu'ils représentent,

[1]. Jeu Sérieux, Vicky Gagnon-Mountzouris, Marie-Michèle Lemieux, Jean-Philippe Pouliot, Groupe de travail de la promotion du développement des compétences informationnelles (GT-PDCI), Université du Québec, 2016, p. 4

mais également de tenir compte de la situation de son opposant .

Le jeu peut donc générer des apprentissages liés tant au savoir-faire qu'au savoir-être.

Pourquoi le serious gaming est-il si puissant auprès de la jeunesse?

Et pourquoi est-ce si difficile pour la génération numérique de se concentrer dans un environnement éducatif traditionnel et magistral?

Parce qu'ils sont nés avec le numérique, le développement du cerveau de la nouvelle génération évolue selon des nouveaux paramètres. La plupart de leurs références sociales sont ainsi façonnées autour des outils technologiques et des méthodes d'utilisation qui s'y rapportent.

La ludification est donc efficace parce qu'elle respecte le rythme et le volume d'information auxquels le jeune de cette génération numérique est habitué.

L'expérience multimédia qui inclue du langage parlé ou écrit, des images, de l'audio, de l'animation ou carrément une simulation immersive en réalité virtuelle est en train de devenir la norme du medium pour présenter du contenu et par conséquent, la norme aussi pour celui qui l'absorbe.

Et la dimension humaine dans tout cela?

En parallèle, curieusement, on situe de plus en plus les métiers d'avenir autour des compétences que l'informatique et le numérique ne pourront pas couvrir. *Plus que jamais, nous compterons sur des aptitudes d'intelligence émotionnelle et une conscience citoyenne étoffée pour mener nos sociétés à bon port.*

L'éthique, l'analyse sociale, la créativité et l'innovation sont des compétences qui resteront toujours à dimension humaine par opposition aux compétences techniques et de gestion de données qui, elles, seront déléguées aux supports technologiques déjà disponibles ou qui seront crées au fil du temps.

Apprendre par simulation permet de pousser plus loin le développement de compétences "expérientielles" et transversales. Une expérience immersive nous aide à mieux capter les multiples dimensions environnementales, politiques et sociales d'une situation donnée.

Le serious gaming devient donc un outil tout indiqué pour travailler les compétences-clé telles que l'empathie, le jugement et l'équité dont nous ne pourrons plus nous passer pour régulariser les avancées technologiques en matière de gestion du data, de l'information et de sécurité.

Le pouvoir politique et l'utilisation des ressources numériques en éducation

S'il apparait évident que le serious gaming est appelé à prendre plus de place dans l'éducation de nos enfants, qu'en est-il de la capacité de nos pouvoirs publics à intégrer ses changements dans nos institutions? Force est de constater que, bien souvent, ils sont à la traine puisque l'évolution technologie est beaucoup plus rapide que la législation.

L'un des enjeux se situe au niveau du palier décisionnel. L'instruction publique relève habituellement des gouvernements nationaux ou encore régionaux. Or, pour réussir ce virage numérique, il faudra plutôt faire appel aux instances internationales d'un côté, puis locales de l'autre.

La coopération internationale apparait essentielle pour régler des questions macros qui ont trait au transfert des données. On parle ici par exemple d'enjeux de propriété intellectuelle, de protection des données personnelles ou encore de taxation des services. À l'autre extrême, c'est à l'échelle de l'école qu'il faudra implanter ces nouvelles initiatives technologiques, en faisant les adaptations nécessaires pour chaque communauté.

Les sources de résistance au changement sont multiples à ce niveau. D'une part, une frange plus conservatrice chez les parents

croit que s'amuser ne peut pas être synonyme d'étudier puisque, "étudier c'est sérieux! " L'approche éducative à leur époque était, elle, très sérieuse et – voyez-vous? – ils s'en sont très bien tirés. Pourquoi en serait-il si différent pour leurs enfants?

Les enseignants peuvent aussi résister à implanter ces changements technologiques dans leurs méthodes pédagogiques. On leur impose déjà plusieurs changements à intégrer au niveau de la matière à enseigner. Intégrer de nouveaux outils peut leur sembler un trop grand bouleversement. L'implantation d'outils technologiques de pointe peut également les rendre inconfortable : non seulement ont-ils parfois des difficultés à utiliser ces nouveaux outils correctement, mais les enfants sont habituellement meilleurs qu'eux!

Pourtant, un virage réussi vers le numérique peut s'avérer la meilleure chose pour l'enseignante puisqu'il peut engendrer des élèves plus attentifs, de la matière qui est mieux intégrée et, ultimement, de meilleurs résultats scolaires.

L'industrie du jeu vidéo et l'éducation de nos sociétés

Les studios de jeu vidéo sont en mesure d'agir en catalyseur des technologiques dans des pratiques éducatives de divers niveaux. Sachant à quel point la relève sera dépendante de son habileté à maîtriser les avancées technologiques dans son cheminement professionnel, il s'agit d'une responsabilité importante pour l'industrie du numérique.

Mais faire des jeux captivants est un art complexe qui lie innovation technologique, exactitude technique, originalité de l'intrigue ainsi qu'une ambiance et des personnages intéressants. Y ajouter un aspect pédagogique ou éducatif est donc un coefficient de difficulté peu banal, qui demande une expertise marquée, en plus d'investissements financiers importants.

Or à ce jour, en dehors des quelques studios spécialisés en Edtech, les concepteurs de divertissement numérique ont trop peu de liens constants et stratégiques avec les leaders politiques.

[2]. Empathy, perspective and complicity : How digital games can support Peace Education and conflict resolution, Paul Darvasi, York University, Mahatma Gandhi Institute of Education for Peace and Sustainable Development, November 2016

L'industrie du jeu dans son ensemble a la responsabilité de s'intéresser à son rôle social en valorisant l'implication de ses concepteurs et de ses créatifs à des projets technologiques dans des pratiques éducatives. L'industrie doit faire la paix avec le fait que son modèle d'affaires en sera transformé et passer d'un modèle B2C à " B2G ".

De l'autre côté, les acteurs publics, institutions d'enseignement, médias et professeurs doivent valoriser l'implication des studios et en faciliter au maximum leur participation dans l'écosystème d'éducation, en valorisant leur rôle et leur permettre de rémunérer les créatifs qu'ils emploient.

Conclusion

Le jeu vidéo est un créneau culturel et éducatif puissant, et recherché. Les jeux sont déjà très répandus dans notre société et ils sont là pour rester. *Cette révolution industrielle – celle du numérique – exige un nouveau code de conduite, un peu à l'image de ce que la révolution du transport a généré avec l'arrivée des voitures au début du 20ème siècle.*

Le passage du cheval à l'automobile a imposé un grand nombre de changements. Aujourd'hui, on qualifie l'habileté de conduire par des permis de conduire, les voitures sont désormais obligatoirement munies de feux de freinage ou de signalisation, la notion du virage à gauche s'est répandue et l'alcool au volant est criminalisé dans plusieurs pays.

La ville de Detroit, pionnière du développement de l'automobile, a été la première ville à utiliser des panneaux d'arrêt, des marquages de voies, des rues à sens unique et des feux de circulation. Qui jouera le rôle de Détroit dans cette révolution technologique?

Autant aborder cette transformation en la regardant en face et en investissant nos ressources humaines, technos et financières pour la propulser positivement.

Il en va de l'habileté de nos enfants à trouver leur place et à pleinement jouer leur rôle de citoyen dans la société qui les attend. Il en va aussi de la sécurité scientifique, éthique, sociale et environnementale de l'ensemble de nos sociétés.

[3]. https://www.google.ca/amp/s/amp.detroitnews.com/amp/26312107

Digital Pedagogies for ***Development of Better Societies***

SHWETALEENA BIDYADHAR

Shwetaleena is a training professional and instructional designer. She has been at TIS for 17 years and has nearly 23 years of work experience. She has devised learning solutions in the domains of K-12, Higher Ed and corporate areas such as Learning Disability, HR, OB, Strategy, IT, Banking, Finance, Sales, Soft Skills, to name a few. Shwetaleena consults with Fortune 500 companies in a wide variety of verticals, several UN and Public Sector organisations, Government and Defense Agencies and International Universities.She holds a doctorate in Organisational Psychology and certificates in Accessible Technology and Learning Disability. She started her career with Robert Kennedy College as a Professor of Organisational Behaviour.

"We are moving from an era characterised by stocks of explicit knowledge to flows of tacit knowledge."

JOHN HAGEL

As educationists, it is our endeavour to provide transformative education to support 21st century learners and help build sustainable societies. This effort can surely be strengthened with the use of immersive, contextual and personalised digital learning pedagogy. Interestingly, *attitudes towards the adoption of technology to enhance learning strategy vary widely.* Some perceive technology as a distraction from academics while others feel it can only be used for entertainment. There also exist strong views that one should focus only on classroom/traditional teaching techniques and stay away from digital resources completely.

In my mind, technology is like fire – harmful if used injudiciously but most productive if its power is harnessed properly. *Technology can be an enabler for the implementation of cutting-edge learning solutions.*

So how does technology in pedagogy create better solutions for different learner groups? Here are a few compelling reasons:

Availability: Educational opportunities can now be availed by many who may lack access to courses through traditional classrooms. It helps the sentiment behind the 'No child left behind' movement and the call for 'inclusive/integrated classrooms', even if virtual.

So it increases the potential reach of education and caters to target audiences such as working professionals who do not have the option of attending these courses physically. It also helps children who may need home schooling for a multitude of reasons.

For example, a first responder in an emergency situation can access 'just-in-time' performance support due to the availability of this channel of information. We have designed courses for Fire services and Ambulance services employees to access this kind of information on tabs they use in their vehicles. Sometimes this makes all the difference between losing or saving a life!

Accessibility: *Technology makes things convenient for us.* But for people with disability, it makes things possible. It provides them with opportunities that would not exist otherwise.

The availability of assistive technology also helps us design courses to be compatible with WCAG/ Section 508 requirements. As we know, we have a moral and legal responsibility to design accessible courseware. It also makes commercial sense as it opens up the access to a larger target audience.

Such projects open up doors for learners with special needs or physical disabilities. *There have been many mobile apps and games designed specifically to help learners with Dyslexia as such multi-sensory experiences really facilitate their grasp of concepts.*

Digital material is easily accessible with the use of screen readers, audio, video captioning, transcripts, OCRs and input devices such as head wands, joy sticks, trackballs and eye trackers too. Let us not forget that Stephen Hawking could contribute as much to science as he did only due to the availability of such technology.

We have worked on several diagnostic tools such as Dyslexia and Dyscalculia screeners, video-based modules that train teachers on early identification of

"Many disabled people have to spend long hours alone. Voice-activated computers are a means of communication that can prevent a sense of isolation."

CHRISTOPHER REEVE

reading difficulties. Another interesting product in this genre` is a web-based training which we co-produced with UK's leading advisory service on inclusion and technology. As subject-matter experts we designed this training for other software developers on how they could create products that comply with the W3C Guidelines.

Personal Pedagogies: *Personal learning ecologies are needed to support self-development through customised learning experiences. This is made possible by the use of mobile technology.* This connects informal, non-formal and formal instructional strategies and aids deep learning.

Technology facilitates the design of micro learning objects mapped to specific enabling or terminal objectives and create a menu of options. These units can be

stringed together to form a highly personalised learning plan for a single learner.

Standardisation: Interestingly, along with an ability for customisation, technology helps us provide some sort of standardisation in the curriculum coverage and presentation. It provides a platform for various learning objects which can then be accessed by a batch of learners. It provides the same type of delivery for all learners. It is especially useful in settings where we lack quality teaching staff or teachers are just not available. Concept coverage is then uniform in terms of level of difficulty, nature of examples used and so on.

Emerging Technologies: Wearables, Augmented, Virtual or Mixed Reality, Artificial Intelligence, Social Media, 3D Animations and 3D printing, Interactive Walls, Holograms, Motion Graphics, iBeacons, Interactive Kiosks, Big data & analytics, Video projections, Cloud computing, IoT– these are all buzz words that aid in the conceptualisation and implementation of immersive learning solutions.

Each of these terms deserves a thesis in its own right! We are seeing many innovative applications of these in areas such as medical training, engineering, construction, first responder training, etc.

Wearables, for example, make technology pervasive by interweaving it into daily life. We could design induction training, process training, SOPs, and performance support where wearables make some of it possible.

Similarly, *Mixed Reality merges a virtual world with our real world. This gives rise to a hybrid environment where physical and digital objects co-exist and interact in real time.*

Headsets such as Microsoft HoloLens are used to experience this environment. iBeacons are used for Location and Contextual Awareness and help build location-based training like trouble-shooting a gas-leak in a factory for example.

Innovative Design Formats: Technology augments instructional design strategy and has become an integral part of current learning interventions. We are able to use it to make high-fidelity design formalities such as experience centers, serious games, simulations, virtual labs etc. Such solutions have been made possible only due to technological advancements.

21st Century Skills: Today's learners have changed from being passive recipients of knowledge to the ones who actually analyse and synthesise content. They need these skills to survive in the current environment, where capability is the key to success and importance and not only competence. Thus the *'Learning by Doing' mantra is now all encompassing.*

Traditional classrooms cannot always provide scope for such hands-on learning activities. This type of teaching does not typically go beyond knowledge and comprehension levels due to lack of application level opportunities and other such practical restrictions.

It is a very exciting time for us as designers of learning experiences. We have the potential of choosing the right technologies and creating blended learning that utilises the best of traditional and digital learning. For example, formats such as simulations, serious games, augmented reality, iBeacons, etc., can help learners practice and internalise high-level concepts. The use of social competitive quizzing has also gained popularity and usually retains learner attention more than traditional tests. So how do all these technologies and instructional strategies integrate into a learning solution? And how do these learning solutions tie in to the ulttimate aim of building sustainable societies?

Let's take the example of the Curious Learning App. It's a simple language learning app that will bring literacy skills to almost 100+M of unserved users. It helps children learn using this app

"We don't have plan B because there is no planet B."

BAN KI-MOON

on their parents' mobile devices. The pilot has already shown that 30% of the children are able to read using this app. Their aim is to create, localise, distribute, and optimise open source mobile software so every child can learn. Can we even imagine such an initiative without the use of technology? Such initiatives go a long way in providing access to education to many backward communities and provide sustainable equal opportunities.

Recent research around Neuroplasticity shows that our current educational frameworks provide skills to train the 'thinking brain' and memory. The focus of new curriculum models should focus on developing competencies such as critical inquiry, mindfulness, empathy and compassion. *These help train the 'socio-emotional brain' and lead to sustainable societies.* If we look at designing learning experiences around these four competencies, then we cannot but utilise technology. Most of the design formats can be used to provide problem-based and active learning experiences to train the 'socio-emotional' brain. There is even available research around how we can try to prevent violence through the use of digital games.

The time has come for us to redefine and reimagine education. The content, available technology, and relevant frameworks, all need to come together to provide comprehensive learning solutions for future citizens so that together we can build a sustainable world.

Using Technology *as a Bridge Towards Peace and Happiness*

ANUMUKONDA RAMESH

Ramesh leads Unity Education efforts in the APAC region, and focuses on educators, educational institutions, and education policymakers. Ramesh previously served as CEO of Media and Entertainment Skills Council, as a Chief Producer at Bharti Softbank, Chief Gaming officer at Kreeda Games, and Digital Media Specialist at IBM, Global Services. Prior to IBM, Ramesh worked on several 3D animated movies and game development projects across the world. Ramesh believes that "education" is a powerful tool to deliver sustainable development.

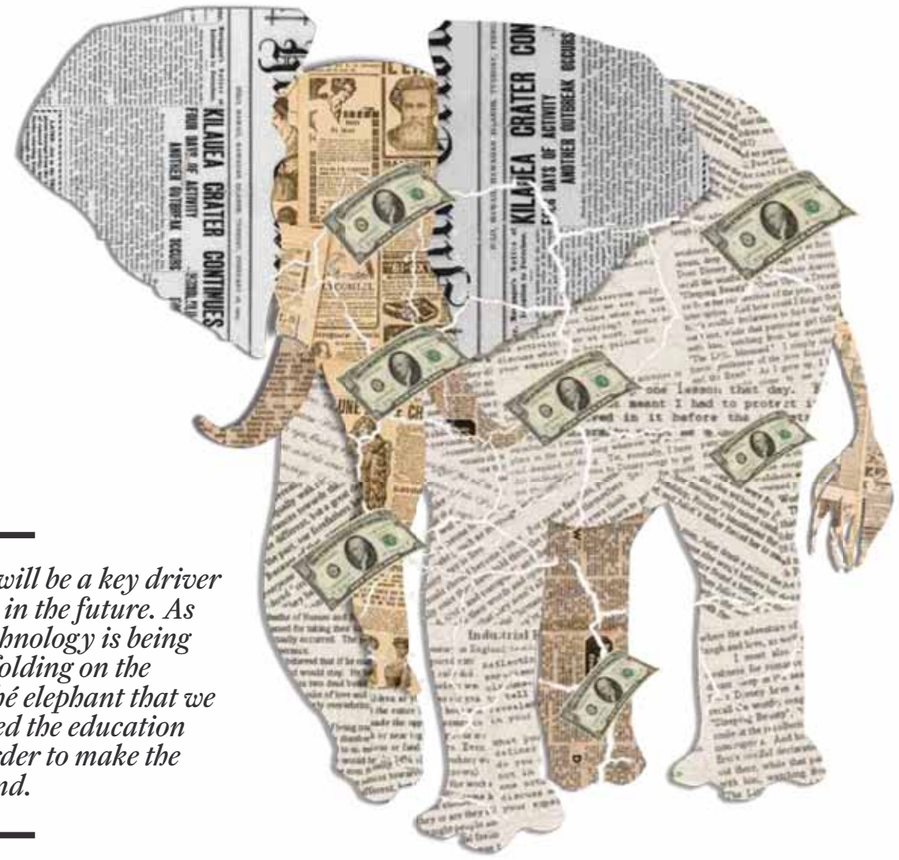
The state of existing education systems

The K-12 education system in some countries has been pretty much the same over the past two decades. With rapid advancements of digital technologies, *the current state of the education systems almost resembles an elephant made of the art of Papier-mâché struggling to move and adapt to the future jobs of the digital age.* An elephant that is perceived as valuable as it takes a big share of time in one's life.

However, the elephant (i.e. the education system) is so big such that a basic primary act of making the elephant stand on its own is challenging. In an attempt to keep the elephant standing and cover the cracks and gaps, dollar bills are pasted on the elephant's body. Institutions and Corporations – are all attracted to this elephant due to its extraordinary value and the high stakes associated with the elephant. *Billions of dollars are constantly being invested into the system to cover the cracks.* Alongside dollar bills, "technology" and "innovation" are other means used to temporarily "fix" the education system.

The issue with the existing education system is that it gives us all the answers, thus training learners' minds to function as "tape recorders". *By providing us ready-made answers, the education system subconsciously directs the learner to be "reactive" as opposed to "responsive",* wherein more often than not the learners are awarded for their ability to effectively memorise what is taught to them in class.

Very few organisations are asking where the spinal cord of the education system has disappeared. As children, while in our formative years, the greatest learning experiences happened as a result of the inquisitiveness we had for the first toy that we were exposed to or when we attempted to follow our parents to the next room with our first step when we could barely crawl. The very reason for our learning was the curiosity we had to explore and discover. However, this curiosity was slowly caged as we progressed through our education system, thus changing our ability to respond and instead developing our ability to react. Our socio-economic dynamics promoted this behaviour by rewarding reactions – recognising those individuals who were able to efficiently react as "successful" and "prosperous". *Thus, a majority of human beings over time became "efficient machines".*



Technology will be a key driver of education in the future. As it stands, technology is being used as scaffolding on the Papier-mâché elephant that we earlier termed the education system, in order to make the elephant stand.

Education is labelled in school. We cannot classify education as being "in class" and "outside" – it is prevalent throughout as is evident in the case where we learn, when we catch a bus, while we cook, etc. *We need to bring back the "curiosity" into learning – we want learners to be cheerful, happy and devote themselves to lifelong learning through the games they play and other such interventions in the education and learning system.* I think play is a natural way in which humans learn.

How education systems can be transformed

The goal of education should focus upon bringing happiness and peace in individuals through holistic education – which will serve the purpose of the spinal cord of the Papier-mâché elephant – making a solid institution in the education system.

In order to achieve this, we need to focus on bringing forth three aspects in education through gamification and play as an integral part of the course delivery:

1) Curiosity
2) Creativity and
3) Compassion to promote happiness

The education system will not be transformed overnight. We need to use an incremental approach. To begin with, these three aspects need to be brought back into content and delivery of education in which key stakeholders such as the educator / teacher need to take the lead. For instance, when a teacher is teaching her class about the basics of English grammar (i.e. verb, nouns, adjectives, etc), instead of simply writing a sentence on the board and then attempting to explain the various elements of a sentence, the

[1]. Papier-mâché (sometimes spelled Paper mâché) is a French phrase for "chewed paper." Papier-mâché products are made of paper pulps or shreds of paper that can be moulded into shapes when wet.

teacher can make this exercise more interactive, challenging students to think and come up with answers. Instead of simply writing "There is a beautiful tree outside the house", if the teacher encourages students to close their eyes and imagine "what is outside the house and hears out all responses, relating each response to either a noun, verb or adjective, the entire process of learning would be more interactive, playful, gamified, imaginative and collaborative, heightening the curiosity and creativity of the learners. *Instead of a monologue in the conventional education system, the teacher will be able to transform learning into a dialogue, generating curiosity and collaborative behaviour.*

Additionally, a very important aspect that we need to reconsider is how our education system rewards success. Currently, our education system is extremely reliant on an assessment framework – wherein ranks and grades are awarded for memorising what is taught in class. Where we have ranks and grades, how is it that creativity can be measured? Instead, can the system nurture creativity by being mindfully aware and empathetic towards different learners and their needs – appreciating different answers by students and even appreciating those who do not answer, since their understanding and comprehension of the subject matter may be different. This would help limit comparison with other learners and rewards, thereby making the education experience more learner centric. Instead of punishing a child for an 'incorrect answer' or no answer for that matter, the system should encourage students to respond. *By practising such empathy and responding instead of reacting to students, we would be able to cultivate behaviours of empathy and compassion in the students.*

The role of technology as the 'bridge'

Technology will be a key driver of education in the future. As it stands, technology is being used as scaffolding on the Papier-mâché elephant that we earlier termed the education system, in order to make the elephant stand. In other words, an attempt is being made to replace technology as the spinal cord of the education system. The scaffolding has different layers that are being supported at different levels by stakeholders of the education system – governments, schools, universities, educators, corporations and others.

Instead of being used as the scaffolding, technology needs to be used as the method of delivery. Augmented reality applications, virtual reality applications and gamified applications can act as a bridge to reach the brighter side of education – which leads to happiness, compassion and human flourishing. We need to understand and accept that technology is a vehicle, not the saviour. Technology cannot put life back into a human being; instead it can accelerate things – with its advantages of low-cost, accessibility and ability to make learning more interactive, immersive, fun, experiential and learner centric.

Around half of the 7.6 billion people across the world have varying degrees of access to technology as a pedagogical approach focused on "Play as a medium" in all forms such as physical board/card games, outdoor games, video games, mobile games, which are immersive, interactive. *I hope in the near future game based learning pedagogical approach can help the 3.5 billion to be transported to the other side of the bridge that comprises happiness and peace.*

FEATURE ARTICLE

Virtual Reality in Education

ARCHANA CHAUDHARY AND **AKASH** SAINI

Many new and emerging technologies have the potential to influence the experience of learning and teaching for both students and teachers. As immersive technologies become more and more human centric, technologies such as 4D Printing (programmable matter that transforms over time), Augmented Reality (AR), Virtual Reality (VR) and Gesture Control Devices will find increasing use in education. Futurists predict that over the next decade, smart machine technologies feeding on computational power, big data, and unprecedented advances in neural networks will disrupt the way we can harness data in order to solve problems. Technologies such as machine learning, virtual personal assistants, conversational user interfaces, smart robots, will transform the education landscape of personalised learning in unimaginable ways.

Until a few years ago, virtual reality technology was only seen in science fiction movies. However, today it has rapidly become one of the most exciting technologies transforming the educational space. Its use cases keep increasing and within education they have virtually exploded.

According to Gartner Inc.'s press release on the Hype Cycle for Emerging Technologies, 2016, "Transparently immersive experiences, the perceptual smart machine age, and the platform revolution are the three overarching technology trends that profoundly create new experiences with unrivalled intelligence and offer platforms that allow organisations to connect with new business ecosystems."

Recent IDC forecasts state that worldwide revenues for the AR/VR market will jump by at least 100 per cent over each of the next four years. The spend on AR/VR products and services is expected to soar from $11.4 billion in 2017 to nearly $215 billion in 2021. Education is expected to represent a sizeable chunk of this figure.

Some believe that these technologies may just be fads and will wane, but Figure 1 shows VR has already emerged from that phase as new transformational use cases, especially in education, continually emerge.

[1]. Gartner Inc.'s press release on the Hype Cycle for Emerging Technologies, 2016: http://www.gartner.com/document/3383817

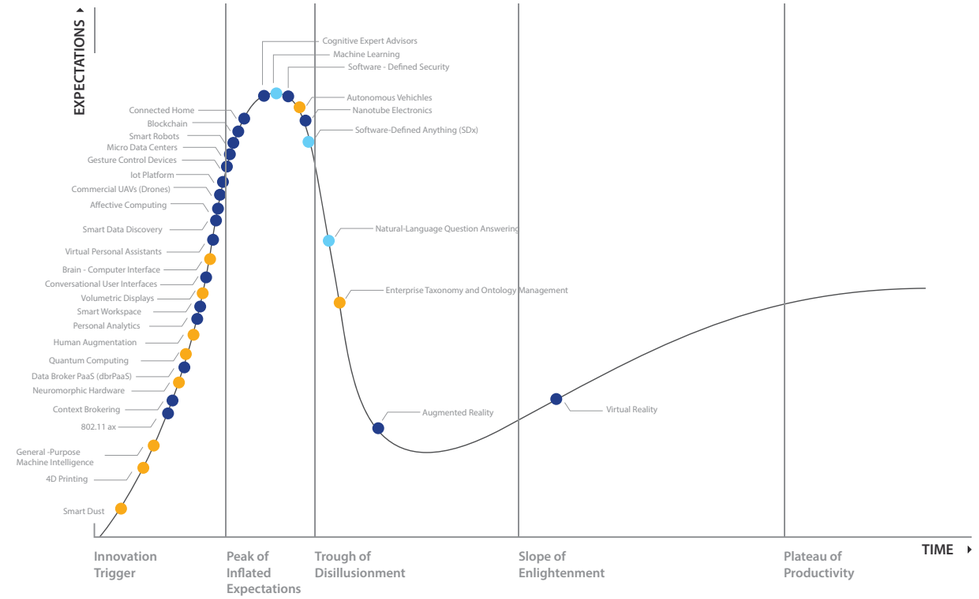


Figure 1: Hype Cycle for Emerging Technologies, 2016 (Gartner, 2016)

Thus, new-age pedagogies are continually undergoing a massive change facilitated by technology and placing the learner at the centre of all education efforts in order to make learning more personalised, engaging and relevant.

Increasingly, interventions through AR, VR, Mixed Reality (MR), X Reality (XR) are allowing learners to experience a deeper way of understanding the world that is multisensory immersive, interactive and more engaging. *Virtual Reality or 'VR' involves interactive, real-time, three-dimensional graphical environments that respond to user input and action, such as moving around in the virtual world or operating virtual equipment.* There is much scientific evidence that using deeper learning experiences such as VR for learning can dramatically improve the learning process of the students and help strengthen their concepts by building upon existing knowledge. According to Chris Milk (Founder VRSE), in a medium like VR, the stimuli that are being fed are so similar to reality that we are essentially duplicating real sensory perception through technology. This allows for deeply engaged learning to occur.

An immersive world of VR can provide a giant laboratory with endless possibilities for educators/teachers/facilitators/learners to experiment and play; and explore new opportunities and alternative configurations. There are some instructional designers who can extrapolate from their experiences with other technologies and immediately seize on using virtual worlds for what they are best at (co-presence, simulation, collaboration, prototyping) and leave the quizzes and notes and document repositories on their course management system, which delivers those types of content better than the traditional teaching-learning practice currently can. *Pedagogically, these types of interactive VR display systems can offer major advantages over other visualisation media, because of the engaging, immersive and interactive (active rather than passive) nature of the learning experience they create [2].*

There are many instances of VR being used successfully in education. For instance, UCLA trains neurosurgeons using VR.

[2]. Balamuralithara, B., & Woods, P. C. (2009). Virtual laboratories in engineering education: The simulation lab and remote lab.

"Learning must be fun and what better way to learn and build understanding of the different histories and cultures of humankind than through virtual reality experience; it definitely beats just using textbooks!"

In many parts of the world, Virtual Field trips to museums are quite popular (the Smithsonian or the Louvre, for example, have several virtual tours, using a variety of technologies) and the learning derived through such immersive experiences is truly transformative. Singapore has its own Learning on the Move (LOTM) method that uses the entire city as an entry point for immersive learning, using the smartphone for continuous augmented reality and immersive experiences, redefining the way people discover places.

Similarly, specialised training for medical procedures such as surgery, or training for difficult and dangerous job training for firefighters and rescue teams, can be conducted using VR. *VR can simulate environments offering second chances that life often does not, it can replicate laboratory conditions when expensive labs do not exist.* Universities are teaching architecture design using virtual reality tools and it is finding use even in the field of special education.

UNESCO MGIEP collaborated with Google to develop several 360-degree expeditions, including one on tea gardens in Assam, complete with lesson plans and teacher instruction manuals. Some sports academies too are using VR for improving performance. VR can also be a powerful technology to teach empathy and compassion; the UN has used VR films to show the plight of refugees and immigrants by "walking in their shoes" and experiencing their distress. These are deeply moving and transformative experiences.

UNESCO MGIEP's foray into Virtual Reality

An interesting and novel collaboration between UNESCO MGIEP and Samsung India brought together their respective expertise to create immersive learning experiences. Using UNESCO heritage sites in India as the entry points of exploration, a Memorandum of Understanding (MOU) was signed between Samsung India and UNESCO MGIEP to build such curriculum for 28 UNESCO heritage sites of India. In this partnership, UNESCO MGIEP oversees the components of educational pedagogy for immersive learning and curriculum and Samsung is responsible for providing the technology assistance. UNESCO MGIEP is responsible for overall conceptualisation, gathering of the expert curriculum designer team, design and smooth delivery of the curriculum, lesson plan and development of an instructional strategy guide for teachers & learners around the VR project. The curriculum is designed with special focus on UNESCO MGIEP's mandate of embedding concepts of sustainable development, respect for diversity and developing competencies of critical inquiry and social and emotional skills (SEL) among learners.

According to Dr. Anantha Kumar Duraiappah, Director, UNESCO MGIEP, *"Learning must be fun and what better way to learn and build understanding of the different histories and cultures of humankind than through virtual reality experience; it definitely beats just using textbooks!"* UNESCO MGIEP believes in transforming education for building peaceful and sustainable societies. It sees immersive experiences such as VR as an integral part of SEL for our younger generations as they face 21st century challenges to build a peaceful and sustainable planet."

The VR project facilitates immersive learning, enhances intercultural understanding and education for sustainable development. Students across India and the world experience UNESCO World Heritage Sites in a more experiential and immersive manner; and UNESCO MGIEP's specific curriculum for each of these sites helps utilise this experience as a classroom intervention to build SEL skills in the learners.

Samsung India, through its CSR in education project, will be providing this experiential content to Jawahar Navodaya Vidyalayas (JNV), where over 500 Samsung Smart Classes have been implemented since 2013. The Samsung Smart Class program has so far benefitted over 250,000 students and has trained over 8,000 teachers on how to effectively use interactive technology in the Samsung Smart Class to teach students. The programme aims to bridge the digital gap between rural and urban India and provide equal opportunities for students to learn. It will also equip students with right amount of engagement to develop high order thinking, challenge the intellectual capacity, foster creativity, and deepen their understanding of their own and others' human experience while enhancing students' ways of observing, responding to, and representing the world.

These are exciting times and we are at the dawn of this transformational way of learning with endless possibilities at the service of humanity.

A New 'Digital Ecosystem' for Whole Brain Learning

DR. NANDINI CHATTERJEE SINGH &
DR. CATHIE NORRIS
DR. ELLIOT SOLOWAY
DR. ANANTHA K. DURAIAPPAH

Current education systems tend to focus primarily on extrinsic motivation (grades and marks) and little is done to develop or encourage intrinsic motivation. To ensure continued learning, intrinsic motivation is crucial.

Learner-led approach in education (LED) is a new approach to learning that mirrors itself on the complexity of society and student ability (Iversen et al, 2015).

New digital learning environments engage students in 'real world-like' interactions forcing them to use multi-sensory ways to learn. Resources from technology can provide access to multiple simulated environments and virtual reality experiences in novel situations enabling students to experience the real world relevance of their learning. For instance, learning platforms facilitate building skills of collaboration and communication.

The rapid advancement in technology has made information accessible and transmissive to all learners. This technological leap has led to the progression of education from oral to print and more recently from print to digital (Castells 1996, 1997, 1998; Best and Kellner 2001) and the creation of an 'information age'.

The impact of digital technology is visible in schools and universities in the form of learning platforms, Massive Online Open Courses (MOOCs) and audio-visual devices. In fact, the impact of technology[1] has been so powerful that the P21 Framework for 21st Century Learning specifically includes Information Media and Technology skills in addition to Learning and Innovation Skills, Life and career skills (P21 Framework 2004). **We recommend here a fourth domain, namely that of Socio-Emotional Learning (SEL).**

SEL has received new attention because of recent neuroscience research that shows students need to be "socially aware" and "emotionally engaged" in order to learn. SEL promotes human well-being and human flourishing, which impacts both academic scores and prosocial behavior (Durlak,Weissberg, Dymnicki, Taylor & Schellinger, 2011). Poor SEL contributes to bullying, classroom violence, social isolation and even depression (Benjamin, Costell, & Warren, 1990; Kessler & Walters, 1998). *In fact, lack of good socio-emotional skills has emerged as one of the most important reasons for negative outcomes in adolescents, such as substance abuse, educational underachievement, and school drop-out (DeVoe & Murphy, 2011).*

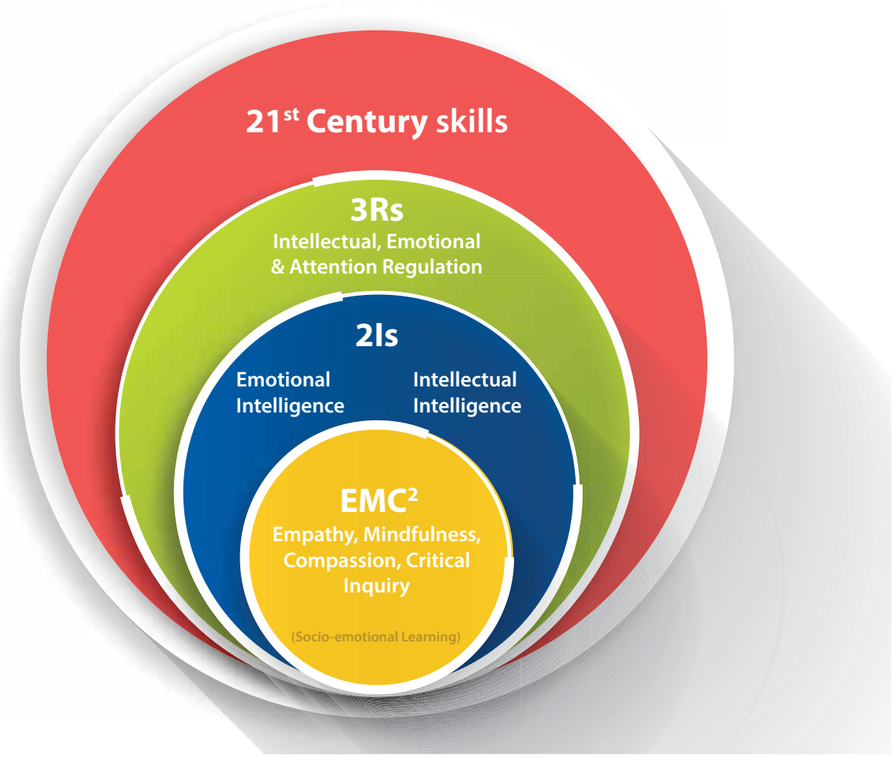
Thus, SEL needs to scaffold all learning and be a priority for education. Targetting socio-emotional skills' intervention is thus an urgent necessity in school education programmes.

The 3R's for SEL include attention regulation, emotional regulation and intellectual regulation[2]. We posit a 'whole brain' approach, when the two parts of the human brain—the rational and the emotional – are nurtured, can optimally together shape education. Our core challenge then is to create an ecosystem that will use digital pedagogies that harness the neural principles of

The 3R's for SEL include attention regulation, emotional regulation and intellectual regulation.

[1] Technology used in this article refers primarily to digital technology.
[2] The common term used in the education literature is cognitive regulation. What is alluded to cognitive regulation in the literature relates to intellectual learning such as rational and critical thinking.

Fig. 1 **Whole-brain** approach to education



learning to nourish the 'whole brain'. We propose here the structure of a new ecosystem of education that will enable a transformation in learning, keeping in mind the educational competencies for 'whole brain' development.

Learning and Neuroscience

Neuroscience has emerged as a powerful tool to unlock some of the mysteries of how learning takes place. Broadly referred to as educational neuroscience, a combination of behaviour and different brain imaging technologies now allow us to study the brain as it learns. Functional Magnetic Resonance Imaging (fMRI) allows neuroscientists to record brain activity as children undertake different tasks such as rhyming, listening, reading, watching others get hurt and rewarded, analysing visual patterns, watching people collaborate and being kind. By analysing patterns in brain activity, scientists can work out which mechanisms the brain was thinking about. Understanding these mechanisms informs pedagogical design and subsequent learning.

For instance, functional imaging studies have shown that the brain areas involved during the pain of social exclusion or rejection are similar to those involved during the pain experienced through physical injury (Eisenberger, Lieberman, Williams, 2003). Rejection has serious implications for an individual's psychological state and for society in general. Research has shown that social rejection can influence emotion, cognition and even physical health. Those experiencing rejection also stand the danger of becoming aggressive and can resort to violence (Leary, Kowalski, Smith & Phillip, 2003). In order to understand and evaluate the impact of such neuroscience research into pedagogical practice, it is important to assess performance in the classroom.

Collecting research evidence on the impact of teaching SEL skills in the classroom can be challenging. Traditional methods, which are primarily didactic, might not be very effective and could be time consuming. Further, assessments of SEL skills either use behaviour rating scales, observations or child interviews, all of which require trained staff and are expensive to administer (Craig, DeRosier, & Watanabe, 2012). Such research studies also face subjective bias, reliability issues and recording errors. This is where technologies such as digital games are emerging as useful and reliable alternatives. Such tools allow behaviours to be automatically rated rather than being coded by observers; these tools are also cost-effective. Most importantly, they provide naturalistic situations that are immersive and can provide new innovative approaches to teach and assess socio-emotional skills (DeRosier et al, 2012).

However, this is true of learning and education in general. Since the primary objective of education is to build real world skills in children, *digital technologies offer exciting innovative, immersive and interactive ways to allow children access to numerous situations.* Digital technologies allow children into a world of situations to which they can relate and address challenges using their socio-emotional skills. *Digital technologies also allow educators to test skills such as planning, pattern analysis, collaboration, among many others.* In fact, new digital technologies, when used effectively, can provide narrated and animated guidance for learning.

Building a technology – pedagogy partnership - An innovative partnership of **technology with pedagogy** to teach 21st century skills has the potential to make learning fun, rewarding, multisensory, immersive experiential and performance based. This warrants a new ecosystem that can carve and design such a learning experience for students.

We posit that digital technologies now present opportunities to create such an ecosystem.

Digital technologies have already revolutionised the ways in which people make friends and communicate, and the ways people shop and sell. We argue that the new digital technologies available today possess the potential to transform education for the learner and have the potential to being not just 'transmissive' but 'transformative'. Digital gaming, for instance, combines immersive technology with good pedagogical practice. It not only supports classroom lessons and content delivery but also provides scope for continuous informal learning as students engage with games beyond the classroom. We next present an alternative, next-generation

We next present an alternative, next-generation 'digital ecosystem for learning' with new 'context', 'content' and 'tools'.

'digital ecosystem for learning' with new 'context', 'content' and 'tools'. We propose that in this new digital ecosystem for learning, pedagogical approach and technological infrastructure be optimally integrated to build new digital pedagogies for the 21st century.

The proposition is that these technologies are important because, when used in concert, they can prepare students for life and work in the 21st century, mirroring in the classroom powerful methods of learning and doing that pervade the rest of society.

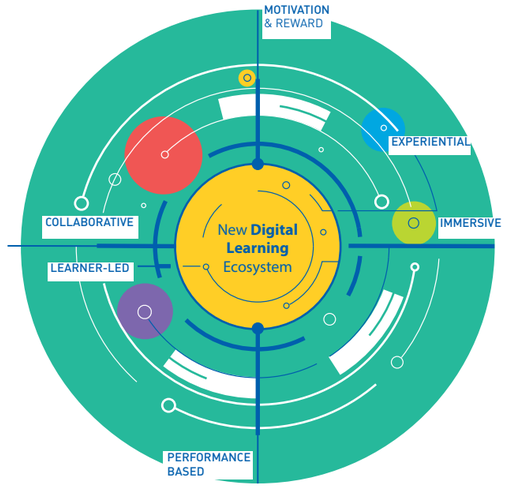
Today, these technologies may exist or operate in isolation but in the future they will operate together and even be interdependent. Such sets of related technologies will go on to form a 'digital ecosystem for learning'. Combinations of these different technologies would create optimal opportunities to build different 21st century skills.

Technologies for Learning

We define components of this new digital ecosystem as 'digital pedagogies' that combine pedagogical approaches with technological infrastructure to facilitate both learning and teaching. In Figure 2, we describe some of the pedagogies we advocate to build 21st century skills and the digital technologies that embody them.

- **Collaborative –** During collaborative learning two or more people attempt to

Fig. 2 Structure Of New **Digital Learning** Ecosystem



learn something together. The objective in collaborative learning is to capitalise on the strengths, resources and skills of each participant and thereby encourage active interaction and participation. *Collaborative learning puts individuals in charge of their own learning and makes them respect the abilities and contributions of their peers.*

The underlying premise is to build consensus through cooperation by group members as opposed to competition, in which individuals try to outdo other group members. These include both face-to-face conversations and computer discussions (online forums, chat rooms, etc). Collaborative learning builds interpersonal skills such as communication, trust, leadership, decision making, and conflict resolution. An effective example of collaborative learning is provided by Learning Platforms, which are digital environments that comprise a framework of tools that work seamlessly together to deliver learning experiences (Hill, Fresenb, & Gengb, 2012).

Learning Platforms are now becoming popular in schools but have so far focused on building resources for the teachers, allowing them to create and collect assignments, monitor students' progress, and provide real-time feedback. *We propose that learning platforms now evolve to include resources / learning for students and develop a system in which learning can be paced by learners and is therefore personalised.*

• **Immersive interfaces –** The role of experience and immersion in learning is well documented. Immersive interfaces are defined as the subjective impression that one is participating in a comprehensive, realistic experience (Stanney, 2002; Lessiter, Freeman, Keogh & Davidoff, 2001). *Immersion in a digital experience involves the willing suspension of disbelief, and the design of immersive learning experiences that induce this disbelief, draw on sensory, action-based, and symbolic factors (Dede, Salzman, Loftin & Ash, 2000).* In a perspective on "Immersive Interfaces for Engagement and Learning", (Dede, 2009), Chris Dede discusses an example on how 'sensory immersion' replicates the experience of location inside a three-dimensional space digitally and how haptic technologies that apply forces, vibrations, and motions to the user recreate the sensory experiences by touching virtual objects. Research shows that immersion in a digital environment enhances learning by allowing multiple perspectives, awareness of different situations and importantly facilitates 'transfer'. Transfer here refers to the ability to utilise learning acquired in a specific context to another 'unrelated' context (Dede, Salzman, Loftin &Ash, 2000).

• **Experiential –** Experiential education embodies 'learning by doing'. Unlike rote or didactic learning, in which the student is passive, experiential learning requires students to be active and engaged. An effective example of experiential learning includes digital games for learning that involve the use of computers and video

We propose that Learning Platforms now evolve to include resources / learning for students and develop a system in which learning can be paced by learners and is therefore personalised.

games specifically aimed at achieving learning outcomes. Digital game-based learning has been shown to exhibit engagement, reward, reinforcement and feedback, all of which directly feed into motivation (Craig, DeRosier, & Watanabe, 2015). *Games are designed to provide content in an interactive environment that allows educators to assess the ability of the learner to retain and apply the acquired knowledge to real-world scenarios.* The most attractive feature of this technology is its experiential nature that provides and helps learners work toward a goal while choosing actions. Games can be designed to provide both short-term and long-term feedback, thereby allowing students to experience the consequences of their actions on a short or long-term basis. The use of play is a primary mechanism of learning and socialisation, is common to all human cultures. While students/players make mistakes, the risk-free setting of a game environment allows failures to become challenges, which then incites them to devise and revise their actions until they arrive at the correct way of doing things. Though the research has been a little slow, there is now concrete evidence emerging (Craig, DeRosier, & Watanabe, 2012) that digital game-based learning generally has positive effects.

• **Motivation and Reward –** Motivation and reward have been two of the most discussed and controversial elements associated with learning. Sternberg (1985) defined motivation as a driving force to use the cognitive components for creative purposes. He suggested motivation as a crucial component for creativity, which affects a person's attention towards a task rather than the intrinsic-extrinsic nature of the motivator (Sternberg & Lubart, 1991, 1996, 1999). In this context, it is crucial that motivation be task-focused rather than reward-focused. This is referred to as intrinsic motivation and is crucial for children since we wish to encourage children to be creative rather than reward seeking. *Current education systems tend to focus primarily on extrinsic motivation (grades and marks) and little is done to develop or encourage intrinsic motivation. To ensure continued learning, intrinsic motivation is crucial.* The digital pedagogies described here (i.e. digital games for learning) by their design encourage goal-or task-based learning and provide opportunities to build intrinsic motivation and develop creative skills. Performance-based assessments have reemerged in education literature and curricula. They provide authentic measures of student learning, and the ability to apply the skills and knowledge learned. They also challenge students to use their higher-order thinking skills to assess application (Chun, 2010). In order to teach 21st century skills such that students can apply their skills to real world knowledge, it will be necessary

to use performance-based assessments as manifested in behavior. As discussed earlier, digital technologies would be extremely useful to ascertain student capabilities and would be able to provide personalised plans for intervention and learning.

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• **Learner-led Education (LED) -** *Learner-led education (LED) is a new learning that mirrors itself on the complexity of society and student ability* (Iversen et al, 2015). Neuroscience research shows that each student has a unique path to learning, determined partly by brain wiring and partly by environment, and LED takes the approach that each student has the potential to design learning processes that are meaningful for the student. This removes focus away from the teacher and teaching to the learner and learning. Digital pedagogies provide such opportunities for 'personalised' learning that enable learning trajectories that can be self-determined.

To summarise, new digital learning environments engage students in 'real world-like' interactions forcing them to use multi-sensory ways to learn. Resources from technology can provide access to multiple simulated environments and virtual reality experiences in novel situations, enabling students to experience the real-world relevance of their learning. For instance, learning platforms facilitate building skills of collaboration and communication. Similarly, digital games have emerged as a novel methodology to teach and assess both prosocial behavior and socio-emotional skills. The digital gaming scenario lends itself rather appropriately for SEL since it allows stealth assessments in real-world scenarios and opportunities to intervene and remediate them when necessary.

Digital Pedagogies at UNESCO MGIEP

Digital technologies are not the innovation we need in teaching and learning. Technologies are catalysts that when applied well, can empower factors we know are powerful for learning: student engagement, deep content, guided learning by doing, valid assessments, and links between classrooms and life. *Digital technologies can succeed only if people use powerful infrastructures of tools to enhance learning in sophisticated ways such as using interactive games to teach socio-emotional skills and assessing children as they learn.*

To build this new digital ecosystem for learning, at UNESCO MGIEP, we advocate three initiatives:

1) Building Tools and Content: The first is developing, implementing, and studying instructional approaches that are transformative for personalised education in classrooms and life-wide learning outside of school. Focused on building skills of critical inquiry, empathy and compassion and designed for school children, the objective of the instructional approaches will be to build skills of dialogue, intercultural exchange, impulse control, attention regulation, intellectual regulation and emotion regulation among many others. As learners engage with these tools and content, backend analytics will be shared with teachers to assess emotional and intellectual intelligence skills.

Digital technologies can succeed only if people use powerful infrastructures of tools to enhance learning in sophisticated ways such as using interactive games to teach socio-emotional skills and assessing children as they learn.

2) Building a Digital Ecosystem: In order to build a learning environment that employs the digital pedagogies agents described above, UNESCO MGIEP is building a new interactive learning platform. Entitled CHIMind (Collective Human Intelligence), the platform will employ digital games, virtual reality, and artificial intelligence to teach 21st century skills. It will embody all the components of the digital learning ecosystem discussed previously (Figure 2) and will provide resources for educators to use such technologies to design their own courses.

3) Explorer Training – Explorers' (teachers who continuously explore new methods of teaching) training is a critical element of any reform agenda. Unless professional development of educators is provided, the next generation model of education we espouse will not be attained. This type of professional development is very challenging because participants must not only learn new skills, but also "unlearn" almost unconscious beliefs, assumptions, and values about the nature of teaching, learning, and schooling. Professional development that requires unlearning necessitates high levels of emotional/social support in addition to mastering the intellectual/technical dimensions involved. The ideal form for this type of professional development is distributed learning communities, so that the learning process is consistent with the knowledge and culture to be acquired. In other words, teachers must experience technology- based learning as the medium of their professional development as well as its message.

The Future

At this point in history, the primary barriers in transforming to a 21st century educational system are not conceptual, technical or economic, but instead psychological, political, and cultural. With the right investment, we can have the means necessary to implement technology-enhanced models of education that prepare all students for a future very different from the immediate past. Whether we have the stakeholder commitment, political and societal will to actualise such a vision remains to be seen.

References

Benjamin, R. S., Costello, E. J., & Warren, M. (1990). Anxiety disorders in a pediatric sample. Journal of Anxiety Disorders, 4, 293-316. Doi: 10.1016/0887-6185(90)90027-7.

Best, S. and Kellner, D. (2001)The Postmodern Adventure Science, Technology, and Cultural Studies at the Third Millennium, Guilford Press.

Castells, M. (1996). _The Rise of the Network Society: The Information Age: Economy, Society, and Culture, Volume I. Oxford: Blackwell Publishers.

Chun, M., (2010). Taking Teaching to (Performance) Task: Linking Pedagogical and Assessment Practices. Change: The Magazine of Higher Learning, 42(2), 22-29.

Dede,C., Salzman, M., Loftin, R.B.,Ash, K. (2000) in Innovations in Science and Mathematics Education: Advanced Designs for Technologies of Learning, M. J. Jacobson, R. B. Kozma, Eds. (Erlbaum, Mahweh, NJ), pp. 361–413.

Dede, C. (2009). Immersive Interfaces for engagement and learning, Science, 323, 66-68, 2009.

Derosier, M. E., Craig, A. B., & Sanchez, R. P. (2012). Zoo U: A stealth approach to social skills assessment in schools. Advances in Human-Computer Interaction, 2012. https://doi.org/10.1155/2012/654791

DeVoe, J., & Murphy, C. (2011). Sutdent reports of bullying and cyber-bullying: Results from the 2009 school crime supplement to the National Crime Victimization Survey: Institute of Education Sciences, National Center for Education Statistics.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. Child Development, 82, 405-432. doi: 10.1111/j.1467-8624.2010.01564.x

Eisenberger N., I., Lieberman, M., D., Williams, K., D., (2002). Does rejection hurt? An FMRI study of social exclusion. Science, 10;302(5643):290-2.

Hill, R., K., Fresenb, J., W., & Gengb, F., (2012). Derivation of electronic course templates for use in higher education. Research in Learning Technology 20: 18665, http://dx.doi.org/10.3402/rlt.v20i0.18665

Iversen., A., Pederson, A., S., Krogh., L., and Aarup Jensen, A., (2015). Learning, Leading, and Letting Go of Control: Learner-Led Approaches in Education, SAGE Open, https://doi.org/10.1177/2158244015608423

Kessler, R. C., & Walters, E. E. (1998). Epidemiology of DSM-III-R major depression and minor depression among adolescents and young adults in the National Comorbidity Survey. Depression and Anxiety, 7, 3-14.

Leary, M. R., Kowalski, R. M., Smith, L., & Phillip, S. (2003) Teasing, Rejection, and Violence: Case Studies of the School Shootings, Aggressive Behaviour, 29, pages 202–214.

Lessiter, J., Freeman, F., Keogh, E., Davidoff, J., (2001). Presence Teleoper. Virtual Environ. 10, 282.

P21 Framework – The partnership for 21st Century skills (2009)

Salzman, M., Dede, C., Loftin, R., B.,(1999) in Proceedings of the SIGCHI Conference on Human Factors in Computing Systems: The CHI Is the Limit, Pittsburgh, PA, 15 to 20 May 1999 (ACM Press, New York, 1999), pp. 489–495;

Stanney, K.M (2002). Handbook of Virtual Environments (Erlbaum, Mahwah, New Jersey).

Sternberg, R. (1985). Beyond IQ: A triarchic theory of human intelligence. New York: Cambridge Univ. Press.

Sternberg, R., & Lubart, T. (1991). Creating creative minds. Phi Delta Kappan, 72, 608–614.

Sternberg, R., & Lubart, T. (1996). Investing in creativity. American Psychologist, 51, 677–688.

Sternberg, R. (1999). Intelligence as developing expertise. Contemporary Educational Psychology, 24, 359-375.

TECH 2017: Experts Convene *from Around the World on Digital Pedagogies for Building Peaceful and Sustainable Societies*

ABEL CAINE & AKRITI MEHRA

The three-day Transforming Education Conference for Humanity (TECH) 2017 organised by the UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development (MGIEP) was held at Novotel Varun Beach, Visakhapatnam City, State of Andhra Pradesh, India from December 16 – 18, 2017. The first edition of TECH focused on highlighting the world's best digital pedagogies for enhancing 21st century skills to build peaceful and sustainable societies, towards achieving the United Nations Sustainable Development Goal 4, Target 7.

TECH 2017 was attended by over 1,700 registered participants (including teachers, educators, learners, policy-makers, technology and gaming experts, amongst others) *from 75 countries and witnessed highly engaging deliberations on the future of education, particularly on the innovative methods of teaching using technology.*

TECH will be held annually over the next five years with a long-term aim of affecting global policy change on the usage of digital pedagogies to render quality and inclusive education for all.

Key Highlights

The key highlights of the Conference included the signing of a MoU between the State Government of Andhra Pradesh and UNESCO MGIEP to set up a blueprint for a Games & Digital Learning Hub in the state as well as the signing of a joint agreement by Samsung India and UNESCO MGIEP to develop Virtual Reality (VR) and educational content for UNESCO Heritage sites in India.

In addition, TECH 2017 saw two Headline sessions by Prof. Sugata Mitra, Professor and Principal Research Investigator at the School of Education, Communication and Language Sciences at Newcastle University, UK and Prof. Heather Knight, Assistant Professor of Robotics at Oregon State University, USA. Additionally, the Conference saw 50 catalytic speakers, who covered diverse themes ranging from Artificial Intelligence in Learning, Understanding the Attributes of a (digital) Teacher/Educator, Design Thinking as a Strategy for Innovation, Games- based Learning and more.

The first day of the Conference witnessed an exciting opening ceremony, graced by the Honourable Chief Minister of the State of Andhra Pradesh, Sri Nara Chandrababu Naidu, Dr. Satya Pal Singh, Honourable Minister of State for Human Resource Development, Government of India, and Ms Audrey Azoulay, Director-General, UNESCO (on video). *Addressing a full house at the TECH 2017, Sri Naidu expressed*

that "education is a key factor for any development" and added that "nothing can be achieved without education".

He further articulated the importance of technology in education and voiced his commitment to the future of education through digital pedagogies. Post his talk, Sri Naidu officially inaugurated the Learning & Startup Zone of TECH, which comprised immersive technologies by startups and other leading organisations in the field of education and technology such as Microsoft India, Samsung and Veative.

The ceremony was followed by a highly engaging 15-minute TECH talk by Dr. Anantha Duraiappah, Director, UNESCO MGIEP, who spoke on the concept of flipping education and of embracing technology as a pedagogy. Dr. Duraiappah expressed that *"Technology should not be seen just as a delivery platform but as a pedagogical tool."*

Following the TECH talk was a highly disruptive panel titled 'We Don't Need No Education', with a diverse set of panellists including Prof. Sugata Mitra, Ms. Vera El Khoury Lacoeuilhe, Diplomat and Jordan Shapiro, world-renowned thought leader on global education – all of whom debated their thought-provoking views on the goal of education. In addition, various breakout sessions were conducted by presenters during the day on varying themes from "The Use of Artificial Intelligence in Distributed Co-Learning" to "Teaching History through Digital Fabrication".

Day 2 of TECH commenced with an engaging debate through UNESCO MGIEP's flagship event, Talking Across Generations of Education (TAG[e]) that provided a platform to youth and policy-makers to exchange views on whether "technology increases or decreases the inequality gap in education". TAG[e] was followed by a captivating talk by Prof. Sugata Mitra on "The Future of Learning" during which Prof. Mitra expressed the requirement of "learner-centric education". Further, Day 2 of TECH witnessed various engaging catalytic sessions as well as breakout sessions, debates and keynote sessions on digital pedagogies and neural learning, as well as design thinking as a strategy for innovation. Eminent speakers included Kaushik Bellani, Managing Director – McGraw Hill Education India Pvt. Ltd., Vinnie Jauhari, Director – Education Advocacy, Microsoft and Sylvia Martinez, co-author of Invent to Learn, Making, Tinkering and Engineering the Classroom.

The last day of the Conference witnessed a Headline talk by Prof. Heather Knight on 'Developing Charismatic Robots for the Real

World'. *During her presentation, Prof. Knight presented with her robot, Ginger and discussed the role of robots in our lives as well as some of the challenges associated with integrating robotics into the real world.*

The valedictory ceremony, held on Day 3 to close the Conference, was graced by the Honourable Minister of Human Resource Development, State of Andhra Pradesh, Sri Ganta Srinivasa Rao, as well as Y.S. Chowdary, Honourable Minister of State for Ministry of Science & Technology & Earth Sciences. Sri Ganta Rao expressed his commitment to the future of education through digital pedagogies and declared the state government's support to institutionalise the TECH as an annual event. He expressed that he would be "keen to see the various methods that UNESCO MGIEP will bring up in the future to advance its efforts".

The Conference was supported by the State Government of Andhra Pradesh, India, and the Ministry of Human Resource Development, Government of India and sponsored by Microsoft India (Education Technology Partner), Samsung India, Dassault Systems, Veative (Immersive Learning Partner) and McGraw Hill (Learning Science Partner). The Knowledge Partners of the Conference included NMIMS, Ubisoft, Quebec Government, ISTE, Social Alpha, EDB and IYC.

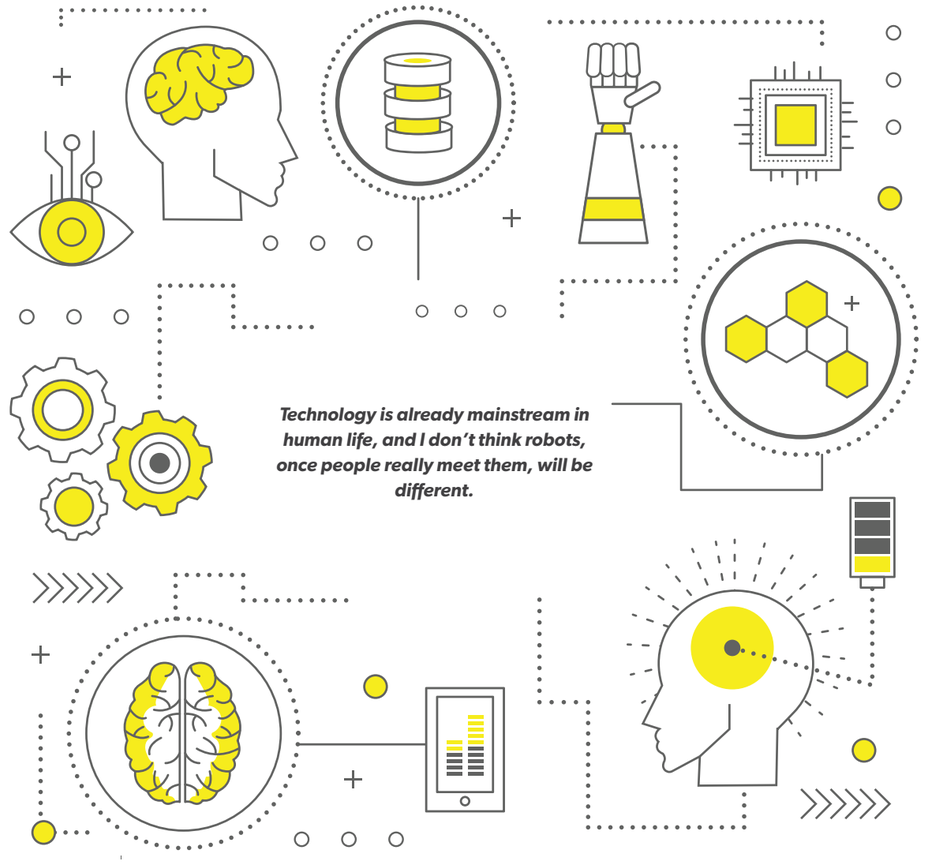
The ed-tech entrepreneurs who showcased their products and technologies at the Conference included Chhota Internet, Chimple Commons, Designmate, Funtoot, Getwings Technologies Pvt Ltd, Meghshala, OpenRap, ReportBee and The TeacherApp.

TECH 2018 will be held from November 15-17, 2018, in the City of Visakhapatnam, State of Andhra Pradesh. Further details on this year's TECH are provided overleaf.

The Role Of Robotics in Achieving Peace

DR. HEATHER KNIGHT, *an Interview with Akriti Mehra*

Professor Heather Knight focuses on Robotics at the Oregon State University. There, her CHARISMA research group uses methods from entertainment to bootstrap the development of Social Robots. Their research interests include minimal social robots, robot ethics, charismatic machines, and multi-robot/multi-human social interaction. She also runs Marilyn Monrobot, a robot theater company with comedy performances and an annual Robot Film Festival. Past honors include robot comedy on TED.com, a robot flower garden installation at the Smithsonian/Cooper-Hewitt Design Museum, and a British Video Music Award for OK GO's "This Too Shall Pass" music video, featuring a two-floor Rube Goldberg Machine. She was named to AdWeek's top 100 creatives in 2017, and Forbes List's 30 under 30 in Science in 2011. Her academic background includes a Post Doc at Stanford University exploring minimal robots and autonomous car interfaces, a PhD in Robotics at Carnegie Mellon University exploring Expressive Motion for Low Degree of Freedom Robots, and M.S. and B.S. in Electrical Engineering & Computer Science at Massachusetts Institute of Technology, where she developed a sensate skin for a robot teddy bear at the MIT Media Lab. Additional past work includes: robotics and instrumentation at NASA's Jet Propulsion Laboratory, and sensor design at Aldebaran Robotics.



1. How can the field of social robotics help build more peaceful and sustainable societies? Is there potential to code for kindness, empathy and compassion?

Building peaceful and sustainable societies is an enormous challenge that requires social, political, and workforce effort, likely on both an individual and collective level. That being said, technologists are well situated to understand and set the application targets for what they build. *The field of social robotics seeks to understand the human environment into which technology would be integrated, before finalising its designs.* Methodologies to assess when and how technologies empower people, and evaluations that seek out and target positive social impacts could be integral to the development of all technologies.

2. There is a general fear that various people have about automation taking over tasks performed by humans. What is your opinion on this and what are some of the challenges you face in the field of social robotics?

I don't think robots can replace human-human contact or connection, but if we add a robot to a group of people, I do think that they have the potential to make that whole group function better. With new people, they can break the ice. With groups they know better, they can offer services, and monitor harmony and discord. In some work, robots can even redirect the social dynamics of the group by revealing their own vulnerability, or annotating conflict in the group so people can correct themselves. These roles of coach and vehicles for our own-social awareness are highly impactful, as cognitively, people respond to robots, especially those with eyes, as social partners.

3.How are human beings responding to the field of robotics? Does this vary culturally?

People seek out connection with pretty much everything. *I would like to see robots that help people meet their own goals, and that support their relationships with each other.*

4. What are some policy recommendations that you would make to institutionalise/mainstream robots in our daily life?

For me, the reason we design all technologies, robots included, is people. Throughout time, toolbuilding has supplanted our efforts to support ourselves. We also invent ornamentation, recreation, entertainment, and vehicles to enjoy lives together. *Technology is already mainstream in human life, and I don't think robots, once people really meet them, will be different.* Children will be born in a few generations who can't remember a world without them. But something to keep in mind is that, unless they have perceivable characters, sometimes – like a car or a dishwasher – we stop calling things robots when we get used to them.

How Digital Pedagogies can Build Peaceful and Sustainable Societies

ROZA OTUNBAYEVA, *an Interview with Akriti Mehra*

Former President, Kyrgyzstan

Roza Isakovna Otunbayeva served as the President of Kyrgyzstan from April 7, 2010 until 1 December 2011. She previously served as Minister of Foreign Affairs and as Deputy Head of Government of the Soviet Kyrgyz Republic before being invited to the Soviet Foreign Ministry in Moscow and later working as President of the Soviet National Commission of UNESCO. She currently heads The Roza Otunbayeva International Foundation.

1. How can education be used as a catalyst to solve the problems that we are faced with today?

Over the years, we have seen a rise in various global issues such as intolerance, violent extremism, climate change, inequality. *We need solid solutions to these problems to ensure our future generations have a peaceful and more sustainable world to live in. Here, education plays a prominent role.* Education is the best possible way of addressing sustainable development issues: it is the basis of prosperity, employment, and economic development. However, 21st century skills, schools and policies in education will all need to undergo massive transformation in order to stay relevant in the rapidly changing digital world.

Current education systems are designed to foster skills to develop human beings who are 'efficient'. These education systems were designed for the industrial revolution and focus solely on economic growth and development of human capital. Instead, we need the goal of education systems to change.

2. How can education systems of the future be transformed?

Schools must facilitate creativity and dialogue, as also enhance students' confidence as professionals in a global context with improving their practical skills. Schools must expand students' horizons into new ways of thinking and learning. A striking example is the secret school of Elon Musk, where the focus is not on the study of science, technology, engineering, and mathematics. Being 100% adhered to the technology company SpaceX, Ad Astra does not devote much attention to the electronic devices as training tools. Most of the time children are involved in practical classes and discussions, and all the theoretical training often comes down to one hour of work on stationary computers, where children interact with the Google Classroom service and the educational platforms of Khan Academy, CodeAcademy, Edx, and others. Education systems of tomorrow need to focus on human flourishing by developing learners who have social and emotional competencies such as empathy and compassion – and are therefore more aware and conscious and lead sustainable lives. *It is important to note that the use of digital technologies is usually more successful as support rather than as a replacement for usual teaching.*

3. What is the impact of technology on education systems globally?

Globalisation is rapidly changing the world. The internet, global economy, climate change – show what happens locally can have a global impact. This means that the next generation will live in both local and global communities. Students have to learn to connect with others at a very young age. Technologies make distance education possible, which in turn enables students to receive education and training from the top universities without leaving their countries. *Today, with the growth of the market supply, it is easier and cheaper to buy one tablet, which can be used even without internet access, rather than annually rent textbooks for the school children.* Technologies empower learners to respond and prepare them to embrace the change. Today learners want to choose their own path of learning. They want to be autonomous. They want to self-certify their skills. Technology enables such personalisation. Technology is a great leveller of quality and access.

4. What are the advantages of the digital medium in education?

The use of the digital medium is increasing exponentially in education systems. Contrary to the belief that this will increase inequality, digital pedagogies will help solve the problem of inaccessibility by being accessible in remote areas around the world where young children are deprived of education. Furthermore, the digital medium helps make learning fun, immersive and experiential as well as customisable for the learner using data analytics and artificial intelligence. This helps provide quality and access to all.

Digital medium in education helps converting paper educational bureaucracy into a digital one, so that it will lead to transparency and optimisation in the educational system.

5. How is the digital medium being used for education in Kyrgyzstan?

With the development of a knowledge-based economy and the rapid spread of innovative technologies, internet and mobile penetration has been steadily increasing in Kyrgyzstan. Various online education portals and courses are being launched to develop online education. One such website is ilimelim.kg – which provides video lessons in easy and simple language in various fields such as humanities, natural sciences, and others. Additionally, an internet portal is being created to present various educational subjects in the Kyrgyz language, tailored to learners who have difficulty learning them in Russian and English. *There is a growing demand for online educational content for learners who speak only Kyrgyz.* Educational institutions are working on the development of the component of e-learning; however, when it comes to its implementation in schools you will find real challenges and contradictions. It is still difficult for educators to change according to the rapidly developing ICT requirements, you might face in some places even the invisible resistance to ICT integration in the pedagogical process. Unfortunately, less than 20% of the digital pedagogies actual capacity is used in my country. Another issue is that often the private sector (employers) are not involved in the process of generating the training programs/curricula, although business is one of the most interested parties in the process of improving the educational process.

6. Do you think digital pedagogies can help achieve peaceful and sustainable societies? Why or why not?

I definitely believe in the power of the digital medium in complementing and helping other solutions to achieve peace and sustainable development. One of the biggest advantages of technology is its ability to provide access in the remotest of regions. In many developing countries, the biggest issue facing education is limited accessibility and technology resolves this. Digital curriculum that facilitates the development of socio-emotional skills amongst young learners can help learners become more aware, conscious and practice empathy and compassion. Digital technologies can create school cultures that are transparent, engaging, and inspiring. Additionally, through technology, learners are able to engage in dialogue with peers across the globe that helps in understanding other cultures and mindsets.

7. What are some of the limitations of using digital pedagogies?

While technology has many advantages, there are also a few limitations. The dependency on the internet and purchasing of expensive devices for access of education can be cumbersome. Additionally, there is a vast amount of information available on the internet. *Young learners and educators face the challenge of ensuring that only correct and relevant information is accessed.* There are also issues of distraction amongst young learners due to the vast amounts of information available and limited filters of this information. Furthermore, due to rapid changes in technology, learners and teachers need to consistently upgrade their skills in order to keep us with the latest advances. This can be challenging, particularly in low-income countries, where the issues facing societies may be grave and there is a need to prioritise in providing basic education to young children.

8. How can we overcome these limitations and how can policy-makers play a role?

Policymakers will need to play a key role in mainstreaming the digital medium to ensure more peaceful and sustainable societies in the future. *Foremost is the need to make the internet and devices readily accessible and prevalent to ensure more and more people are able to have easy access.* We must remember that introduction of digital technologies requires considerable investment, including expenditures on equipment and adapting to the new tools. Financial limitations lead to the 10-15 years' education gap between developing and leading countries. Second is the need to come up with laws that filter relevant information to the learner. Thirdly, policy-makers will need to focus on and invest in educators, schools, universities and entrepreneurs who will develop and deliver content in a fun, immersive, experiential and interactive manner.

Government of India
Ministry of Human Resource Development

United Nations Educational, Scientific and Cultural Organization

Mahatma Gandhi Institute of Education for Peace and Sustainable Development

TECH
Transforming Education Conference for Humanity
2018
VISAKHAPATNAM

FROM TRANSMISSIVE TO TRANSFORMATIVE PEDAGOGIES: DIGITAL TECHNOLOGIES FOR FOSTERING 21ST CENTURY COMPETENCIES

Digital Pedagogies, Games for Learning, Social & Emotional Learning. AI.SDG 4.7

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WHY TECH 2018?

Building on the success of **TECH 2017, UNESCO MGIEP** with the support of the State Government of Andhra Pradesh will organise TECH 2018 to delve into the role of digital technologies in enabling a shift from "transmission pedagogies" to "transformative pedagogies" to create more peaceful and sustainable societies. **TECH 2018** aims at drawing a blueprint for harnessing pedagogical possibilities opened up by digital technologies, in order to contribute to enabling a revolutionary shift in education from individual content acquisition to collaborative intelligence.

CONFERENCE THEME: FROM TRANSMISSIVE TO TRANSFORMATIVE PEDAGOGIES: DIGITAL TECHNOLOGIES FOR FOSTERING 21ST CENTURY COMPETENCIES

TOWARDS SDG 4.7: EDUCATION FOR PEACE, SUSTAINABLE DEVELOPMENT & GLOBAL CITIZENSHIP

SUB-THEMES

Transformative Gaming and ***Digital Pedagogies*** for SEL

Beyond the Four Walls of the Classroom

Transformative Gaming & ***Digital Pedagogies*** for STEM+

Artificial Intelligence and the Future of Education

The Institutional Framework for Application of Digital Technologies in Education: Towards Surveillance or Collaborative Intelligence?

FORMATS

Highly interactive Keynotes

Catalytic Sessions

Panels

Debates

Paper & Poster Exhibitions

Mock classrooms and **interactive displays** of digital tools and methodologies

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Education Technology Specialists

Educators and Teachers

Curriculum Designers

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Learners

Youth & Students

Game Designers

Ed-tech Exhibitors

CITY OF VISAKHAPATNAM

TECH 2018 will be held in **Visakhapatnam** in India – a coastal port city, often known as The Jewel of the East Coast, situated in the state of Andhra Pradesh. Nestled among the hills of the Eastern Ghats by the Bay of Bengal, Visakhapatnam offers the best of India's vibrant culture, fascinating architecture, jewel-like beaches, gastronomic delights and more.

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Digital Education: An exceptional opportunity ***bringing new challenges vs. A big challenge offering massive opportunities?***

VERONIKA SOBOLEVA

Veronika Soboleva, Founder of VS Consulting (Paris, France), Co-Founder at Harbour.Space University (Barcelona, Spain).

Education inequality is a fundamental root of a much broader inequality. Due to a fast technological development (16 million Internet users globally in 1995 vs. 4 billion Internet users globally in 2017; source: McLuhan's Global Village, 2017) and fusion of mass media information into a social system - the educational gap is becoming inevitable in the well-developed countries as well. *Hence, the role of technology in the future of education starts playing a crucial role: it can become a facilitator as well as an obstacle.*

Taking massive online courses as one of the examples (Coursera, Khan Academy, Unacademy, Edx, Udacity, etc.) would be an entry point to illustrate this.

Connectivism, or a theory of learning in a digital age, has given access to everyone to online educational courses. Various sources and levels of online studies (basic digital skills for beginners alongside advanced professional trainings for world champions in computer programming from the most prestigious universities) have tremendously democratised the learning process itself. Availability of online horizontal learning as well as the prevalence of multi-source learning models have definitely improved the global access to education. However, the absence of general standards, which can be seen as an advantage because of a totally open model and the absence of bureaucratisation in the first place, might be foreseen as an obstacle at the same time. Moreover, in many cases of technological advancement, the question raised is far beyond digital development aspects, and still includes human aspects, even more than before. *The educational gap and digital divide is well observed among numerous countries and regions around the world, the divide is even higher between urban and rural areas, male and female.* It's directly referring to the basic literacy skills as well as infrastructural, technical and individual economic conditions within the region in most of the cases. *Therefore, standardisation and understanding of the local context is key when approaching the question of digital pedagogies' integration into the local context.* The role of local facilitators and communities is crucial, and an effective dialogue between country governments and NGOs has to take place in a bigger scale. A contribution from different stakeholders could be done through:

- Governments assisting in the establishment of new schools or digital learning centres in remote areas;
- NGOs bringing their expertise and solutions for digital products to be implemented, training teachers;
- Local communities preparing and hiring local (especially female) teachers in order to assure social inclusivity and to promote of a safe and secured environment.

Though the socio-economic and cultural contexts within distinct regions are different, an approach to bringing solutions remains similar: adapting the curriculum, responding the society demand for educations through existent low-cost technologies (e.g., Skype education), establishing schools in the countryside and remote areas, training teachers, establishing clear guidelines from the government and allocating specific budget for digital pedagogies. *Only by including local actors and leading a grassroots- level effort by giving a sense of leadership to the local people, a bigger scale positive change can be*

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observed. One of the recent best practices that can illustrate all that points of bringing technologies to the classroom would be "Dasaran", a unique, online school environment that connects all schools across Armenia in a unified virtual platform, with a community of nearly one million users, including school children, parents, teachers, and principals. The project was started by physical introduction of schools to the platform and providing them free digital tools for teaching students, communicating with parents, as well as offering solutions to the government to track the overall progress from a specific school or area. Being carefully implemented on a grassroots level from the beginning, the project has been successfully and organically growing. It now includes all Armenian schools offering digital education tools and solutions to the main stakeholders of the process.

Bringing technology to the classrooms has to be perceived not as a challenge but as an opportunity to change and improve people's life. We need to let students experience technology in all ways possible from an early age, in conjunction with using traditional teaching practices.

I'd like to illustrate this point with another concrete example that I've currently observed facing in my educational practice. A young bachelor's student, who graduated from a local maths school in rural Cuba, was fascinated by computers. He started writing algorithms at high school on paper without having access to a computer but sending it to a friend asking to compile these and list out errors. He became an excellent programmer because he had to be extremely careful not to make any typos and lose time on testing wrong solutions. This was noticed by his professor and he was encouraged to enter a university. After being accepted, he trained daily on several international online platforms for programmers (e.g., Codeforces, TopCoder, HeroX, AtCoder), submitting educational rounds and actively participating in study discussions with peers from all over the world. Eager to improve even more, he joined a university programming team and soon became a champion of Latin America in computer programming. Having reached that level, he was limited in what he could achieve because of his financial and geo-political situation, so he has continued teaching elder students at his university and competing with the world community online. After scoring a high grade at the top online rankings – his results were seen immediately by several prestigious universities in Europe, where he was offered a full scholarship and a teaching position. After completing his Master's in Europe, he is planning to go back to his country where he was offered a position of a senior professor of the Computer Science department, being in charge for training future champion teams, performing worldwide. It's a bright example of unobstructed, limitless and positive use of technologies in education removing any regional and socio-economical borders.

In conclusion – I would like to underline the central role of a particular person, a human being in implementing digital technologies into education. In my opinion, youth have to become a technology facilitator and undertake a leadership role in a 4th industrial revolution, helping to improve human communication and conflict resolution by introducing technologies. Taking an active position and spreading the word, getting involved in local initiatives and initiating/undertaking new educational projects is the generational responsibility.

The role of public institutions is primarily to facilitate infrastructural access to digital solutions for particular people. By opening an opportunity to study and facilitating access to digital resources to one young leader is in reality helping to motivate him or her and to spread it to hundreds more people, which means that the scaling will happen naturally. Indeed, raising one person's literacy level in digital technologies can have a viral impact. I strongly believe that investing in human capital from an early age, rather than technology itself, is a crucial point for digital educational progress. *Moreover, human values such as compassion and awareness have to be respected while introducing technologies in order to ensure a sustainable and balanced future. Only together they can lead to a peaceful society.*

YOUTH VOICES

The role of Technology *in Education for Building Peaceful & Sustainable Societies*

TASKEEN

Taskeen is pursuing her PhD at the University of Cambridge on the role of African Massive Open Online Courses in supporting the marginalised. Her MPhil thesis focused on the sustainable implementation of the One Laptop per Child project in Rwanda. She is the co-founder of Khwela, an online platform aimed at educating and empowering unemployed youth. Prior to that, she initiated Solar Powered Learning in South Africa and Mobile Education for Smart Technologies in India.

The disruptive nature of technology has forced us to pedagogically rethink education: It shifts the focus of education away from schooling, and back to learning. Because of this and increased means to access, online learning, both informal (i.e. keyword searching) and non-formal (i.e. online courses), has increased in popularity. However, education has never been value-neutral. *We cannot overlook the politics of education in the online space given that education is a politically, socially and culturally mediated project.* With globalised education, this becomes even more contentious as the internet is dominated by Western narratives and discourse. The sources of knowledge production, especially digitally, lie in the West, and often promote dominant Euro-American epistemologies. This backdrop is essential when considering the role of technology in education for building peaceful and sustainable societies. *I argue that whilst empathy and compassion-building is essential for creating peaceful societies, it is not enough.* Past and present day injustices, and power imbalances need to be acknowledged and addressed to constructively move forward.

In striving for peaceful and sustainable societies, we first need to evaluate what peaceful and sustainable societies are. More importantly, who decides? Will such societies embody communitarian notions of Ubuntu from South Africa, or Buen Viver from South America? If we continue in the current trajectory, this is unlikely to happen as a big factor in building peaceful and sustainable societies is building a value system. However, different groups of people have different, sometimes conflicting, values. *In the age of globalisation, dominant discourses of secularism, commodification, and individualism overpower other perspectives.* This is further perpetuated through technological determinism; the idea that the technologies implemented in a society, shape the social norms, values, and functionings of that society. Marshall McLuhan aptly describes this when he says, "the medium is the message". Thus, technological determinism, globalisation, and neoliberalism cannot be separated. *As technology penetrates communities globally, so do neoliberal values, to the extent that these become the value system, where local, cultural or religious values are given second place, if they fit in at all.* Just as renaissance humanism had the unproblematised assumption of a universal archetype of Man, conceived in Europe yet assumed to be universal in physical and cognitive form, we must be wary of who decides the universal tenets of peaceful and sustainable societies, and whom they marginalise.

If we want to create sustainable societies, we must realise that technology, and its counterparts "development" and "progress", are not necessarily the ideals we should be striving for. What we should be striving towards is a sustainable balance; a steady-state. In pursuit of "catching up" with modernity, we fail to realise that the entire globe cannot live like the "technologically advanced" West. Attempts at this will completely destroy the planet. The West reached this point of "progress" through plummaging and exploiting global resources and population. Thus for everyone to aspire to such levels of growth is highly unsustainable and unethical. We should not merely envision more sustainable pathways to development, but actually question and re-envision what we are striving towards in the first place.

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As the message of neoliberalism seeps into societies all over the globe, with technology as its medium, how can we instead use technology in education to help rather than hinder such societies? Here, one is often given the answer that technology needs to be "adapted to local contexts". However, this phrase still assumes that the solution lies in tweaking a Western version of technology to suit non-Western contexts. It assumes that Western knowledge and technology is superior, and the rest of the world is uncivilised, inferior, and in need of Westernisation to advance. *Rather, I propose a model of transformation from within, where technology is built ground up, with and by the community in question, rather than being trickled down from the West.* I use this design process in my research in South Africa to build a framework for decolonised inclusive Massive Open Online Courses that meet the needs of the marginalised. With such models, I see hope for technology being used peacefully.

Education for sustainable societies needs to have justice at its core. Such a society should strive for equity within itself and between other societies. It needs to recognise and overcome the power and dominance exercised by some over others. It needs to give room for previously marginalised and subjugated societies to grow, allowing for equal opportunity. *Sustainable societies need to embrace difference; not enforce homogeneity and assimilation that often comes hand in hand with the embracing of "global" value systems.* With these principles of justice at the core of education, whether online or face-to-face, we can strive towards genuinely building peace.

Lessons Learned with *Technology in Education*

ISHAN MATHEUS DE CAMPOS UNNI

In his 15 years, Ishan has lived in the United States, Japan, and now Brazil. He is a 10th grader in Colégio Poliedro, a nationally recognised school for its high standards. He is heavily involved in physical sciences projects and Olympiads, winning several awards in national competitions. Additionally, he is enthusiastic about robotics and programming and was fortunate to present a project at the TECH 2017 conference. Ishan also loves traveling and spending time with friends and family.

My friends and I have never experienced a world without the internet, laptop computers, cell phones, touchscreens, wireless communication, social media and much more. Although many of us might not have access to the latest technology, there is no denying that it has been embedded in our society. *With technology penetrating every corner of our lives, it has proven itself to be extremely useful in areas of communication, science, engineering, medicine, business, and the arts. Importantly, technology has already and will continue to play an influential role in education.* This can be through linking areas with minimal expertise in subject matter to preeminent experts thousands of miles away, or by providing a teacher the freedom to focus on student instruction over student assessment in the classroom. However, in order to achieve these results this process should be conducted strategically, thoughtfully, and cautiously.

Access to the internet provides an abundance of information that can be extremely useful and can open a world of possibilities in the field of education. *My personal experience is a compelling example of this. With access to the internet, I was able to learn how to code on my own.* With a group of like-minded friends, we developed an interactive programme to teach patients with dementia and those who have suffered a stroke recover their motor skills and develop an improved outlook on their condition. I was proud to present this work at the 2017 Transforming Education Conference for Humanity. Additionally, I have many friends who are autodidacts as well, learning whatever piques their interests. One friend chose to learn how to speak Arabic using free language software on the internet. Now that this sea of information is at our disposal, people can fish out what they need at any time. This on-demand access to information has allowed people to learn and develop independently at breakneck speed that is likely unrivaled in history.

Despite the positive outlook, there are still many issues to be addressed. One example is that many people don't have access to computers or the internet, making it heavily dependent on their socioeconomic group. *For example, in a country like Brazil, where over forty percent of the children live in poverty, access to technology in education is of secondary concern.* Addressing the widening gap between the societies that have access and those that don't should be a priority for policymakers and educators alike. Additionally, with the freedom of information, comes the freedom of misinformation. This means that facts and truths can be ignored or washed away in favor of fiction and lies. Hardly a day goes by where fake news doesn't rear its ugly head, muddying the waters between fact and fiction. This is particularly important when discussing young developing minds that biologically rely on the emotional over the rational part of their brains. Thus, it is extremely valuable for people to determine the validity and the value of what they are exposed to in this information age. Teaching students how to use technology in a responsible manner is as important as using the technology itself. As technology normalises itself and settles into our society, we may become blind to its unforeseen consequences. The industrial revolution improved life expectancy and per-capita wealth by providing access to goods like textiles, metals, chemicals, food, and new, faster modes of transportation. Undoubtedly, it had a positive effect on society, but many unintended consequences were generated in its wake. Poor labor practices, societal and economic stratification, and a terrible impact on the environment. That serves as a cautionary note to the technological revolution, making a sensible argument to carefully evaluate how any new technology is implemented—even in education.

A powerful tool in the right hands with the right mindset can achieve wonders. I believe the technological revolution we are experiencing is proof of that. *I look forward to seeing new methods developed by educators around the world to address equal access and foster social and emotional development to enhance the well-being of both individuals and society as a whole.*

With technology penetrating every corner of our lives, it has proven itself to be extremely useful in areas of communication, science, engineering, medicine, business, and the arts. Importantly, technology has already and will continue to play an influential role in education.

UNESCO MGIEP's Annual Retreat

January 31-February 2, 2018, Jim Corbett Park, State of Uttrakhand, India

UNESCO MGIEP's Annual Retreat 2018 was organised at the Jim Corbett Park, State of Uttrakhand, India. The retreat was held from January 31 – February 2, 2018 and was focused on developing the 'Theory of Change', a methodology / tool for defining long term goals and the projected path for the Institute as well as for the programmes and projects. Additionally, numerous team building and collaboration activities were conducted over the three days in order to build synergy between the teams within the Institute.

UNESCO MGIEP holds discussions with the Minister for Information Technology & Communication, State of Andhra Pradesh for the upcoming Games & Digital Learning Hub

February 2018, State of Andhra Pradesh, India

The team from UNESCO MGIEP met with Shri Nara Lokesh, Minister for Information Technology, Communication, Panchayati Raj and Rural Development, State Government of Andhra Pradesh, to discuss the upcoming Games & Digital Learning Hub in the state and the importance of embedding socio-emotional learning in education systems.

Experts convene to discuss the upcoming Games & Digital Learning Hub in the State of Andhra Pradesh

February 2018, Visakhapatnam, State of Andhra Pradesh, India

A group of 20 experts in the field of education technology and games for learning from around the world convened in Visakhapatnam, State of Andhra Pradesh to discuss the development of the blueprint of a Games & Digital Learning Hub in the State of Andhra Pradesh. The Hub is envisioned as a place where multiple stakeholders will work together to design and develop games and digital learning products to impart socio-emotional learning and critical inquiry.

Samsung India Partners with UNESCO MGIEP to launch the Taj Mahal in virtual reality

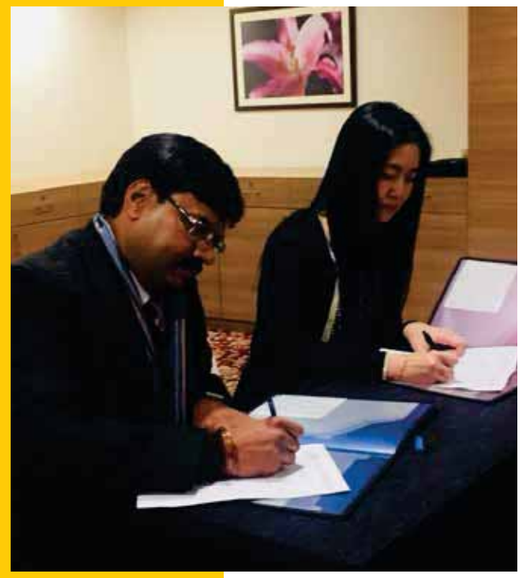
February 23, 2018, Lucknow, India

Samsung India showcased a Virtual Reality (VR) film on the Taj Mahal at the UP Investors Summit in Lucknow. The film has been developed by Samsung in partnership with UNESCO MGIEP. The VR film on Taj Mahal was unveiled by Honourable President of India, Shri Ram Nath Kovind, and Chief Minister of Uttar Pradesh, Shri Yogi Adityanath, in presence of the Union Finance Minister, Arun Jaitley, Governor of Uttar Pradesh Shri Ram Naik and Industries Minister of Uttar Pradesh, Shri Satish Mahana. A Memorandum of Understanding (MoU) has been signed between Samsung India and UNESCO MGIEP to launch 360 video and VR educational content for 28 UNESCO Heritage sites in India.

APEC-Tsukuba and UNESCO-MGIEP co-organise the International Conference XII

February 7-10, 2018, Tsukuba University Tokyo Campus, Japan

APEC-Tsukuba and UNESCO-MGIEP co-organised the International Conference XII " 12 years of Lesson Study (Jugyo Kenkyu) on APEC project network", February 7-10, at Tsukuba University Tokyo Campus. The event was co-hosted by the Ministry of Education, Culture and Sports, Science and Technology (MEXT), Japan; Ministry of Education, Thailand; Khon Khaen University, Thailand and the Southeast Asian Ministers of Education Organisation (SEAMEO). On February 10, 2018, UNESCO MGIEP's Director, Dr. Anantha Duraiappah, delivered a keynote address, during which he presented the Sustainable Development Goals as well as UNESCO MGIEP's mission of Building Socio-Emotional Learning for Education 2030.



UNESCO MGIEP partners with Sikkim Government to develop Textbooks for Sustainable Development

February 21, 2018, Gangtok, State of Sikkim, India

UNESCO MGIEP signed a partnership agreement with Human Resource Development Department (HRDD), the Government of Sikkim, India, to embed the concepts of peace and sustainable development in the textbooks of core subjects such as Maths, Environmental Studies (EVS) and English for grades 1 to 5. The agreement was signed during the first workshop of textbook authors, organised jointly by the State Council of Education Research and Training (SCERT), Sikkim and UNESCO MGIEP from the February 19-21, 2018 at Gangtok, Sikkim.

The workshop was attended by a core group of about 40 textbook authors from various parts of Sikkim. This core group would be responsible for the development of the textbooks to be published by February 2019.

Dr. Nandini Chatterjee Singh from UNESCO MGIEP recognised by the Government of India for her contribution to the field of neuroscience

March 08, 2018, New Delhi, India

On the occasion of International Women's Day on March 8 2018, Dr Nandini Chatterjee Singh of UNESCO MGIEP was recognised by the National Academy of Sciences, India. She was awarded the Department of Bio Technology's (Government of India) Young Woman Scientist Award for her contribution to the field of neuroscience. The ceremony was presided over by Dr. Harsh Vardhan, Hon'ble Minister for Science & Technology, Earth Sciences and Environment, Forests and Climate Change, Government of India. Dr. Chatterjee Singh leads UNESCO MGIEP's flagship project, Libre – based on building socio-emotional learning for Education 2030 as well as the Difference Learning project that aims to improve functional literacy by enabling parents, teachers, special educators and psychological experts to identify different learners, provide diagnosis and cater to different needs in the classroom.

Dr. Yoko Mochizuki of UNESCO MGIEP participates as a plenary speaker in the international conference PERSPECTIVES ON GLOBAL CITIZENSHIP: A SHARED COMMITMENT

March 12-13, 2018, Trento, Italy

Dr. Yoko Mochizuki participated as a plenary speaker in the international conference 'Perspectives On Global Citizenship: A Shared Commitment', held in Trento, Italy, on March 12-13,2018. The conference brought together scholars, policy-makers, civil servants, teachers and educators, CSO practitioners, researchers from Europe and beyond. It was a joint initiative to share lessons learnt from the EU project "Global Schools", which covers 10 European countries: Italy, Austria, Bulgaria, Czech Republic, France, Ireland, Latvia, Portugal, Spain and the UK. Started in 2015, the Global Schools project involved 17 partners, led by Autonomous Province of Trento (PAT). The initiative was co-¬funded by the DEAR Programme of the European Commission.

UNESCO MGIEP participates in the Mobile Learning Week

March 26-30, 2018, UNESCO HQ, Paris, France

UNESCO MGIEP participated in the Mobile Learning Week, UNESCO's flagship ICT in education conference, held from March 26-30, 2018 at UNESCO Headquarters in Paris, France. During the Mobile Learning Week, UNESCO MGIEP organised a workshop based on social-emotional learning, with focus on UNESCO MGIEP's flagship project titled Libre. Additionally, a panel discussion was organised on game-based assessments in education systems to assess the development of social and emotional skills such as empathy, compassion and mindfulness amongst learners.

Release of the #YouthWagingPeace Action Guidelines for stakeholders

April 2018, Montreal, Canada

The #YouthWagingPeace was launched by UNESCO MGIEP at the 39th UNESCO General Conference in November 2017. Thereafter, a set of action guidelines in French were released for a diverse set of stakeholders ranging from educators, families and guardians, religious leaders, school administrators and policy-makers. Led by two dynamic Coordinating Lead Authors and five Lead/Chapter Authors, the #YouthWagingPeace garnered over 2,000 youth submissions/case studies, and finally integrated over 150 case study submissions from young educators and practitioners from over 50 countries. The Guide is available for download http://bit.ly/ywpguide

An interaction with experts in education technology at Alliance Numerique

April 2018, Quebec, Canada

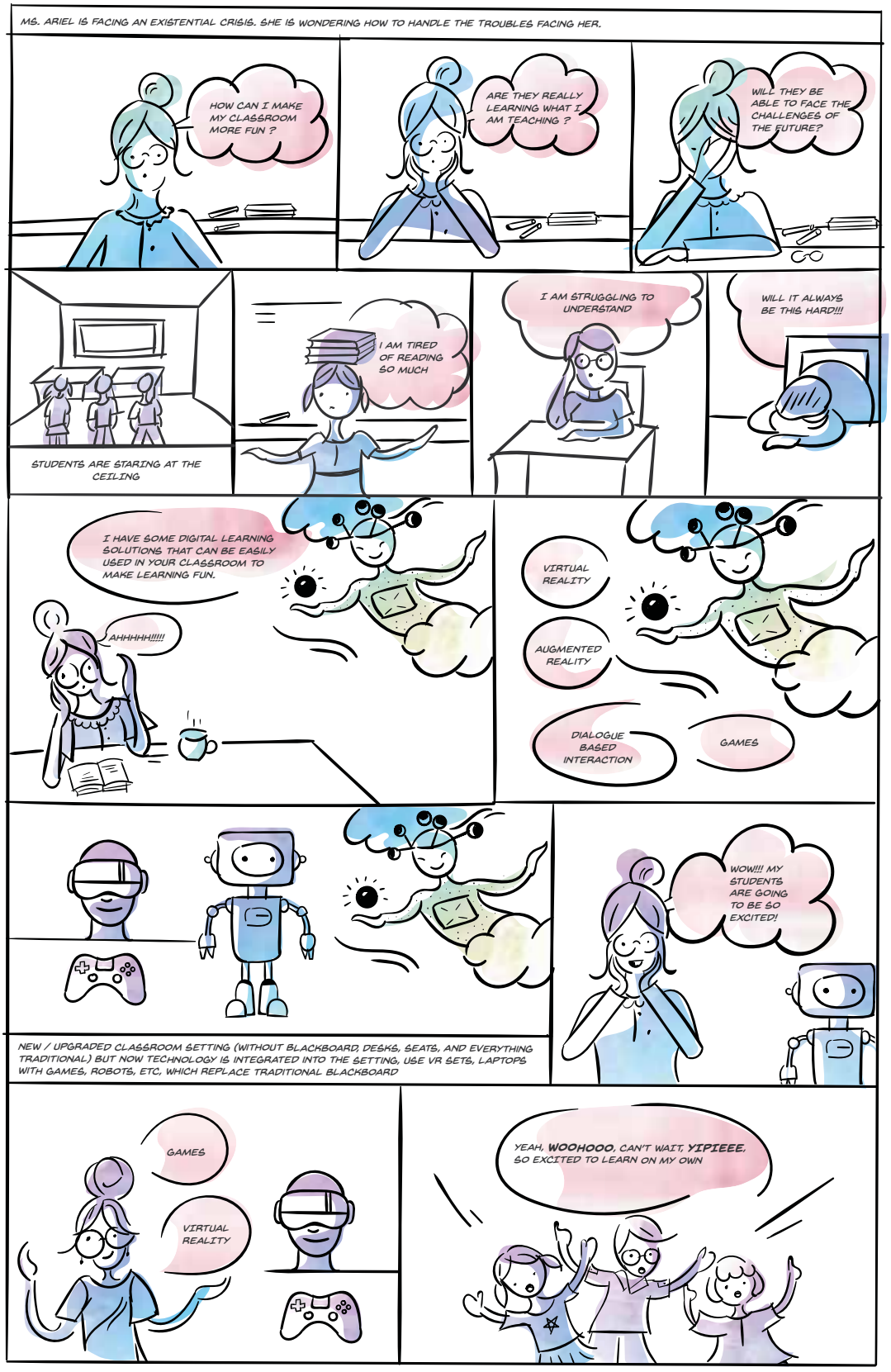
Dr. Anantha K. Duraiappah, Director, UNESCO MGIEP, and Ms. Archana Chaudhary, Project Co-ordination Officer, UNESCO MGIEP, visited Alliance Numerique, a business network of the new media industry and interactive content from Quebec. During their meeting, Dr. Duraiappah and Ms. Chaudhary interacted with various active members in the video gaming and interactive digital entertainment sector from Quebec and discussed UNESCO MGIEP's interventions in the Gaming & Digital Learning spaces. Dr. Duraiappah also announced the dates for UNESCO MGIEP's second international education technology conference, titled Transforming Education Conference from Humanity (TECH) 2018 and encouraged experts in video gaming and education technology to participate in the conference.

Harnessing the potential of technology to foster intercultural understanding

May 2018, Rome, Italy

Aditi Pathak, Programme Specialist – Digital Intercultural Exchange, UNESCO MGIEP, represented the Institute at the XIII GUIDE CONFERENCE – The Education In The Fourth Industrial Revolution from May 3-4, 2018 in Rome, Italy. During the conference, Aditi conducted a talk on the blended learning programme and discussed the potential of digital dialogue to promote intercultural competencies and how it can be adapted in educational systems. Ms. Pathak also presented the DICE – Learning Labs project of UNESCO MGIEP, an ICT-based intercultural exchange project that connects schoolchildren and teachers across the globe, allowing them to share ideas and drive their own learning on issues related to peace and sustainable development.

*WHERE **LEARNING** IS FUN*



The Blue DOT is UNESCO MGIEP's bi-annual publication, featuring articles showcasing our activities and areas of interest. The magazine's overarching theme is the relationship between education, peace, sustainable development and global citizenship. To view the e-publication, visit – http://bluedot-mgiep.org or http://mgiep.unesco.org/

The Blue DOT
January 2018, Issue VII
The Blue DOT
July 2017, Issue VI
The Blue DOT
January 2017, Issue V
The Blue DOT
July 2016, Issue IV
The Blue DOT
January 2016, Issue III
The Blue DOT
July 2015, Issue II
The Blue DOT
January 2015, Issue I

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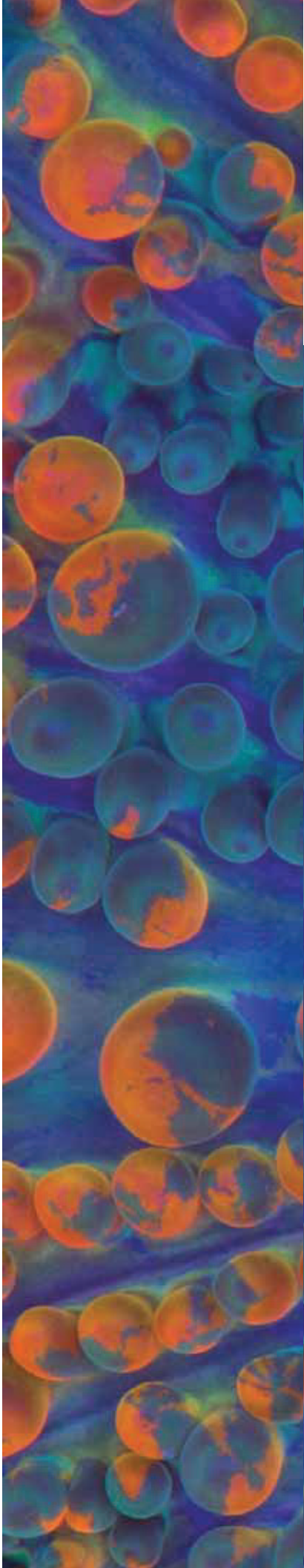

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