The Gulf Arab States Educational Research Center - Kuwait

The International Conference on:

Innovative Education in an Era of Change

تعليم مبتكر
لعصر متغير

29 - 30 November 2022

Manama – Kingdom of Bahrain

المركز العربي للبحوث التربوية لدول الخليج

يمكنكم التواصل معنا من خلال:

البريد الإلكتروني: gaserc@gaserc.com

الموقع الإلكتروني: www.gaserc.com

الكويت – الشامية – قطعة 3 – شارع يوسف إبراهيم الغانم

ص.ب: 12580 – الشامية 71656 – الكويت

هاتف: 24830766 – 24830428

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◆◆ Foreword

Under the title «Innovative Education for an Era of Changing», the Gulf Arab States Educational Research Center (GASERC) held its third international conference in Manama, Kingdom of Bahrain, from 29 to 30 November 2022. His Excellency Dr. Muhammad bin Mubarak Jumaa, Minister of Education in the Kingdom of Bahrain, generously sponsored this event. The conference is part of GASERC›s ongoing activities to keep up with the global developments in educational theory and practice, to contribute to the educational reform projects in the member states of the Arab Bureau of Education for Gulf States (ABEGS), and to facilitate the exchange of experiences among educators at the regional and international levels.

The conference title expresses the common feeling among many educators around the world that education needs to be rethought in innovative ways, in order to cope with the large and rapid changes that our world is undergoing, and to prepare our new generations for an uncertain future. Therefore, the conference poses a number of important questions about the future of education in light of contemporary global changes, and the need to restructure educational systems in response to the new digital technologies. This requires rethinking the curriculum design, learning content, and teachers› roles and competencies.

The conference featured a distinguished group of academics, professionals, and experts, including Keynote speakers from different regions of the world, representatives of regional and international educational organizations, and educational leaders and specialists from ABEGS member states (United Arab Emirates, Bahrain, Yemen, Kuwait, Saudi Arabia, Oman and Qatar).

I would like to express my heartfelt gratitude and appreciation to the conference speakers who enriched it with their insightful visions and extensive professional experience. I would also like to acknowledge the conference moderators who managed the conference sessions with high efficiency, which enabled us to benefit from all ideas and discussions that took place. I also extend my heartfelt gratitude to the delegations from the Member States, appreciating their acceptance of our invitation to participate in this important scientific event. Lastly, I extend a special thanks to GASERC team for their big efforts in preparing and organizing this conference in such a professional way.

As we present this conference proceedings to readers, we hope that it will help to explore innovative alternatives for the future of education, paving the way for educational reformers in ABEGS member states, and supporting their sincere efforts to build modern educational systems that meet the expectations of the new generations for a better future.

Dr. Suleiman Al-Askary

Director of the Gulf Arab States Educational Research Center

The Gulf Arab States Educational Research Center (GASERC)

The Gulf Arab States Educational Research Center (GASERC) is a specialized organization that belongs to the Arab Bureau of Education for Gulf States (ABEGS), and is located in Kuwait. It was founded in May 1977, with the aim of improving education in the Gulf Member States, fostering cooperation, and implementing joint educational activities. GASERC Member States are: United Arab Emirates, Bahrain, Yemen, Kuwait, Saudi Arabia, Oman and Qatar.

GASERC conducts research and educational activities that aim at examining the current situation of education in the gulf countries, and supporting their efforts to achieve the educational development. It also tries to keep up with the latest trends in education worldwide to draw implications that can positively influence Member States› educational policy and practice. GASERC also provides consultation services in the field of education as needed. Moreover, it supports the collective efforts of the Member States to achieve regional educational goals.

Every two years, GASERC undertakes a set of research programs approved by ABEGS General Conference (Ministers of Education). These programs cover various educational fields, such as curriculum, educational policies, teacher preparation and training, school administration … etc. Since its establishment, GASERC has carried out more than two hundred research programs. In addition, it holds an annual educational cultural season, which includes lectures and symposiums, where specialists in various educational, academic and cultural fields participate.

GASERC also organizes seminars that gather academic specialists, teachers, school principals, supervisors, students and parents to discuss a wide range of education-related topics. Moreover, it publishes its programs outcomes in the form of reports and research products to be distributed to Member States and exhibited at book fairs for purchase. In addition, GASERC issues a quarterly periodical called «Educational Futures», which highlights the results of recent educational research and innovations at the international level.

About the Conference

◆◆ Context

The recent crisis brought on by the Covid 19 outbreak, which has afflicted the entire world for the past two years, has exposed the many inadequacies in our education systems and has revealed their struggle to adapt to the changes forced by the current unanticipated crisis. By and large, school closure applied as a precautionary and protective measure to contain the pandemic has taken a toll on many students. It has deprived millions of them from education, resulting in a significant learning loss for them, with far-reaching consequences that could persist for so many years to come.

Nonetheless, the dire situation created by the recent pandemic has brought to light the deep crisis the educational system has been suffering from for decades and has revealed the need for rethinking approaches to education. Hence, many research efforts have emerged that perceive the recent crisis as a catalyst for profound transformation that has altered people's perspective towards education, its institutions, and delivery channels. Fundamentally, it seems that we are on the verge of a new era of educational reform; one that will witness significant and structural changes in established educational systems, driven by the constant and rapid development of information and communication technology (ICT), as well as the widespread application of digital technology across many domains.

Apart from Covid 19 crisis, today humanity is facing major global challenges, including climate change, digital transformation, workplace automation, violent conflicts and civil unrest. To overcome these challenges, we must strive to prepare the next generation to live a better life by enhancing their understanding of the emerging trends that will shape their future lives, and how to efficiently address them. Certainly, education lies at the heart of these efforts that aim at improving future life and promote human welfare. It is the best long-term investment.

However, while contemporary educational reforms have generated potential opportunities for improving education and supporting its role in addressing today›s pressing issues, they have also revealed a number of challenges that must be addressed. As a result, there is an urgent need to develop an innovative educational model that can anticipate the future based on existing conditions, by mapping opportunities and constraints, in order to plan for a brighter future for the next generation.

◆◆ Objectives

The conference aims at:

1. Identifying the current education crisis, diagnosing its root causes, examining its features, and assessing its impact on educational systems' ability to respond to economic and societal development needs.

2. Suggesting innovative solutions and alternatives to reshape current education systems to adequately respond to the challenges posed by recent transformations and future development demands.

3. Discerning global innovative trends and new practices in digital curriculum design, digital learning resources, pedagogical and evaluation practices, and teacher professional development.

4. Exchanging educational experiences and fostering collaboration among member states.

◆◆ Themes

The conference activities and discussions revolved around the following four themes:

1. Global trends and the future of education

This theme provides a comprehensive overview of the challenges facing education in the modern era, considering the massive expansion of digital technology. In comparison to other social institutions, schools have evolved relatively slowly, if at all, during the last five decades, both in terms of organizational structure and daily practices. That is to say, education has not been able to keep up with the rapid pace of change in our world today, restricting its ability to meet individual and social demands appropriately. As unexpected challenges, such as health pandemics, economic crises, political tensions, and natural disasters, unfold, the education crisis escalates, and the education system improvement plans are hampered by the urge to respond to emergency situations and minimize losses.

Despite the fact that education systems across different countries encounter distinct challenges, the educational crisis appears, in essence, to be global in nature. Nowadays, all education systems are under immense strain due to the rapid changes affecting every aspect of life, the increasing complexity of today›s world, the high economic competitiveness, dramatic changes in labor markets, and the new skills in demand in today's workforce and digital workplaces. Furthermore, ICT has posed many challenges to educational systems, such as information explosion and big data, along with issues raised by emerging digital spaces and new social media, particularly the tensions these environments have created between the local and the global, civil and digital citizenship, and the actual and the virtual world. The present education system, with its outdated school system and practices, seems incapable of addressing these challenges, and, can hardly meet the ever-growing needs of the new generation of digital natives, who grew up in a technology- dominated world.

2. Restructuring the education system: exploring innovative digital solutions

This theme focuses on educational reforms that need to be implemented at

the structural and institutional levels. Furthermore, it considers how to make the shift to an alternate mode of education delivery, as well as what solutions digital technology may provide to assist with this transformation.

By and large, the structure of public education system we currently know has been around for many decades. The school is still a physical structure, where students are distributed across discrete grade levels to receive "age-appropriate" content. Traditional assessment methods are often utilized as a means of promoting students to the next grade level, year to year. Digital tools are barely used effectively to enhance the teaching and learning process, and the internet, as an ever-expanding information resource, is not well integrated into the curriculum.

Notably, Covid 19 crisis has provided an exceptional chance to examine how information and communication technology (ICT) may be effectively integrated into education. Yet, even though schools have reopened in most countries and are back to normal, the pandemic has created a landscape that will continue to stimulate innovation and technology integration to improve the educational process and learning outcomes. Nevertheless, it seems that this digital transformation in education can pose significant challenges, such as educational inequity, poor human interaction, negative physical and mental health effects of screen time, and invasion of privacy and information security. Other challenges include issues pertinent to rethinking teachers and learners' roles, curriculum design, and technology-based learning and assessment. To overcome these obstacles, educators must chart a new trajectory for education that includes innovative digital solutions that integrate physical and virtual settings, to ensure inclusive and equitable quality education for all.

3. Curriculum: content, resources and design

This theme attempts to define how issues raised in the previous themes are reflected into the school curriculum. This encompasses learning objectives, as well as the competencies and skills students need to prosper in the 21st century. It also covers content selection, educational resources, as well as instructional strategies and tools.

Basically, over the last few decades, there have been calls to reconsider educational content and instructional practices in the light of new transformations. As the world is becoming more complex and human knowledge more interconnected and deeply interwoven, the school curriculum can no longer be perceived as a collection of distinct subject matters. Instead, new paradigms have emerged that adopt alternative curriculum designs that reflect knowledge complexity characterizing the modern era. Educational specialists still raise the old question: what should we teach our students? This question is vital nowadays, especially as

humankind has made the transition from the industrial to the information age and the fourth industrial revolution, which is unlike anything they have experienced before. Noticeably, this transition and the resulting large-scale transformations are taking place amid severe crises, including climate change, health pandemics, global political unrest, beside serious challenges facing democracy and human rights.

Thus, given the current digital transformation that has impacted nearly every aspect of human life, educational systems cannot afford to stay passive to communication and information technology if they are to strive in the global economy. Integrating technology in teaching and learning necessitates a shift in pedagogical thought beyond just moving face-to-face activities to the virtual realm. Hence, development of instructional tools and media should be accompanied by major transformation in traditional teaching, learning and evaluation practices. New models should be adopted to guide content selection, delivery methods, and assessment techniques.

Moreover, students› virtual spaces, their abundant use of media outside of school, and the vast amount of knowledge they acquire on their own, are factors that have to be considered when designing alternative pedagogical approaches. In addition, advances in learning management systems are creating new opportunities for gathering and analyzing unprecedented levels of students› learning data, which can enable the adoption of differentiated and personalized learning models to accommodate students' diverse learning styles. However, the question remains as to what digital innovative solutions to be adopted to make the most of all these opportunities and overcome obstacles.

4.   Teacher education: new competencies and roles

The focus of this theme is on redefining teacher roles in light of the new structural educational reforms, new approaches in curriculum design, and alternative technology-based instructional strategies. It examines competencies teachers need to acquire, and implications for developing teacher education institutions, to ensure they are adequately prepared to meet new expectations.

In fact, teachers are a key element in providing education and play a crucial role in sustaining and implementing reform initiatives. Well-trained teachers are critical to providing high-quality education, and so teacher education remains a top priority in all educational systems. However, there are still many concerns regarding the efficiency of teacher education and training programs, teachers' working conditions, and the new roles they need to adopt in digital and hybrid educational settings.

These issues have received much attention during the unprecedented disruption caused by the COVID-19 pandemic school closures, as teachers

were forced overnight to switch from an in-person to an online format of teaching, and were tasked with organizing online classes and communicating with students at a distance, on a trial-and-error basis. Fundamentally, this was a historical turning point, as it highlighted the significance of reconsidering teachers› roles in light of the recent massive digital transition, which has resulted in substantial changes in learning environments, instructional materials and practices.

Nonetheless, while the issue of digital transformation has taken center stage in discussions about the future of education and teacher roles, education encompasses more than just the use of technology. Teachers' interaction with students include various affective, social, and emotional dimensions that need to be considered. This raises questions as to the innovative solutions necessary to reconcile the goals of integrating digital technology in education, on the one hand, and at the same time maintaining the human interaction closely related to students› personal development, on the other hand.   Other doubts have been raised concerning the ability of present teacher education and training institutions to update their programs in a way that enables teachers to acquire the competencies necessary to perform effectively in physical, digital, and hybrid learning environments.

◆ Program

The conference program included the following activities:

1. Opening speeches by the conference sponsor representative, the Director General of the Arab Bureau of Education for the Gulf States (ABEGS), the Director of the Gulf Arab States Educational Research Center (GASERC), and representatives of regional educational organizations.

2. Eight Lectures covering the conference themes delivered by keynote speakers.

3. Two workshops covering the following topics:
   - Developing digital educational resources
   - Teachers professional development to integrate digital technologies in education

4. Exhibition of publications of (ABEGS) and its affiliated institutions.

◆ Participants

The conference had about three hundred participants representing a distinguished group of academics, professionals, and experts, including:

1. Keynote speakers, well -versed in the conference themes, from different regions of the world.

2. Representatives of regional and international educational organizations.

3. Educational leaders and specialists from ABEGS member states representing ministries of educations of United Arab Emirates, Bahrain, Kuwait, Saudi Arabia, Oman and Qatar.

4. Professors from colleges of education and professionals working in the educational sector.

5. GASERC and ABEGS experts and researchers.

◆◆ Keynote Speakers

Distinguished Keynote speakers from different regions of the world took part in the presentation of the conference topics as follows (For speakers' biographies, please refer to Appendix 2):

Session 1: Global trends and the future of education

Prof. Sohail Inayatullah, *UNESCO Chair in Futures Studies, Professor at Tamkang University, Taiwan*
Topic: Educational futures in times of disruption: The break-out or back to business as usual?

Dr. Sobhi Tawil, *Director of Future of Learning and Innovation at UNESCO*
Topic: Global Trends and the Future of Education: The Imperatives for Transformation

Session 2: Restructuring the education system: exploring innovative digital solutions

Prof. Mark Brown, *Director of the National Institute for Digital Learning, Ireland*
Topic: Unboxing Digital Transformation: Reshaping Education for Better Futures

Prof. Hamdy Abdelaziz, *Dean, School of e-Education, Hamdan Bin Mohammed Smart University, UAE*
Topic: Innovative digital solutions for re-engineering education in the Arab world

Session 3: Curriculum: content, resources and design

Dr. Anthony Magana, *Oxford Research Encyclopedia Scholar, CEO Magana Education, Marzano Research Associate, USA*
Topic: Curriculum: Content, Resources, and Design

Prof. Saleh Salim Al-Busaidi, *Dean, College of Education, Sultan Qaboos University, Oman*
Topic: Future Curriculum: Requirements and Challenges

Session 4: Teacher education: new competencies and roles

Dr. Chua Bee Leng, *Associate Dean, Professional Practice, Office of Teacher Education, National Institute of Education, Nanyang Technological University, Singapore*
Topic: Empowering teachers to be future-ready: Curriculum, Pedagogies and Technologies

Dr. Abdulrahman Almedaries, *Director General of the UNESCO Regional Center for Quality and Excellence in Education, Saudi Arabia*
Topic: The future of teacher quality: transformations for a changing future

◆ Moderators

The conference sessions were moderated by (For of moderators' biographies, please refer to Appendix 3):

Prof. Adulsalam Al-joufi
Advisor, Arab Bureau of Education for the Gulf States

Prof. Abdullah Ambusaidi
Undersecretary of the Ministry of Education, Oman

Prof. Abdulazez Al-Ruwais
Supervisor of program management at the Arab Bureau of Education for the Gulf States

Prof. Ibrahim Al Naimi
Undersecretary of the Ministry of Education and Higher Education, Qatar

Opening Ceremony

The conference started at 9:00 am on November 29, 2022. The opening session featured speeches by His Excellency Dr. Muhammad bin Mubarak Jumaa, Minister of Education in the Kingdom of Bahrain, His Excellency Dr. Abdul Rahman bin Muhammad Al-Asimi, Director General of the Arab Bureau of Education for the Gulf States, Dr. Suleiman Ibrahim Al-Askari, Director of the Gulf Arab States Educational Research Center, and Ms. Costanza Farina, Director of the UNESCO Regional Bureau for Education in the Arab States in Beirut.

Speech of His Excellency
Dr. Mohammed bin Mubarak Jumaa

Minister of Education in the Kingdom of Bahrain

In the name of God, the most gracious, the most merciful

His Excellency Dr. Abdulrahman Al-Asimi, Director General of the Arab Bureau of Education for the Gulf States,

His Excellency Dr. Suleiman Al-Askari, Director of the Gulf Arab States Educational Research Center,

Ladies and gentlemen,

Our distinguished and honorable guests,

The Kingdom of Bahrain is honored to host the third international conference titled «Innovative Education for an Era of Change», which is organized by the Gulf Arab States Educational Research Center during the following two days, in cooperation with the Ministry of Education in the Kingdom of Bahrain.

On this occasion, I am pleased to welcome the honorable guests and all the participants, hoping that the work of this important educational conference will

be crowned with the desired success and that its recommendations and outputs will contribute to the further advancement of the educational process in our Gulf countries.

I feel privileged to convey the Ministry of Education›s appreciation for the immense support that Education receives from His Majesty King Hamad bin Isa Al Khalifa, the great King of the country, and His Royal Highness Prince Salman bin Hamad Al Khalifa, the Crown Prince and Chairman of the Council of Ministers. The fact that the leadership of our beloved country is committed to enhancing the educational system, updating educational methodologies, and fostering creativity and excellence among youth is indicative of their unwavering dedication to establishing a contemporary educational system that aligns with national development objectives and stays current with global transformations. This commitment is demonstrated by their willingness to adopt successful international experiences and practices.

I would like to extend my gratitude to the Gulf Arab States Educational Research Center, located in Kuwait, for taking the initiative to host this significant conference in collaboration with the Ministry of Education in Bahrain. I am thankful for their efforts in sharing successful educational practices and experiences.

Furthermore, I acknowledge the crucial role played by the Gulf Arab States Educational Research Center in analyzing the educational situation in GCC countries, devising educational strategies that align with contemporary global trends, promoting the exchange of experiences, and conducting educational research.

Dear colleagues,

The conference theme «Innovative Education in an Era of Change» encourages us to contemplate the current state of education and prepare for its future. Its purpose is to cultivate a well-educated generation that possesses twenty-first-century skills, thinks critically, participates in society, and contributes to developmental initiatives. This aspiration demands a move away from conventional education that emphasizes rote learning toward progressive education that stimulates creative thinking.

The rapidly evolving scientific, economic, social, and intellectual landscape of our world necessitates the establishment of an educational system that adapts to these changes and leverages modern learning technologies. The aim is to cultivate students who possess a creative mindset, are proficient in twenty-first-century skills, and are cognizant of critical challenges confronting their country and the globe, including economic, environmental, and societal issues.

Education not only shapes the youth, fosters development, and prepares for the future, but also creates an awareness of present challenges and future opportunities, while instilling citizenship values such as tolerance, coexistence, acceptance of diversity, rejection of intellectual intolerance, and openness to the world.

I extend a warm welcome to the Kingdom of Bahrain, your second country, and I express my hopes for the success of the conference and its ability to generate

recommendations that enhance the state of education in our countries. Such recommendations would be in line with the main goal of the Gulf Cooperation Council, which is to promote coordination, integration, and interdependence among member states in all sectors.

Peace, mercy and blessings of God.

Speech of His Excellency
Dr. Abdulrahman bin Muhammad Al-Asimi

Director General of the Arab Bureau of Education for the Gulf States

In the name of God, the most gracious, the most merciful

His Excellency the Minister of Education in the Kingdom of Bahrain, Dr. Mohammed bin Mubarak Jumaa,

His Excellency Dr. Suleiman Ibrahim Al-Askari, Director of the Gulf Arab States Educational Research Center,

Keynote speakers in the conference,

Ladies and gentlemen,

Peace be upon you,

First and foremost, I would like to express my deepest gratitude and appreciation to the Government of the Kingdom of Bahrain for their continued support and assistance towards the activities and events organized by the Arab Bureau of Education for the Gulf States. On this note, I am pleased to extend my congratulations to His Excellency Dr. Muhammad bin Mubarak Juma on his recent appointment as

Minister of Education in Bahrain, while also thanking his predecessor, His Excellency Dr. Majid Ali Al-Nuaimi, for his cooperation and support towards the programs and activities of the bureau, which played a significant role in achieving its objectives and mission. I would also like to acknowledge the Ministry of Education in Bahrain for their efforts in supporting the bureau›s activities and programs.

Furthermore, I would like to recognize the valuable contributions of the Gulf Arab States Educational Research Center for in promoting the development of education in the member states, including the organization of the third international educational conference titled «Innovative Education in an Era of Change». The conference took place during the aftermath of the COVID-19 pandemic, which significantly affected numerous economic, social, cultural, and educational activities, with education being the most impacted as it disrupted the conventional methods of knowledge transmission.

The pandemic forced many educational institutions to rely on distance education using information technology and virtual spaces. This resulted in a significant educational loss, the effects of which could last for years to come, despite the innovative methods that the member states of the Arab Bureau of Education for the Gulf States have implemented to mitigate the impact of the pandemic. The pandemic made it clear that certain aspects of the educational system need to be reconsidered, and it was a major turning point in the thinking of those responsible for education about educational institutions and methods of delivery. There is a need to accommodate the radical changes in learning environments, media, and practices by seeking innovative alternatives to restructure the educational system. This can be done by benefiting from the development initiatives of member states and international experiences in this field.

Ladies and gentlemen,

In addition to the previously mentioned impact of the pandemic, it is evident that a new global reality has emerged, especially in terms of problem-solving strategies and the prevalence of digital transformations and automated systems in various aspects of life. This new reality has prompted educational officials to restructure the education system in a manner that improves its quality and enhances school performance. It is our hope that this conference will keep up with the latest developments in global educational theory and practice that can contribute to creating a better future for the upcoming generation by equipping them with the skills to understand and properly handle various variables.

Ladies and gentlemen,

It is essential for us to examine our current reality and reflect on its challenges and opportunities in order to create a bright future. This can be achieved by carefully reviewing teacher training programs and ensuring that the educational material is engaging and convincing for students. Education serves as the foundation for developing industrial, economic, and social institutions, and is key to promoting

global security and prosperity. The ABEGS member states share a common desire for innovative education that prepares future generations for a better future. With the help of God, this goal can be achieved.

In conclusion, I would like to reiterate my appreciation to the Minister of Education in the Kingdom of Bahrain for his support and presence at the conference, as well as to the Director of the Gulf Arab States Educational Research Center, and the speakers in the various conference sessions. My gratitude also goes to all those who played a part in organizing and preparing for this event. I pray that the outcomes and recommendations of this conference will greatly contribute to achieving our desired goals for education in ABEGS Member States.

And peace and God's mercy be upon you.

Speech of His Excellency
Dr. Suleiman Ibrahim Al-Askari

Director of the Gulf Arab States Educational Research Center

In the name of God, the most gracious, the most merciful

His Excellency Dr. Mohammed bin Mubarak Jumaa, Minister of Education in the Kingdom of Bahrain,

His Excellency Dr. Abdulrahman bin Muhammad Al-Asimi, Director General of the Arab Bureau of Education for the Gulf States,

Her Excellency Ms. Costanza Farina, Director of the UNESCO Regional Bureau for Education in the Arab States in Beirut,

Your Excellencies, the experts participating in the conference,

Distinguished guests of our conference,

Ladies and gentlemen,

Peace be upon you,

I would like to offer my heartfelt congratulations to Your Excellency, the Minister, on your appointment to this esteemed position, and I wish you great success in your

important duties. I also want to express our deep gratitude and admiration for your predecessor, His Excellency Dr. Majid bin Ali Al Nuaimi, and wish him all the best in his future endeavors.

We are filled with immense joy, honor, and pride to hold our third international educational conference in the beautiful city of Manama and on the soil of the Kingdom of Bahrain. This country is always lively and thriving, constantly progressing and advancing towards a better future for its people. It generously provides a good quality of life for all its residents and works hard to promote peace and development around the world, thanks to the wise and enlightened leadership of His Majesty King Hamad bin Isa Al Khalifa, King of the Kingdom of Bahrain, and with the support of His Royal Highness Prince Salman bin Hamad Al Khalifa, Crown Prince and Prime Minister.

Honourable Minister

Your Excellency›s remarkable attention to this educational conference and its participants are clearly demonstrated by the exceptional hospitality, cordial reception, and consistent support that we have been receiving from you and the Ministry of Education since the conference›s planning stage and throughout its duration. This exceptional support is a testament to your deep interest in promoting collaborative educational efforts among the Gulf Arab countries, and your commitment to its sustainability, development, and contribution to the overall progress and achievement of our nations in realizing their goals.

Ladies and gentlemen

The Title of our conference is «Innovative Education in an Era of Changing». It›s only natural that education development is linked to the needs of the time, including advancements, learners› circumstances and needs, and opportunities provided by scientific research outputs and their applications in enhancing sources of knowledge, tools for learning, and professional skills for improving lives and well-being. The fundamental question is: what are the features of this change that will be witnessed in the upcoming decades, what are the factors that will influence it, and what are the outcomes that will arise from it? And most importantly, what measures can we take to channel our efforts towards leveraging the benefits of these changes and avoiding their potential negative effects?

By looking at the present and anticipating the future, it›s clear that the fast-paced advancement of digital technology and its intelligent applications is one of the most powerful factors impacting various aspects of human life such as industry, economy, trade, medicine, communication, transportation, and education. Education, in particular, is the source of human capital that a country needs to maintain its identity and existence, protect its people, strengthen social cohesion, provide its institutions with competent and skilled workers, and prepare its citizens to absorb new knowledge and skills in their specialized fields, all of which contribute to the country›s development and growth.

Since the beginning of the 21st century, the ABEGS member states have shown

a great deal of concern about using information technology in their education development initiatives, making it a top priority. They have made significant progress in eradicating digital illiteracy among teachers, creating digital learning materials, setting up digital platforms to support learners, and promoting teacher and student-led initiatives in schools aimed at developing digital resources related to their areas of study.

The increasing role of digital technology in our lives in the coming decades places two significant responsibilities on education, which are the main focus of this conference. The first responsibility is related to the level of professional proficiency required from educational institutions, particularly in terms of teachers› digital and professional competencies. These competencies are essential for teachers to be able to adopt the latest digital technology developments, facilitate the teaching and learning process, and educate their students about the legal and ethical regulations governing the use of available resources in the internet to ensure a safe transition to the digital age. The second responsibility is related to the appropriate digital content for teaching and learning, the criteria for its development or modification, and the professional skills required for those who undertake these tasks. These two issues offer a vast opportunity for reflection, discussion, and sharing of ideas and experiences, which we hope to achieve through the two workshops that will accompany the conference.

Ladies and gentlemen,

Looking ahead to the changes that will occur in the next 25 years of the 21st century and the educational system that will be suitable for those changes and meet the needs of future generations, requires more than just seeking partial reforms to update the old system. It requires an innovative education system that is responsive to the future›s characteristics and necessities for a decent life. This system should have a solid foundation in schools where development plans and projects are put into practice, creating a permanent learning community where everyone acquires renewed knowledge and shares advanced experiences. This conference›s frame of reference and program of work and activities reflect this vision and feature a distinguished group of educational experts from around the world, including representatives from ABEGS member states. His Excellency Dr. Abdul Rahman bin Muhammad Al-Asimi, Director General of the Arab Bureau of Education for the Gulf States, is guiding and supporting this effort.

Ladies and gentlemen,

The program of this conference includes presentations by Keynote speakers in the plenary sessions, as well as activities in two workshops. We hope that everyone will actively participate and contribute to the success of the conference, and that we will all benefit from the insights, discussions, and recommendations that arise from it. Our goal is to broaden our perspectives and imagine a future of innovative education and peaceful cooperation for the well-being of all people around the world.

Peace, mercy and blessings of God.

Speech by:
Ms. Costanza Farina

Director of the UNESCO Regional Office for Education in the Arab States in Beirut

YE Dr. Mohammed Bin Mubarak Jumaa, Minister of Education in Bahrain,

YE Dr. Abdulrahman Bin Mohamed Al- Asimy, Director General of the Arab Bureau of Education for the Gulf States (ABEGS),

YE Dr. Suleiman Al-Askary, Director of the Gulf Arab States Educational Research Center (GASERC),

Dear friends, participants, and colleagues

Assalamu alaykum and good morning to all!

It is a great pleasure to be here in Manama for the International Conference on Innovative Education in an Era of Change.

It is a great source of pride for me to be among such a distinguished group of education champions, policy makers, advocates, experts, and academia specialists.

I would like to take this opportunity to congratulate his Excellency Dr. Mohammed Jumaa for his recent appointment as a Minister of Education. I convey my best wishes to His Excellency for a very successful mission.

I would like also to extend my profound gratitude to the Kingdom of Bahrain for generously and graciously hosting all of us in this beautiful capital – Manama – the city of trade, multiculturalism and religious coexistence. A capital that is also known by its unwavering commitment to education, building on this history and building on the future.

Allow me also to express my personal thanks to ABEGS and GASERC for inviting me at the conference. It is a true honor for me to be able to contribute a UNESCO perspective in this event.

The subject that brings us together today: Innovative Education in an Era of Change is extremely timely and strategically very relevant.

We are here today because we know that:

education is at the heart of the challenges of our societies,

it is at the heart of all the challenges we face in the world,

but also in the dear large region, education is in the face of poverty, un-employment, migration and displacement, vulnerability to climate change, and the repercussions of conflicts.

And I want to start by conveying to all of you the strong commitment and support of the United Nations family, and of UNESCO in particular, to elevate education at the top of the international political agenda so that all those challenges can be meaningfully addressed.

Dear Minister, Excellencies, dear Partners and Friends,

This is a critical moment that brings us together around education in this important conference. We have come here because we believe that in order to build peace and to build strong societies, there is no more essential tool than to act early «in the minds of men and women» – and, therefore, of children and young people.

This power of education, this ability to act on minds and mindsets is what presided, in the aftermath of the Second World War, over the creation of our Organization, UNESCO.

It is this very same conviction that united the international community in 2015 around the 2030 Agenda for Sustainable Development and in particular Goal number 4 – for an education oriented towards the inclusion of each and every one in society, so that on one is left behind.

And it is in this very same conviction that the UN Secretary General Guterres convened a Heads of States Summit to transform Education: The Transforming Education Summit (or TES), which took place in September this year in NY the UN General Assembly. The Summit sought to fundamentally re-think the purpose, content and delivery of Education in the 21st century and to elevate education in the national, regional and global political agenda so that aspirations, solidarity and solutions could be mobilized to transform education.

For an education that is truly transformative, and not only technical or geared to economic purposes.

For an education that is humanistic, all-encompassing and instrumental in responding to the challenges of the sustainable development we collectively are determined to achieve.

This is a massive undertaking, but I am delighted to see that this important international conference is a critical step in the right direction.

It is not only about protecting the right to education, everywhere and for everyone. It is also about transforming the eco-systems and the dynamics of teaching and learning.

The good news is that we can -and should- build on all our solid achievements, on lessons learnt, and on the promising practices we all have experienced in our activities, and I am sure we will hear very interesting solutions from the following speakers.

Dear friends,

While discussing "Innovative Education" and ways to transform education in this region, I would like to invite you to give special attention to few key areas – which are in line with the TES outcomes and that can charter the way ahead:

We should keep in mind that humanistic education must be defended. This is what the report on the UNESCO International Commission on the Futures of Education also tells us, which will be presented today by my dear colleague Sobhi Tawil.

As we still have a long way to concretely achieve the transformation we aim for, we should mobilize greater and more diversified levels of equitable and efficient investments in education, improving the efficacy of domestic financing as well as of the international aid. And this should embrace all stages, from early childhood and all the way to reach lifelong learning.

Emphasis should also be placed on supporting educators, which are the backbones of the educational systems. One example: according to a study prepared by UNESCO last year, only a third of teachers globally have access or exposure to any professional development to fully comprehend and to respond to climate change challenges and to mitigate the related risks, like loss of biodiversity, which is the tragedy we are currently experiencing.

If we are truly committed to transforming the world, we must support educators and their further professional development.

The TES is a once-in-a-generation opportunity to drive a new pathway for education by listening to the voices of youth and young people. We cannot transform education without having youth engaging meaningfully with us through inclusive dialogues and without giving them the platform to contribute to decision making processes. Education must offer clear answers to their legitimate ambitions. We

hope to see a youth led global movement to transform education.

In their national TES commitments, 50% of governments, including many countries of this region, have prioritized measures to address learning losses, while a third of countries committed to supporting the psycho-social well-being of both students and teachers.

It is worth noting that several measures strengthening COVID-19 recovery and getting back on track on the SDGs realization have been highlighted as a top priority.

Countries have also emphasize the need for innovations in education to prepare the learners of today for a rapidly changing world, but at the same time the need to bridge the digital divide that was so obvious during COVID times was defined as a crucial matter to tackle. Globally and regionally the COVID pandemic has widened and exacerbated disparities and inequalities, that now we need to address.

Excellencies, Ladies and Gentlemen

UNESCO is committed to support Member States to bring transformation to scale. And to do that, the first critical step is the «Greening Education Partnership» launched by UNESCO during the Summit. Through this initiative, UNESCO will engage with the Member States to ensure that every learner is climate ready. This means:

First, to redesign school programs so that climate change education occupies a prominent place by 2025;

Second, to develop teachers competencies and provide them with suitable educational resources;

Third, to convert schools, places of learning, into environmental models so that they can lead the way in the response to the climate crisis.

To reach this ambitious objective, robust partnerships are essential, we appeal, therefore, to the commitments of Member States, to the educational community and civil society as a whole. I hope you will all be interested to take advantage and participate in this new initiative to green education.

Dear Friends,

Let me add that during the TES, UNESCO and UNICEF launched Gateways to Public Digital Learning, a global multi-partner initiative to create and strengthen inclusive digital learning platforms and content. This will be an effective vehicle to re-address the digital divide and to ensure that every learner, teacher and family can easily access and use high quality digital education content to advance their learning.

Last but not least, a new "Commitment to Action on Education in Crisis Situations" was also launched at the Summit, as a commitment by member states and partners to transform education systems, so that they can better prevent, prepare for, respond to and recover from crises and protracted conflicts. Our goal is to build crisis resilient educational systems.

Before I conclude, let me reiterate that UNESCO stands ready to support Member

States in the region. Do reach out to us to work together, in partnerships, along with the UN family to make transforming education a strong reality in the region.

Let's take advantage of the auspicious momentum, that this international conference represents to demonstrate that concrete results can be achieved to transform education and realize a better future.

Thank you all for your attention

Plenary Sessions

Session 1:
Global trends and the future of education

This session addressed **«Global trends and the future of education»**. It was moderated by **Professor Adulsalam Al-joufi**, advisor at the Arab Bureau of Education for the Gulf States. The lectures in this session were presented by **Professor Sohail Inayatullah**, UNESCO Chair in Futures Studies, Professor at Tamkang University, Taiwan; and **Dr. Sobhi Tawil**, Director of Future of Learning and Innovation at UNESCO.

The session began with a lecture by Professor Sohail Inayatullah entitled **«Educational futures in times of disruption:** The break-out or back to business as usual?». In this lecture, he presented ten ways in which the future is used. These range from imagining the impossible to challenging used futures, to making visions real. Case studies from interventions in educational futures with numerous groups including the PRC, the Government of Norway, the Asian Development Bank, OECD, Edmund Rice Education, the Government of Malaysia, among others, were used to illustrate challenges and solutions ahead.

Dr. Sobhi Tawil gave a lecture entitled **«Global Trends and the Future of Education: The Imperatives for Transformation»**, in which he discussed the efforts of UNESCO in shaping the future of education. He highlighted one of the most important publications issued by UNESCO on this topic entitled «Reimagining our futures together: A new social contract for education». He also shed light on the goals and outputs of the «Transforming Education Summit», which was held by the United Nations in New York in September 2022, in response to the global crisis in education, to explore its future and explore possible alternatives to change it. Then he addressed the reasons that prompt us to rethink education and why we must do so now, pointing to some of the problems facing education at the global level and putting many education systems around the world at risk of failing to achieve SDG4.

He also touched on the problems caused by the Covid-19 pandemic in education and the resulting educational loss.

Dr. Sobhi Tawil acknowledged the uncertainty of the future and the difficulty of predicting it with certainty. However, he highlighted some variables that may contribute to shaping this uncertain future. He concluded his presentation by referring to some topics that educators should focus on in order to build a better future for education. The most important of which are: recovering from the effects of Covid-19 pandemic, resilience to future shocks, addressing educational exclusions, transforming the teaching profession, renewal of curriculum content, and digital learning and transformation.

The session ended with a general discussion among the audience on the ideas put forward by the two speakers.

Session 2:
Restructuring the education system: exploring innovative digital solutions

This session was dedicated to discussing the second theme of the conference, **«Restructuring the education system: exploring innovative digital solutions»**. The session was chaired by Professor Abdullah Ambusaidi, Undersecretary of the Ministry of Education in Oman. The lectures in this session were given by **Professor Mark Brown**, Director of the National Institute for Digital Learning in Ireland; and **Professor Hamdy Abdelaziz**, Dean of School of e-Education, Hamdan Bin Mohammed Smart University, UAE.

Professor Mark Brown delivered a lecture entitled **«Unboxing Digital Transformation: Reshaping Education for Better Futures»**. In this lecture, he tried to answer a set of important questions such as what might the next future look like? How can we redesign our schools, educational institutions, and the education system for a better future? What role can new digital solutions play in helping to shape our preferred future? He highlighted lessons that can be learned from the past in order to explore opportunities for digital learning and to know the major future trends and the related challenges and opportunities facing today's educators. He adopted a wide-angle, multifocal lens drawing on personal insights and critical analysis of several competing perspectives to help to zoom in and out to reimagine possible, probable and preferred futures. He illustrated the complexity of the new

and emerging digital education ecosystem, which is simultaneously converging, getting larger in scale, more open as well as closed, and growing in diversity. The lecture focused on illustrating the inherent tensions and interwoven nature of the digital education environment and showing how digital transformation is part of a broader social practice. By discussing the future of the education system, Professor Brown attempted to balance the language of opportunity with the need for deeper criticality. He highlighted the spirit of hope and the crucial role educators play in designing more innovative learning cultures that help challenge traditional mindsets and practices to reshape education for better futures - for all.

Professor Hamdy Abdelaziz gave a lecture entitled «Innovative digital solutions to re-engineer education in the Arab world». In his lecture, he presented some innovative digital solutions for re-engineering education in the Arab world based on the methodology of foreseeing the future by developing scenarios that can be tested and generalized. Six scenarios, based on the principle of influence and Orbit Shifting Digital Transformation, were presented to re-engineer the dimensions, components, elements and processes of the education systems in the Arab world.

The lecture presented innovative digital solutions to re-engineer the main elements of the educational system: objectives, content, technology, assessment, educational leadership, and educational research in the Arab world. In order to benefit from the thoughts presented in this lecture, professor Abdelaziz suggested relying on the model of abandonment, experiment, and adoption as a model of orbital impact to achieve innovative digital transformation in education.

At the end of the session, a general discussion took place among the audience about what was presented.

Session 3:
Curriculum: content, resources and design

This session addressed the third theme of the conference, **«Curriculum: content, resources and design»**. The session was moderated by **Professor Abdulazez Al-Ruwais**, Supervisor of program management at the Arab Bureau of Education for the Gulf States. The lectures in this session were given by **Dr. Anthony Magana**, Oxford Research Encyclopedia Scholar, CEO Magana Education, Marzano Research Associate, USA; and **Professor Saleh Salim Al-Busaidi**, Dean of College of Education, Sultan Qaboos University, Oman.

Dr. Anthony Magana presented a lecture titled **"Curriculum: Content, Resources, and Design"**. In his lecture, he emphasized that significant gains in student learning and achievement are possible when modern digital tools are fully leveraged to enhance highly reliable instructional and learning strategies. He pointed out that realizing these gains necessitates reimagining and rejuvenating educational curricula, resources, and design. Dr. Magana presented the results of some of the research he had conducted over the past years on the principles of effective online learning. In particular, he highlighted his T3 Framework for Innovation, which increments learning into three hierarchical domains: Translational Learning (T1), Transformational Learning (T2), and Transcendent Learning (T3). He synthesized the findings from his research into 5 Critical Commitments that educational leaders must make in order to maintain learning continuity and accelerate learning in an era of change. In order to

ensure students' current and future learning mastery in this era of unprecedented and rapid change, he argued that governmental agencies must no longer rely on traditional approaches to curriculum, pedagogy, and assessment, but rather must be prepared to enact these critical commitments. He maintained that those willing to take these steps will lead schools forward in such a way that minimizes future disruptions to learning continuity, builds limitless learning capacity, and reverses the negative impact of learning loss by generating collective system efficacy now and well into the future.

Professor Saleh Salim Al-Busaidi gave a lecture entitled **«Future Curriculum: Requirements and Challenges»**. During his lecture, he stressed the need to reconsider our educational curricula in terms of content and method of presentation. He addressed the requirements of the future curriculum by talking about the challenges of the future and the imperatives of changing the curriculum. The lecture stressed the importance of departing from the old template in defining learning content. In addition to paying attention to the content, the lecturer addressed the methods of teaching and learning, which are essential elements in the success of any educational curriculum. In order to ensure that the content is implemented in the right way, Professor Al-Busaidi highlighted the importance of paying attention to the training

of teachers and students. He pointed out that teachers must be trained on active learning methods, problem-based learning and other modern teaching methods that focus on the student and make him interactive and positive.

The session ended with a general discussion among the attendees on these topics.

Session 4:
Teacher education: new competencies and roles

This session was dedicated to discussing the fourth theme of the conference, **«Teacher education: new competencies and roles»**. The session was moderated by **Professor Ibrahim Al Naimi**, Undersecretary of the Ministry of Education and Higher Education in Qatar. The lectures in this session were delivered by **Dr. Chua Bee Leng**, Associate Dean, Professional Practice, Office of Teacher Education, National Institute of Education, Nanyang Technological University, Singapore; and **Dr. Abdulrahman Almedaries**, Director General of the UNESCO Regional Center for Quality and Excellence in Education, Saudi Arabia.

Dr. Chua Bee Leng gave a presentation titled **«Empowering teachers to be future-ready: Curriculum, Pedagogies and Technologies»**. She emphasized that education needs to be rethought, reimagined, and redesigned to equip our learners with the competencies and values required to thrive in the constantly changing world. With the changing role of education, she stressed that future-ready educators must be values-anchored, and possess the knowledge, skills, and competencies to develop every learner holistically to his or her fullest potential. Dr. Chua highlighted the elements of teacher education programs in Singapore that are values-based and evidence-informed. She illustrated that teacher education programs in Singapore provide student teachers with a broad repertoire of pedagogies to meet the diverse needs of their learners, and to harness technologies to enhance students' learning. She also highlighted the importance of meaningful partnerships with education institutions and industry partners that provide authentic interdisciplinary learning experiences for the student teachers to apply their knowledge to real life and to

embrace multi-perspective learning.

Dr. Abdulrahman Almedaries gave a presentation entitled **«The future of teacher quality: transformations for a changing future»**. In his presentation, he addressed the fundamental shifts in teacher quality standards in response to developments in a changing future that is difficult to predict. In order to chart the future transformations of teacher quality, the results of several studies conducted by the UNESCO Regional Center for Quality and Excellence in Education, during the period from 2015 to 2021, on the reality and future of teacher quality in Arab countries were reviewed. It was emphasized that the teacher will remain at the center of the quality of education now and in the future despite the major transformations resulting from the development of technology and the applications of artificial intelligence and their uses in education. Dr. Almedaries pointed out that making the teaching profession more attractive and ready for a changing future requires working on the shifts in the field of enhancing the quality of policies and systems related to teachers' work, to ensure creating innovative environments for teachers, enabling them to inspire their students, in order to enhance the quality of their learning.

At the end of the session, a general discussion took place among the attendees on the issues raised.

Workshops

Two simultaneous workshops were organized on the evening of the first day of the conference on two important topics: **«Developing digital educational resources»** and **«Teachers professional development to integrate digital technologies in education»**. The number of participants in these two workshops reached 68 participants, including educational specialists from the ministries of education in ABEGS Member States, keynote speakers, professors from the Bahrain Teachers College, as well as teachers and educational supervisors from the Ministry of Education in the Kingdom of Bahrain.

Workshop 1:
Developing digital educational resources

This workshop aimed to define quality standards for the selection and design of digital educational content. It also aimed to examine the reality of using digital learning resources in schools and discuss the challenges facing the development of digital content for educational curricula in ABEGS member states and ways to overcome them. The workshop participants were divided into four groups. The first group discussed the «quality standards for digital educational content», and the second group discussed «the advantages of using digital resources in teaching and learning». The third group discussed «the reality of employing digital learning resources in schools», and the fourth group discussed «the challenges of developing

digital content for curricula» in ABEGS Member States.

At the end of the workshop, each group presented a report on the results of its work and the recommendations it suggested. A general discussion took place on the findings and recommendations reached.

Workshop 2:

Teachers professional development to integrate digital technologies in education

This workshop aimed to identify the digital competencies needed to enable teachers to use digital technology in education. It also aimed to identify the challenges teachers face in the context of integrating digital technology in teaching and learning and ways to overcome them. The workshop examined the effectiveness of the current programs of teacher education and ways to develop them to keep up with the demands of integrating technology into education. It also aimed to identify appropriate alternatives to enhance the continuous professional development of teachers in the field of integrating technology in education.

The workshop participants were divided into four groups. The first group discussed the topic of «teachers' digital competencies», and the second group discussed the «challenges facing teachers in integrating digital technology in the teaching and learning process». The third group discussed the topic of «developing teacher education programs to enable them to employ technology in education», and finally, the fourth group discussed the «Professional development for in-service teachers in the field of integrating technology in education».

At the end of the workshop, each group presented a report on the results of its work and the recommendations it suggested. A general discussion took place on the findings and recommendations reached.

Conference Papers
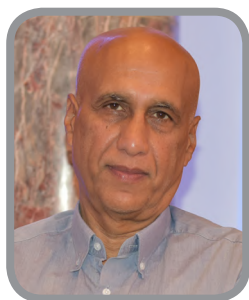
Education in Disruptive Times

Professor Sohail Inayatullah

UNESCO Chair in Futures Studies

Professor at Tamkang University, Taiwan,

Associate, Melbourne Business School, the University of Melbourne, Australia

Previous pandemics led to numerous changes in public health including advancements in sanitation, vaccinations, and antibiotics. Education however remained based on the factory narrative with students compliant and teachers as wardens. COVID-19 and others crisis will likely not just change health policy in the next fifty years, but it might also shift how we teach and learn: where, when, and how. Indeed, some have called this the COVID Big Bang.

PERSONAL CONTEXT

In the past three years, I have run nearly 100 futures thinking workshops assisting individuals, communities, businesses, nation-states, and international organizations develop transformative educational strategies for a post-COVID world. These include Eastern Shanghai Normal University; the National Development and Reform Commission, PRC; Brisbane Grammar School; Edmund Rice Education Australia; the Walter and Eliza Medical Institute, Melbourne; WHO; INTERPOL; the Government of Abu Dhabi; the Asian Development Bank; the Government of Brunei; the Malaysian Public Service; Sasin Business School, Thailand; the Government of Egypt; UNDP; UNESCAP; Edotco Asia; Globe.com; The Philippines Senate; to mention a few. For the purposes of this chapter, I focus on four projects and use the other as insights to reflect on the futures of education in disruptive times.

BRISBANE GRAMMAR SCHOOL

In January of 2020, Brisbane Grammar School, a leading private school in Australia asked me to run a one-day workshop on educational futures. I agreed and using the core ideas of Futures Studies we explored alternative futures with over 100 teachers, staff, and a few students. Several key ideas stood out on that day. First, they focused on the year 2030, as they did not wish to merely engage in strategies planning. Second, they all had a strong sense that something needed to change. They had clarity that the factory model of education needed to shift, and new model needed to replace it. For them the factory model as numerous others have commented was more about control than learning; more about creating obedient workers then knowledge workers that questioned and created knowledge; and while they agreed

with the discipline that was created in the model, they did not think that it created leaders who could navigate the uncertainties of the future.

In specific their diagnosis of the current system suggested five areas of change. I quote extensively from work we did with the school. These were:

1. A change in the nature and structure of curriculum.

    *   A move away from traditional structures of only having one set time and place for the delivery of curriculum

    *   Changes in subject offerings - a loss of the demarcation between different subjects and disciplines

    *   A move to more responsive, customized learning that is linked to real world tasks, skills and problem-solving

    *   A shift away from age-based structures for progression through year levels

2. The impact of technology on education and learning:

    *   Opportunities for remote and asynchronous learning – increased flexibility beyond the existing timetable structures

    *   The opportunity to use AI to free up teachers from administrative tasks and allow them to focus more on student relationships, customized interventions with students, and professional development of greater expertise

    *   Threats to the role and work of teachers if teachers are purely seen as 'holders and communicators of knowledge' (Google and the internet will be superior at this)

    *   Threats to the role of critical thinking if students develop an over-reliance on the use of technology, rather than a mastery of how to use it to enhance their understanding of issues

3. The rise of alternative providers of education including:

    *   Google University or other tech companies entering the education market

    *   The rise of global schools with strong brands and international schools entering the Australian market with online offerings

    *   Alternative schooling – the rise of non-qualified teachers in offering education alternatives to teach students

4. Social and economic changes including:

    *   A major economic downturn (recession or depression) that results in a loss of revenue and changed priorities (both for the school and members of the community)

    *   Changes to the definition of gender and community pressures to

provide coeducational experiences

Based on an assessment of the disruptions ahead and used futures that needed to change, participants concluded that five areas of current strength needed to be enhanced. These were:

1. Broad liberal education (with a focus on the adaptability of learners and the ability to apply a broad range of thinking skills to specific, contextualized problems).

2. Learning that emphasizes effective thinking (with a focus on learnings who possess a range of thinking skills instead of holders of knowledge).

3. Pedagogical excellence (and therefore pedagogical improvement and allocating time for the professional development of teachers).

4. Trans-disciplinary learning. And

5. Student well-being.

They anticipated that it would take five years to move in this direction and ten years to see some marked successes.

And then COVID-19 hit.

The school asked to meet again to refresh the vision, and examine their strategic priorities based the pandemic. We met virtually with school leaders. After reviewing the changing landscape – the scenarios – the strategies they had designed earlier accelerated.

School leaders intuitively understood that they needed to prepare not for THE future but for alternative futures. These used the opening scenarios but then transformed them to focus on their needs. This was a critical part of the process, to not get lost in our scenarios but to use the alternative futures to construct their own futures. I quote again from our earlier work.

1. MIGRATING GEESE?

They implications of future pandemics pushed them to imagine a future where creating a trusting and inclusive place would be paramount. Those at the back needed to be protected. Trust would differentiate us from others.» As the system veered into chaos, unity was everything – we are all on the same team. The metaphor that was suggested was that of the «migrating geese.» In this narrative, everyone is connected; people take turns at the front, helping to lead others. Those ahead help those who are tired or need support.

2. THE THERABAND – LET'S GET FLEXIBLE

Participants also suggested that flexibility would be foundational. This was the most important learning during the lockdown period. Creating learning that honours the sleep schedules of teenagers was considered crucial. Their

tag line was "let's get flexible" with the operating metaphor that of the Theraband. The School needed to keep the online and virtual environment along with the physical. A working hybrid teaching system was the goal.

3. WELLBEING

Participants as well suggested that the pandemic had highlighted the importance of wellbeing. Courses need to ask the question of how the wellbeing of students and staff would improve. It would be an opportunity to enhance learning, living and community.

The notion of wellbeing became critical in the larger discussions on school policy. Four dimensions were considered pivotal.

- The culture of wellbeing would be paramount
- Flexibility – develop the capacity for variation
- Collaboration – retain new capacities for collaboration and this process to build a sense of community
- Personalize learning – develop pathways to enhance this through engagement

However, personalization does not, nor should it, mean a loss of community. This was important, they wanted to ensure the narrative of «we are all in this together.»

4. CREATE A STORM WARNING

In the long run, participants argued that as the future is likely to remain challenging, the key is to be able to anticipate the difficulties ahead. Participants at Brisbane Grammar School did not focus on how to prevent this future, but how to create structural systems to anticipate and create best practices in this tough environment. The storm warning was suggested, as this was a way to prevent a flooding disaster. Finding zones of control, activities that students and staff could do would help minimize despair. They reasoned that if the School could not stop the turmoil ahead, they could prepare students, staff, and the School for this difficult future. They needed to be on top of a few key issues, including financial hardship and mental health issues of students and staff.

At the end of the futures workshop, three key lessons stood out. First was to review plans for increased construction and instead move budgets to hybrid teaching. Second was to move the digital innovation strategy to warp speed. And finally, and again most importantly focus on wellbeing for all stakeholders

The future thus was mapped, and new strategies were created. This was possible in that we moved from the future as prediction to shifting to alternative futures

where different policy decisions could be made, all the time demonstrating that planning needed to be visionary and iterative.

At the same time as we were working with this school, we were engaged with Edmund Rice Education Australia, a progressive Catholic education school system. We had met with them pre-COVID 19 and through a series of workshops began the conceptual shift toward student- centred education. Many of the similar concerns came up with stakeholders, however, Edmund Rice was far less concerned with immediate strategies but with the longer term paradigm change, how they could keep leading toward 2040. They saw futures thinking as part of their overall learning journey.

Critical in this journey was the inclusion of students.

With this group we developed scenarios based on their perspectives and not on the larger issue of COVID-19, as they were taking a longer-term view. They examined how to ensure students who graduated had fulfilling jobs and careers, that is, they wished to connect skills with work. But this begged the question, what might future work look like? Would students move to the portfolio career model? Would they have dozens of jobs over their career? As artificial intelligence continues to enter our day-to-day work life, will their still be jobs in the future? Using the Change Progression methods, four scenarios were created.

in the first scenario, the no change future, schools teach and train for the 1950s, for jobs that no longer exist (Brown, 2016). Students graduate, but then are ill prepared for the world work in front of them. Knowledge is neither useful nor adaptive. They do not have the emotional and intellectual skills required. Edmund Rice Education thus fails students, and indeed, themselves.

In the marginal change scenario, they do not try and change too much given the expected resistance from parents, teachers, and the media. They retain the factory model, but teach coding, bio-informatics, and use new platforms for peer to peer interaction, but testing and curriculum design is conducted by the educational hierarchy and confined by national boundaries. The best students gain leeway to experiment with classes from around the world but must do so on their own time. In this future, Edmund Rice helps the few succeed but by and large, the core mission of progressive education is lost.

In the adaptive change future, they imagined a future where all schools would be combined to make one national school. This would allow fluid mobility between schools for teachers, students, and principals. They could «move» physically or virtually. This would allow greater agility in curriculum change. Centralization paradoxically would allow greater mobility of students and teachers creating a far more flexible education system. This would prepare them for any future.

In the radical change future, they imagined students no longer being bound by

age, time, or space. They could learn from wherever, whenever, and whomever. The school system would then accredit their learnings through negotiated outcomes. Or they would develop national and global boards of accreditation. Furthermore, the forced marriage between the state or local authorities would be terminated, Education could then become a partnership between the school system and large information technology corporations such as, Google, Ali Baba, Amazon, or Apple. This scenario they argued would best prepare students for the future. Learning would occur anytime, anywhere, with anyone, all from the comfort of one›s living room.

FROM SCENARIOS TO DEPTH

But while scenarios explored alternatives, the critical part was where did the wish to go. We combined visioning with CLA or causal layered analysis to develop this. CLA has four levels of analysis: the litany or day to day concerns and headlines. The systems that create such headlines. The worldviews or deep culture underneath the system, and finally the core metaphor/myth that supports the entire edifice.

This part had two phases. In the first we developed the view of students. Their view is best represented as a shift toward the tailor-made suit i.e., education as personalized. Systemically this meant both a shift in the real and hidden curriculum – where and who they learn but also the power and pedagogy.

Table 1:

Initial CLA. Edmund Rice Education Australia

Catholic students in 2030 / 2040	Today	Preferred Future
Litany	Mandatory schooling Standardized, outdated, restricted	Flexible, unrestricted, global Everyone has access Relevant and adaptable
System	Segregated by status and gender. Restricted. Does not support individuality	Students control learning Increasing drive to learn Increasing access to education
Worldview	Recall and striving for results rather than knowledge	Knowledge is useful and adaptive
Metaphor	Generic suit	Tailor-made suit

As we role-played this future with students – to create embodied learning - they changed the narrative to the tinder of education, where they could swipe right or left to send the teacher or principal packing. For them, this was a full choice educational system, where they could learn from anywhere, anytime, anyone.

In response, principals now focused on structure – for many seeing the threat and for a few the opportunities in this change - argued for a moderated system. They - students and principals – then worked toward an integrative approach. In the negotiated future - that served the interests of all parties - learning would be on-line using AI applications, but there would be social hubs for face to face emotional and sport interaction. However, the spiritual purpose of life, of life as service to those less fortunate would not be lost sight of. Students would co-design courses with teachers and principals. Schools would reduce their allegiance to the national curriculum and bring in global partners.

In this integrated future, the school system would be designed for flexibility and creativity. Exams may remain, but they would be minor markers on a longer and deeper learning path. Teachers would work with students to develop their lifelong learning pathways - becoming not factory bosses, but life gurus, making the transition from «the lecturer» to the «knowledge facilitator.» Principals would ensure that all progressed, none were left behind, and for those students who needed far more structure, they would design for that. They would negotiate with global education providers for the best possible outcomes given funding.

Table 2:
Integrated CLA. Edmund Rice Education Australia

Edmund Rice	Student	Principa	Integrated 2030 / 2040
Litany	Students know their needs	Traditional teaching and learning is best	Holistic teaching and learning
System of education	Students design their education Fluid and Flexible	Principals and teachers design education for a changing world	Social hubs anchor virtual learning Teachers as navigators and life gurus
Worldviews	Student-led artificial intelligence enhanced education	Tradition-led education with some reforms	Technology plus place plus spiritual learning
Metaphors	Tinder of education	The authority	Life as learning. life as service

3 EAST SHANGHAI NORMAL UNIVERSITY

Education and methodology must be attuned to local conditions. In a project for principals, policy analysis and professors of education in the Shanghai region what struck us most was the localized understanding of narrative.

Table 3:
CLA East Shanghai Normal University

	Current reality	Transformed
Litany	Schools are the mainstay of education, with less family and social involvement	Home, school and community collaborate to educate people
Systemic	The school is regarded as the main or even the only place of education, where students receive standardized courses and learning	Deep integration of education with community and family; development of diversified educational resources; improving parents' parenting concepts and encouraging more parents to participate in education; education outsourcing
World view	Formal education, learning, and studying (Learning is formal)	Borderless education, breaking the boundaries of school education ("Education is life")
Metaphor	"Ivory tower"	"Disneyland Resort"

While for many in western nations, Disneyland would not be seen as a preferred future, for this group of experts it certainly was. The new metaphor moved away from the typical Ivory tower toward a narrative that was easier to reach. It was more inclusive as community, school and family could participate. Disneyland as well was everywhere and thus borderless. But while global, the focus on community and family ensured that learning was place based: localized.

The concluded their preferred future and looked at the issue from multiple perspectives – a CLA stakeholder analysis.

CLA STAKEHOLDER ANALYSIS

	Students	teachers	parents	community	government	Transformed 2040
Litany	Innovative talent for the future of society	Digitally literate teachers	Highly involved parents	A deeply integrated community with the school	Service-oriented government	Collaborative parenting between home, school and community
Systemic	Curriculum diversification; personalized learning; self-directed learning; borderless learning	Flexible teaching methods	One of the elements of education is involving in school work actively.	Provide the necessary human, financial and material resources	Policy support and policy driven	Deep integration of education with community and family; development of diversified educational resources; improving parenting concepts and encouraging more parents to participate in education; education outsourcing
World view	Education as growing	Teaching means two-way interaction	Family education is an integral part	Educational community	Education for sustainable development	Borderless learning; lifelong education
Metaphor	Happy children	Designer and engineer of amusement facilities	Parents with children	Rest area	Amusement park manager	Disneyland Resort

What is critical here is not just the categories they selected (students, teachers, parents, community, and government) but the wished in their strategy to ensure all stakeholders were included and had a voice in their visioning of the Disneyland Resort strategy.

BEYOND THE SCHOOL AND SCHOOL SYSTEMS

Education as the above example illustrates is of course not merely held in schools and school systems. Research institutes are part of the educational eco-system. They too are undergoing dramatic changes as the nature of the university, the production of knowledge and research shifts.

We worked with a large medical and science institute to develop their scenarios, preferred and alternative futures.

For them, the main issue was the used future, that is, practices that continue though they no longer are effective and efficient. While for schooling, it is the factory model, for science-based research institutes, there are multiple used futures. First, measures used to evaluate and compare output - i.e. grant funding and publications – are no longer fit for purpose. The work is not linked to the industry, clinicians nor startups. The metaphor of the used future remains the Ivory tower. This no longer works as there is need to connect with citizens, corporations, other nations, to mention three stakeholders. This is the shift from competition in a research institute to a cooperative model. In the institute we worked with after exploring what did not

work, articulating scenarios of possible futures, they developed the core vision of they could move from the ivory tower to a connected world.

This vision had the following key components:

1. Becoming is a globally renowned institute where creative blue-sky research is secure and long-term focused on public benefit. As a unique, bubbling, boutique and world leading medical research centre, it provides a curated blend of discovery science and translational impact. The institute is driving an end solution and real outcomes: discovery–translations–cure. Research is focused, productive, cutting edge and highly relevant – it delivers improvements in health highly regarded by all. The nature, size, scope and balance of research projects are fashioned to fit in with the changing norms of the society being served. New fields of research, or new paradigms are continually conceived and developed. The speed of translation has increased meaning both reduced time and increased success rate for basic discoveries to have clinical impact. The institute is a go to place for solutions for a range of health problems. Solution spaces range from 'molecules to patients'. The Institute is a place where 'diseases go to die'. The institute's people make life better for people who are suffering – making the unhealthy, healthy.

2. The Institute is constantly adapting and is highly collaborative. It is an inclusive workplace, intellectually vibrant, dynamic and well-funded. Highly collaborative research/teamwork is driven primarily by curiosity – work is exciting and relevant. WEHI is networked, horizontal, collegial, diverse (people and science), inclusive/equitable (gender and culture) and welcoming. It is a melting pot of best minds who are unapologetically curious, collaborative, and willing to share. Research is performed by flexible multidisciplinary teams that are adaptively assembled around big questions. Exceptionally talented individuals are free to spread around the institute, rather than being 'owned' by a particular lab, and thus can collaborate freely to achieve discovery. There is also less pressure to produce results. Teams focus on contemporary big problems using best technology and best partners. The working environment is a continuation of what has always worked at the institute – where some of the brightest, quirky people, work together in an intimate community. There is happiness and kindness in the way people live and do research.

3. The Institute is a high-performance environment recognised for contributions to the international and national society. Community trusts and values the institute. In fact, the community is one of the institute›s primary partners and funders. Moreover, science is recognised as a key part of the life of national society – just like sport and the arts – it is integrated with law, politics, ethics, and governance. Medical research has partnered with environmental research and other areas of science and has led to broad understanding of these connections for human health improvement. The Institute helps deal

with the health problems created by climate out of control and flow through society, such as new and dangerous viral infections.

4. The institute is financially independent. As it is ahead of the game, it is an attractive place to invest and source innovations. Government, philanthropy, and translational partners pour in with funding. Freedom from grant writing frees time and minds to focus on doing science. Resources are dedicated to the big issues. There is consumer and industry integration. The institute is very well connected, both internally and internationally. The only thing limiting the Institutes people's science is their interests and the problems they seek to solve. Research positively impacts on improved health at a new level. The Institute provides cost effective treatments to the ones in need. In a nutshell, the Institute not only leads science, but transform how science is done."

As a way to integrate this vision, the group used CLA.

Table 5:
CLA. Research Institute

CLA	Current	Transformed
Litany	Lacking diversity A way to go towards gender equity	Dispersed and dynamic but with a strong sense of intra-institute community
System	Seen as an ivory tower Seen as having more support than other	Major changes in diversity at all levels – has broad impact on all aspects of the institute
Worldview	Hierarchical and nation-state based.	globally recognized and connected
Myth/Metaphor	Ivory Tower	Lighthouse/Beacon of hope

Note, however. that is new metaphor also is somewhat removed and does not speak to the structure of the Institute. To further their narrative, the group thus created this internal CLA.

Table 6:

Internal CLA. Research Institute

CLA	Current	Transformed
Litany	Hierarchical, labs based	Teams based – dynamic, agile, cooperative, individuals delivering healthy consumables
System	Inflexible structure, grant based model of funding	Functional/demand/topic/purpose driven research teams Nimble structure Different KPIs Stable, predictable funding decisions controlled by the institute Flexible funding supporting functional needs Endowment incomes Targeted and strategic grant applications Longer funding cycles leading to greater stability
Worldview		International research effort Co-badged internationally
Myth/Metaphor	100-pound gorilla	The Hive

This CLA dramatically shows the change i.e., a far more cooperative, adaptable and agile institute. They intended the new narrative to be the hive, instead of the current 100-pound gorilla. Other organizations too wish to shift their story to one that is far more connected. For example, with a large global knowledge provider of spiritual education, they moved their story from the lotus flower that has yet to bloom to luminous mycelium network. This network suggests that they need to connect not just at the level of visible meetings and conferences but at the deeper level – in this case connecting with nature, spirit, and each other to grow the eco-sphere, their alternative educational system. They are also in the process of changing their litany from number of alternative schools that practice global spiritual inclusive ecological thinking to youth who become global leaders.

◆◈ Conclusion

Using these case studies and dozens more since COVID-19, there are numerous key factors.

First, the modernist factory system, competitive, surveillance, exclusive based is being challenged on all on fronts. Primary is the issue of diversity and inclusion, a practice that the factory whitewashes. In one major development Bank we have worked with they argued that the key used future was patriarchy. This was at the internal and external structure. Women needed to feel save in their workplaces. And loans needed to not go just to nations but to females, businesses, starts-ups and others. As the head of the research Institute commented: we need to move away from a world of white labs, white coats, white buildings, run by white males. More broadly, diversity and inclusion were critical components in moving forward.

The insight is not novel but the contradictions of self and other through structure have become more prevalent. In a conversation with the former president of Interpol, he suggested that his country in the beginning had one of the best responses to COVID-19. However, their blind spot were the migrant communities. They were not protected by the government and subsequently COVID-19 spread there. They had talked of inclusion, but they missed a vital component of who they were. Thus, the UN message of we are all in this together is critical. This of course leads to the response of: Are we? The structural inequities in the world system (core-periphery, terms of trade, access to health and education) ensure that until we have a narrative that resolves the fault lines of local, national and planetary, COVID will keep on emerging, over and over. In this regard, the new narrative of the PM of New Zealand is instructive: we are a team of 6 million. We have yet to develop the narrative capacity to speak of a team of eight billion. Certainly, pandemics create the threat of mass extinction as climate change does, but we remain acting in a world as if boundaries can stop viruses. Narrative, we suggest can. They can be destructive (just a flu) or transformative. Education as well, it can create Talibanization or Planetary civilization.

Second, every group has challenged the office place and its silos. Whether school systems, the Malaysian Public Service, large telecom companies over and over, the complaints remain; we cannot do well in a rapidly changing world where we are constrained by old structure. We need to become far more agile. One international science-based organization suggested that they were like a large blind crippled elephant. Slow top heavy. Instead to meet the needs of changing citizens they needed to become like an octopus – the brains everywhere, fluid, fast, agile and deeply connected to its environment.

Third, COVID-19 has clearly showed that the environment has changed and will continue to change. To align with this changing environment, connectivity is critical. For schools, this is ensuring that all stakeholders especially students are consulted as well as partners outside the school system. For science-based research institutes, it is moving away from traditional funding models – the state -toward peer to peer, toward public science. The risks in this approach are many, but the need for a science that is trusted by the many is crucial to counter trends toward against science. In this science, the shift from the Ivory Tower to the Lighthouse is promising, as is the shift from the 100-pound gorilla to the hive.

Fourth, creating the hive and similar flat structures and processes was challenging when the physical office was paramount. COVID-19 has pushed educational systems into legitimizing hybrid spaces of learning and doing. What was a luxury or an afterthought before has now become the norm. While the demand for some face to face remains it is hard to imagine a future where technology – zoom and other platform – are merely circus side shows.

Fifth, in our own case, as futurists, we moved our considerable work to an online space, the metafutureschool. There we have several self-paced courses that through video, text, and questioning provide the framework. We use in conjunction with interactive presentations and action learning. For the learner, this is knowledge in one›s living room. For the teacher, this means virtual workshops are more focused and interactive. Instead of a 9-hour workshop, they are two hours.

Another aspect of hybridity is that it allows the learning to disappear as appropriate. There is no need to ask teachers if they can be excused, they can merely keep video and sound off. Freedom of choice is enhanced. One can be present or not be present.

Our focus in these engagements however is not just a learning of text but ensuring that the text leads to action learning. Thus, after the interactive workshop and methods sessions, we recommend working group experiment i.e., develop a project around the topic. For example, in Malaysia and Abu Dhabi this has led to work in developing national safe tourism Strategies. This is more than crime-free and more ensuring that tourists feel that a hospital is nearby, that the destination will take care of you.

Sixth, this leads to the last main insight. Pandemic foresight preparedness has not just been about having individuals who can scan for risks but ensuring there is public

trust. With high schools we have worked with this became their core focus. Ensuring that students, teachers, and the community trusted the school. This has meant a transparent communication strategy, ensuring that all stakeholders understand their COVID-19 response, and most importantly that all will be taken care of. The school moves thus from a place of learning to a site of trust building, of community creation. In a world of conspiracy, trust between teachers and learners as well as within peer-to-peer learning communities is critical.

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Unboxing Digital Transformation: Reshaping Education for Better Futures

Professor Mark Brown

National Institute for Digital Learning

Dublin City University, Irland

◆◆ Abstract

The COVID-19 crisis was a watershed moment for new models of digital education. It has raised important questions about the future of the education system. Accordingly, this paper explores the question, what might the next future look like? How can we redesign our schools, educational institutions, and the education system for a better future? What role can new digital solutions play in helping to shape our preferred future? Set against these questions, we briefly reflect on key lessons from the past before unboxing digital learning to reveal major future trends and the related challenges and opportunities facing today's educators. While predicting the future is impossible, there is a crucial need for bigger-picture thinking to understand how to harness the potential of digital transformation. Accordingly, the paper adopts a wide-angle, multifocal lens drawing on personal insights and critical analysis of several competing perspectives to help to zoom in and out to reimagine possible, probable, and preferred futures. Such helicopter thinking is needed to rethink and reshape a more fit-for-purpose 21st Century education system that meets the needs of learners, future citizens, and changing societies. It covers much ground and helps to illustrate the complexity of the new and emerging digital education ecosystem, which is simultaneously converging, getting larger in scale, more open as well as closed, and growing in diversity. Inherent tensions and the entangled nature of this ecosystem demonstrate how digital transformation is part of a wider social practice. Thus, this wide-ranging discussion of the future of the education system attempts to balance the language of opportunity with the need for deeper criticality. Throughout the analysis is the spirit of hope and the crucial role educators play in designing more innovative learning cultures that help challenge traditional mindsets and practices to reshape education for better futures for all.

Keywords: COVID-19, digital education, digital transformation, future trends, possible futures

◆◆ Introduction

The COVID-19 pandemic had the potential to be a game-changer for the future of digital education. However, the long and rich history of online distance learning

did not feature prominently in our response to the pandemic (Shearer, 2021). There is even a risk of undoing what is already known and losing sight of the longer-term horizon as we get caught up in the current wave of publications with a COVID-19 focus. This paper seeks to address this concern by unboxing the main trends in digital learning with an eye on the future but anchored in lessons from history. The term unboxing is adopted as a metaphor for digital education as we continually seek to look inside the box for new technology solutions to solve the problems of education. The metaphor is borrowed from the YouTube craze where millions of people take delight watching a video of someone unwrapping a gift and the quick thrill of finding out what is inside the box. However, the thrill does not usually last very long and often is followed by disappointment. Thus, the phenomenon of unboxing has similarities to the hype, hope and disappointment cycle that characterises the history of educational technology (Gouseti, 2010). In unboxing digital learning, the intention is to connect the past with the present and shape the future direction of research, theory and practice.

The paper begins by taking a closer look at what is really inside the box. It starts with the challenge of defining digital education and the concept of digital transformation. Having established that both terms are difficult to define, the nature of digital transformation is illustrated through several metaphors. The second part of the paper then looks at what we might pull out of the digital box in the future. It explores five macro-level trends in digital education:

- Convergence
- Personalization
- Openness
- Interactivity
- Diversification

The final section considers some of the challenges and opportunities facing educators and policy makers in realising the potential of digital education. A critical multifocal perspective is adopted throughout the discussion, providing a lens through which to zoom in and out from different angles and competing viewpoints. The basic assumption is that digital education is framed by a collection of boxes of many different colours and shapes with competing images of the future. It follows that a discussion of major trends is more than just a speculative exercise of future storytelling as it requires a deeper critical analysis of different drivers and change forces. From this perspective, digital transformation needs to be anchored in broader social imaginaries: our ideas about digital education needs to be shaped by our ideas about what constitutes a good citizen and a thriving learning society.

What is really inside the box?

The first challenge is to define digital education. This is not an easy task as "what used to be a simple binary of face-to-face or online has now become so extremely

complex that our ability to understand each other is impaired" (Irvine, 2020, p. 42). The reality is that digital education is often spoken about in the context of many overlapping terms such as e-learning, blended learning, online learning, distance learning, flipped learning, hybrid learning, to name a few. As Johnson (2021) writes in a recent Canadian report:

> "While the statement that more online, hybrid, and technology-supported learning are expected seems straightforward enough, one only needs to ask what another means when they use these terms to reveal widespread differences in how these commonly used terms are defined" (p. 2).

Singh and Thurman (2019), for example, have identified 46 definitions of online learning alone in a major literature review. For the purpose of this paper, 'digital education' is understood as a broad umbrella concept which refers to three main types of study modes:

- Blended learning
- Hybrid learning
- Online learning

The above categories are taken from a comprehensive global analysis of emerging quality standards, practices and supports for digital education recently published by the OECD (Staring, et al., 2022). While globally there is no single accepted definition of digital education, these three broad categories are based on differences in time and location of instruction:

- *Online learning* refers to a type of education where all direct teaching occurs online, either synchronously or asynchronously, or in combination.
- *Hybrid learning* refers to a type of education where direct teaching occurs using a mix of online and on-campus instruction, with the online components taking place synchronously, asynchronously, or in combination.
- *Blended learning* refers to a type of education where all direct teaching takes place in-person and is blended with and enhanced by online materials and activities and asynchronous interactions.

While blended learning was originally defined by Garrison and Kanuka (2004) as a general term referring to the blending of online and face-to-face teaching, the above categories recognise more contemporary developments, including the emergence of hybrid and hyflex models of education requiring a more nuanced distinction. With a broad conception of digital education to anchor the remainder of this paper, attention now turns to better understanding the nature of digital transformation.

While digital transformation is widely accepted as a major change force shaping society, it remains difficult to define. Unfortunately, digital transformation is often couched in the language of technological determinism – a perspective which attributes far too much significance to the impact of technology itself rather than the

role of people and culture (Selwyn, 2016). On the other hand, social determinism, which is usually associated with the claim that 'technology is just a tool' and it is how people use the tool that is most important in determining related educational outcomes, is equally problematic; after all, no tool is neutral (Brown, et al. 2019). The key point is that digital transformation is entangled in a complex constellation of change forces that need to be understood from a deeper socio-cultural perspective. According to Grajek and Reintz (2019), digital transformation is:

> A series of deep and coordinated culture, workforce, and technology shifts that enable new educational and operating models and transform an institution's operations, strategic directions, and value proposition.

Thus, digital transformation is not about technology per se. It involves the way in which new digital technology meshes with people and culture. Notably, Westerman (cited in Bozkurt & Sharma, 2022, p. ii) claims that:

> When digital transformation is done right, it can be like a caterpillar turning into a butterfly, but when done wrong, all you have is a really fast caterpillar.

This metaphor suggests that digital transformation is far more problematic than most educators and policy makers appreciate. Arguably, digital transformation is more like the cross-pollinating flight of a butterfly rather than the direct path of a bullet (adapted from Cuban 2018). This image of a butterfly conjectures up the idea of digital transformation being a journey without a final destination. While there is considerable merit thinking about digital transformation as a journey, the danger is that if you do not know where you want to end up then how will you get there? This question raises the importance of having an underlying educational vision that shapes the changes we wish to make through the potential of digital technologies. Put simply, what type of education system do we seek to achieve through digital transformation?

These questions rarely feature in discussions about the digital transformation of education. We know from history that major transformations of society such as the Industrial Revolution of the 19th Century are rarely benign as there are usually winners and losers. This point underscores the need for educational leaders to drive the digital transformation of the education system if the outcome we seek is a more socially inclusive education for all. We also know from the history of educational technology that there is an underlying tension between efforts to tame as opposed to transform pedagogy through new digital technologies. The truth is that out of the box thinking is rare and we risk false clarity in thinking that digital technology alone will transform the education system. The crucial point for policy makers is that digital transformation should be in the service of big ideas, not as a big idea in itself (Brown, 2023).

What might we pull from the box?

The discussion now shifts attention to five macro-level trends in the evolution

and future development of digital education. We look inside the box in thinking about how new digital technology can be used to reimagine the education system for more inclusive digital societies with better futures for all.

Convergence – digital leakage

The trend of Convergence has already been noted in the above discussion concerning the definition of digital education. The shift away from a simple face-to-face/online binary has muddied the waters (Irvine (2020), with Gourlay (2021) arguing that ‹…the notion of 'virtual learning' is a flawed one (p. 57). In explaining the embodied and increasingly entangled relationship we have with technology from a socio-material perspective, she argues that learning is always in person, even when studying alone at home in front of a screen (Gourlay, 2021). This point reminds us that digital education is more complex than most people appreciate and not a single monolith as it encompasses many different forms.
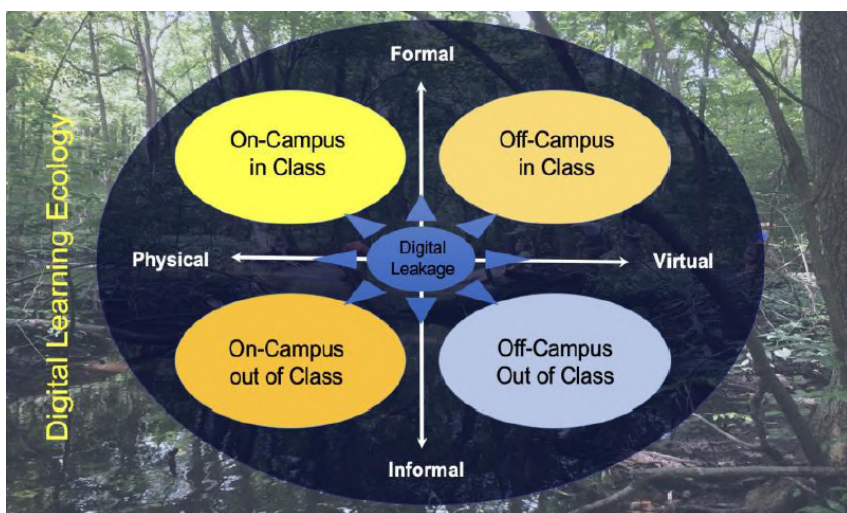

Figure 1. The Digital Learning Ecology (Brown, 2015)

Another way to think about Convergence is to consider the places and spaces where learning can occur. As Figure 1 illustrates, in today's new digital learning ecology, learners can now learn on-campus (on-site) in formal classroom settings, on-campus (on-site) within informal out-of-class contexts, off-campus (off-site) within formal in-class settings, and off-campus (off-site) within informal beyond class contexts (Brown, 2015). This representative of the digital learning ecology suggests increasing leakage in the future across these four quadrants of learning.

Massification – supersizing learning

A second important trend is Massification or the development of massive pedagogy. This term refers to education being delivered or experienced at a mass scale (Brown, 2016). Typically, the MOOC movement is viewed as the catalyst of mass online participation, but large social and personal learning networks existed well before the MOOC. While the level of attention given to the MOOC by popular media may have faded in recent years, the phenomenon continues to evolve and challenge traditional models of instruction, including those designed specifically for online distance education. In particular, the MOOC challenges assumptions about optimal class size and the teacher's ability to manage large cohorts of learners.

Massification is not without well-documented problems in terms of low completion rates, but most critiques fail to recognise or encapsulate the many faces of MOOCs. It is naïve to think that all MOOCs are the same. Additionally, the MOOC movement has challenged our traditional conception of course completion (Maartje, et al., 2017) and given new insights into online learning barriers (Rabin, 2020). Independent of the claimed under-evidenced benefits or exaggerated promises, MOOCs should no longer be viewed as lingering on the fringes of education. As Shah (2021) reports:

> "Ten years ago, over 300k learners were taking the 3 free Stanford courses that kicked off the modern MOOC movement. I was one of those learners. Now, a decade later, MOOCs have reached 220 million learners, excluding China. In 2021, providers launched over 3100 courses and 500 microcredentials. In 2021, 40M new learners signed up for at least one MOOC, compared to 60M (fuelled by the pandemic) in 2020".

During the early period of the COVID-19 crisis, MOOCs attracted almost 500 million visits from learners worldwide in the 30 days before June 2020, up 2.5 times from January 2020 (HolonIQ, 2020). While the MOOC movement is associated with the increasing unbundling, disaggregation, globalisation, marketisation and monetisation of higher education (Morris, et al., 2020), not all online learning platforms or partnerships are created equal. Thus, sweeping generalisations of the MOOC are unhelpful. Moreover, the reality is that the MOOC is now a permanent feature of the global education landscape, especially as demand continues to grow for flexible models of continuous professional development.

Current micro-credentialing initiatives designed to help increase participation in education and enhance employability are evidence of how massification is redefining old recognition and credential models (Brown, et al., 2021). The reshaping of the traditional credential ecology is likely to continue with the growing unbundling movement. Bozkurt, Akgün-Özbek, and Zawacki-Richter (2017, p. 131) describe the gradual mainstreaming of MOOCs in terms of a shift from "…disruptive to a sustaining innovation". While the MOOC phenomenon is here to stay, a new area of future growth and innovation may be in schooling education. A recent literature review suggests increasing use of MOOC platforms by teachers and younger learners

(Koutsakas, et al., 2020). The key point is that learning at scale through new online pathways and platforms will continue to be an important trend. It follows that educational policymakers would be wise to engage more with the MOOC movement as new private-public partnerships challenge traditional business models.

Openness – opening the curriculum

The Openness movement is another major trend set to continue to play a role in shaping the future of digital education. The concept of Openness has many dimensions and sits within a broad spectrum of open initiatives (Conole & Brown, 2018). Weller et al. (2018) suggest several principles associated with open practices, including: freedom to reuse, open access, free cost, easy use, digital/networked content, social/community-based approaches, ethical arguments for openness, and openness as an efficient model. Consistent with these principles, the following statement from the 2012 Paris OER Declaration is often cited as one of the touchstone definitions:

> "Open Educational Resources (OER) are teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions" (UNESCO, 2012).

While open education is not a new term and has attracted research interest for over 30 years (Zawacki-Richter, et al., 2020), it continues to evolve and covers a range of philosophies and practices. According to Zawacki-Richter, et al. (2020), 'Throughout history, openness has been given many meanings: access, flexibility, equity, collaboration, agency, democratisation, social justice, transparency, and removing barriers' (p. 321). They argue that openness is a living idea that continues to evolve and has become associated with many more meanings and interpretations. At an ideological level, openness is associated with promoting equity and social justice and the assumption that education through the internet can help to fix social disparities (Almeida, 2017). From this perspective, OER can act as a 'social transformer' (Knox, 2013).

In the future, the integration of Artificial Intelligence (AI) and educational data mining algorithms could help to increase and enhance the use of OER for teaching, learning and assessment. In presenting a future vision, Tlili et al. (2020) discuss the potential of these solutions in addressing the problem of locating and selecting the most appropriate OERs among the many thousands, if not millions, that are published and that are available online, and trusting them.

At the macro-level, Conole and Brown (2018) argue that openness provides a real opportunity to reduce costs, enhance quality and address increasing global demand for education. On the other hand, the openness movement is imbued in the contested terrain of globalisation, fast capitalism and neo-liberalism (Brown, 2016). According to Brown (2016), the discourse of openness simultaneously supports

the democratising of learning at the same time as a more laisse fare Silicon Valley narrative. Thus, openness could mean virtually anything and is potentially a two-headed monster. Importantly, the growth of the openness movement should not become a substitute for "… a well-funded public education system" (Bates 2015; cited in Almeida, 2017, p.5).

Interactivity – learning by design

Interactivity is well-established as essential for active and meaningful learning. Interaction has long been a defining and critical component of the learning process. In the context of online distance education, Moore (1989) was the first to propose three types of interaction that Anderson (2003) later encapsulated in the Interaction Equivalency Theorem. This seminal theorem continues to define the core parameters of interactivity and how digital education can be used to create rich knowledge building communities. At a basic level, Anderson (2003) describes three common types or dyads of interaction involving learners: learner-learner; learner-teacher; learner-content. Over the years, several other dimensions of interactivity have been added to the original model, including teacher-teacher, teacher-content, and learner-administrator.

However, frequency of interaction by itself does not equate to better quality learning experiences. There are important qualitative differences in the value and quality of interaction. The key point is that the mere presence of new digital technology does little to increase online interactivity or support more fundamental changes to the formal spaces within which people learn (Brown, 2015).

While new digital technologies offer affordances to border cross and expand conceptions of interactivity, how this happens in practice depends on the way teachers and learners choose to interact. Importantly, teachers' pedagogical decisions and how students decide to engage in different learning experiences can lead to different outcomes through the same technology. It is abundantly clear that teachers' pre-existing pedagogical beliefs play a crucial role in mediating practice (Tondeur, can Brank & Ertmer, 2017; Lawrence & Tar, 2018; Fernndez-Batanero, et al., 2020). Therefore, whether an experience is active or passive within and across these theoretical domains of interactivity is strongly dependent on the pedagogy being applied, learners' goals, motivations and prior experiences, and the wider organisational culture.

Historically, the study of interaction in online and distance education contexts has tended to focus on asynchronous communication, which offers a flexible pace for learning (Siemens, et al., 2015). The term asynchronous learning refers to delayed communication, not live or happening at the same time (Irvine, 2020). Prior to the COVID-19 crisis, this form of interactivity was essentially the foundation of most online learning. Another feature of asynchronous learning is interactivity with the content. While content can take many different forms, from static to dynamic resources, the emergence of rich media, specifically video, offers an exciting area

of development. The COVID-19 crisis appears to have accelerated demand for video content, and there is an increasing body of research seeking to understand how best to deploy this technology in the service of active and meaningful learning (West, et al., 2017; Chorianopoulos, 2018; Mayer, Fiorella & Stull, 2020).

In contrast to the wealth of asynchronous literature, before the COVID-19 crisis, there were relatively few dedicated resources on the application of synchronous interactivity in digital learning environments. A rsystematic review of two decades (1995 to 2014) of research on synchronous online learning confirms the relative dearth of literature as no research articles were found to be published before the year 2000 (Martin, et al., 2017). The pivot to Emergency Remote Teaching appears to have resulted in a significant uptake of synchronous interaction as regularly scheduled face-to-face classes were replaced by live online ones. There is now renewed interest in how to facilitate and promote deep discussions using synchronous online learning tools. While still an emerging research area, a recent systematic literature review conducted by Raes et al. (2020) identifies many important gaps in the literature on what they call synchronous hybrid learning. The authors conclude that:

> "...existing research suggests cautious optimism about synchronous hybrid learning which creates a more flexible, engaging learning environment compared to fully online or fully on-site instruction" (Raes et al., 2020, p. 269).

Significantly, new wearable technologies are rapidly emerging for more immersive synchronous learning made possible by developments in Augmented Reality (AR), Extended Reality (XR) and Mixed Reality (MR). Such developments challenge the conceptual definition of what constitutes an interactive learning environment (Hamilton, et al., 2021) and offer "...the possibility for learners to have first-hand experiences that would not be possible in the real world" (Natale, et al., 2020, p. 2006). Accordingly, these technologies are likely to be one of the most exciting new trends in online learning over the next 1-5 years.

Yet, Raes et al. (2020) also identify several pedagogical and technological challenges. More sophisticated technology does not always mesh well with the classroom. There are also quality issues to consider and a renewed focus on Universal Design for Learning (UDL). While new developments in the design of immersive synchronous tools and online platforms potentially create more opportunities for authentic, engaging, and seamless forms of interactivity, they do not guarantee active and meaningful learning. Understanding of how to design and lead rich discussions using these platforms will be paramount towards promoting meaningful live interaction. Such interactions will continue to rely heavily on educators› skill, knowledge, and pedagogical competence to design quality conversations where learners engage in deep knowledge construction.

Diversification – Learning at the edge

Diversification of digital tools and technologies and the associated growth of

demand for online learning is another increasing trend likely to continue. There is an ever-increasing variety and diversity of online learning solutions available to today's educators. On the other hand, the Learning Management System (LMS) continues to play a core role at most higher education institutions, despite predictions of its death (Farrelly, Costello & Donlon, 2020). This role is unlikely to be replaced in the foreseeable future, but as the diversity of digital tools has grown, the digital learning environment is increasingly viewed as a complex ecosystem of interconnected technologies. As this ecosystem becomes more complex, more specialist and distributed knowledge is needed. No one individual or educational institution can keep up to date with the pace and diversity of new developments without being more widely connected. Ecologically speaking, rather than focusing primarily on core proprietary technology, embracing this greater diversity is crucial to building resilience and adaptability to future shocks or more gradual changes to the learning environment (Weller & Anderson, 2013). The lesson from this line of theorising is that diversity at the edge provides valuable breeding grounds for cultivating learning innovation and reimagination.

The opportunity to explore these overlapping boundaries and develop specialist knowledge across the ecosystem is partly supported by open-source applications with strong global communities. It is noteworthy how many digital learning technologies are free and openly available, as Bower and Torrington (2020) illustrate in a typology of tools. They identify and map 226 free web-based tools arranged into 40 types and 15 clusters. Building on this latest dataset and the list of open tools and technologies published in 2015 (Bower, 2015), the analysis provides an interesting gauge on trends in digital learning over the last five years. The authors extrapolate the following implications:

> "Firstly, we would expect that smaller tools without a significant differentiation or business case will either discontinue, marketize, or be taken over. Secondly, it would appear that larger players in the online technology ecosystem will continue to crowd-out smaller players, as their suites of tools become more ubiquitous and integrate greater functionality. We can expect that the built-in intelligence of tools will continue to increase as the machine learning and learning analytics fields become more mature" (Bower & Torrington, 2020, p. 14).

The trend towards larger players squeezing out smaller innovators is not an entirely new phenomenon, and this could be accelerated by growing concerns about data protection and cybersecurity. However, influenced by the rewilding movement, which seeks to retain ecological diversity in the natural environment, there is a small yet growing call by some educators for the restoration of a less managed ecosystem. Rewilding in an educational technology context is an endeavour to ensure that a more diverse ecosystem can develop so that all can have space or a habitat. As Weller (2022) writes, the aim is to develop a more sustainable, diverse system, which better reflects the broader environment outside of formal education. This more organic bottom-up approach to digital learning advocates greater local pedagogic

experimentation by adopting small scale, low impact tools that make it as easy as possible to innovate without becoming an institution-wide technology.

In the future, arguably, the interoperability between digital tool is probably more important than the number of tools available for teaching, learning and assessment. As the digital ecosystem becomes more complex, even more strategic partnerships are likely to emerge between institutions and industry suppliers to provide a more integrated digital learning experience. Some of the larger MOOC platforms are already changing their business models to integrate with other IT systems to better support micro-learning experiences. Over the next few years, several new digital learning platforms are likely to emerge with affordances so rich and compelling it will be hard to ignore their potential. The above wearable and immersive learning technologies are likely to fall into this category along with new developments in Artificial Intelligence (Cox, 2021) and Virtual Laboratories (Reeves & Crippen, 2021). However, as Zawacki-Richter et al. (2019) ask in their systematic literature review of research on Artificial Intelligence in education: where are the educators? Educators must have a strong voice in making and shaping the increasingly diverse digital learning ecosystem.

What is sitting outside the box?

While the digital ecosystem has become more diverse, the growth of BigTech is another significant trend that largely sits outside the box. In many countries, online education delivery often "…involves public universities partnering with, or using the services of, private companies" (Morris, et al., 2020, p. 3). The COVID-19 crisis appears to have accelerated this trend, with growing concerns about the automation of education (Selwyn, Hillman, Bergviken Rensfeldt, et al., 2021), the rise of platform pedagogies (Perrotta, et al., 2021), the surrender of control to surveillance technology (Selwyn, O'Neil, Smith, et al., 2021) and narratives of policing and punishment (Logan, 2021). These are not trivial matters.

The final out of the box issue to raise is an increasing recognition of the unsustainability and environmental costs of digital education. While the idea of developing low carbon higher education systems is not new, with Roy et al. (2008) claiming that distance learning involves 87% less energy than full-time campus-based courses, Facer and Selwyn (2021) argue, the environmental impacts of EdTech require renewed focus and urgent attention. On the one hand, they suggest that online learning may be an environmental solution to help lower emissions of students who might otherwise travel to classes and reduce on-campus power consumption. In response to serious economic 'constraint' or climate 'collapse' scenarios, online learning may become the default mode to enable more efficient access to schooling and higher education (Educause, 2020). On the other hand, Facer and Selwyn (2021) point out:

> "At present, however, ambitions for the massively increased global use of online, data-driven and AI technologies in education are

dependent on unsustainable levels of energy and natural resource consumption" (p. 15).

They note that this includes the "dirty" aspects of digital hardware production, the vast energy requirements of data-processing centres and the increasing problem of e-waste. According to Strubell et al. (2019; cited in Facer & Selwyn, 2021, p. 15), "...a typical machine learning model emits the equivalent of around 300,000 kg of carbon dioxide - comparable to the lifetime carbon emissions of five cars". While rising ecological instability does not feature strongly in current discussions about digital education, a deeper analysis of the industry's underbelly reveals an 'explosive' environmental footprint. As Selwyn (2021) writes, depletion of natural resources, energy curtailments and further planetary degradation may over the next decade "... put paid to established 'abundant' forms of digital technology use" (p. 496). While we need to maintain a hopeful outlook where digital education is part of the solution, we need to anticipate 'unknowable futures' (Selwyn, 2021).

◆◆ Conclusion

The unboxing of digital education has shown that it has many different shapes, and five macro-level trends are likely to influence future developments. The trend analysis underscores the point that digital education must be understood in the context of wider societal change forces. While the digital education ecosystem is simultaneously converging, getting larger in scale, more open and closed, and is growing in diversity, a problem remains in terms of access to the Internet. The reality is that if students do not have access to the Internet, then digital education in whatever format is problematic and unlikely to advance the goals of equity, inclusion, and social justice. At the risk of sounding technocentric, the analysis also reveals that the choice of specific tools and platforms for digital education matters. Not all platforms confer the same pedagogical affordances. Also, there is a crucial tension between large propriety systems and smaller tools operating on the edge of innovation.

Importantly, well-developed theoretical frameworks provide a strong foundation for applying new digital technologies for effective teaching, learning and assessment. Nevertheless, the success of digital education depends heavily on educators. With an increasing demand for online learning in response to the COVID-19 crisis, there is a need for more impactful professional development opportunities that challenge teachers' pre-existing pedagogical beliefs and promote a deeper understanding of new digital technologies—for better and worse. Ultimately, teachers' values, mindsets and underlying educational philosophies are key to unboxing the transformative potential of new digital technologies. They influence how teachers respond to new learning opportunities as they navigate through competing change agenda. While the mediating influence of teachers' beliefs is crucial, we cannot underestimate other structural barriers arising from traditional learning cultures and wider socio-cultural constraints. If we are to challenge these barriers, then educators need to go beyond the quick thrill of unboxing the latest technology to reshape possible, probable, and preferred futures.

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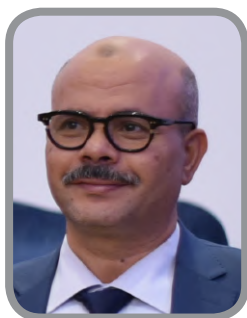
Innovative Digital Solutions to Re-engineer Education in the Arab World

Prof. Hamdy Abdelaziz

Dean, School of e-Education, Hamdan Bin Mohammed Smart University, UAE

◆◆ Abstract

The coronavirus (COVID-19) pandemic is a stressful and challenging test for education systems around the world. With hundreds of millions of learners and hundreds of thousands of teachers forced to stay at home during the pandemic, education policy makers have thought of innovative alternatives to sustain education in times of crisis, and ensure offering educational opportunities for all learners at different educational levels. With adopting various methods to combat the pandemic by different countries, the coronavirus crisis is an opportunity for policy makers and educational thinkers to exchange experiences and cooperate in mitigating the effects of the crisis by offering initiatives and exchanging experiences for innovation in the field of education in general, and the field of digital education in particular.

This lecture presents some innovative digital solutions to re-engineer education in the Arab world. The lecture adopts the methodology of looking into the future by developing scenarios that can be tested and generalized. Six scenarios, based on the principle of influence and Orbit Shifting Digital Transformation, will be presented to re-engineer the dimensions, components, elements and processes of the education systems in the Arab world. The lecture presents innovative digital solutions to re-engineer the main elements of the educational system: objectives, content, technology, assessment, educational leadership, and educational research in the Arab world. In order to benefit from the thoughts presented in this lecture, the lecturer suggests relying on the model of abandonment, experiment, and adoption as a model of orbital impact to achieve innovative digital transformation in education.

Curriculum: Content, Resources, and Design

Dr. Anthony J. Magana

Oxford Research Encyclopedia Scholar, CEO Magana Education, Marzano Research Associate, USA

◆◆ Executive Summary

It is beyond refutation that the COVID-19 pandemic has changed our world in ways both substantive and unforeseen. A recent analysis by UNESCO suggests that the disruptions to schooling caused by the pandemic have obliterated twenty years of academic attainment globally, with the most impoverished students suffering catastrophically (Dorn et al., 2020). If left unaddressed, the pandemic-fueled learning loss will undermine human welfare and global economic development at a never-before-seen scale.

However, there is cause for optimism. Breakthrough innovations synthesized from five decades of research on Digital Age learning offer the direction, guidance, and support structures educational systems need to reimagine modern schooling. Compounding evidence suggests that large gains in student learning and achievement are possible when modern digital tools are fully leveraged to enhance highly reliable instructional and learning strategies. The realization of these gains necessitates reimagining and rejuvenating educational curricula, resources, and design.

In 1995, pioneering educational researcher Dr. Sonny Magana created and served as the principal of a symbiotic model for building collective student efficacy that he called Cyber School. Dr. Magana's Cyber School was the subject of a longitudinal research study which first surfaced enduring principles of effective online schooling. These findings were further investigated and codified into the T3 Framework for Innovation. The T3 Framework increments learning into three hierarchical domains: Translational Learning (T1), Transformational Learning (T2), and Transcendent Learning (T3). Compounding, peer-reviewed evidence suggests that implementing the strategies in the T3 Framework can double student learning productivity and achievement. It is highly likely, therefore, that learning systems that innovate existing curricula by implementing the T3 Framework methodology will increase the impact of digital learning tools to unlock students' limitless capacities for learning and contribution, and better prepare today's students for tomorrow's learning challenges.

The 5 Critical Commitments

This vision document synthesizes the findings from Dr. Magana's research efforts

into 5 Critical Commitments that educational leaders can make to maintain learning continuity and accelerate learning in an era of change. The 5 critical commitments guide the process of shifting curriculum content, resources, and design to not just address the pandemic-fueled learning loss but make significant strides to reverse it. The 5 critical commitments will further help learning systems maintain learning continuity when faced with future learning disruptions.

The 5 Critical Commitments for Modern Schooling That Works

1. Critical Commitment 1: Provide universal and equitable access to digital production devices, broadband connectivity, and cyber security.

2. Critical Commitment 2: Build and sustain a common language for a 21st century pedagogy.

3. Critical Commitment 3: Build and sustain capacity for Meta-Learning.

4. Critical Commitment 4: Develop future-focused curriculum pathways that are driven by students' needs, interests, and passions.

5. Critical Commitment 5: Provide multiple opportunities for students to demonstrate mastery.

Critical Commitment 1: Provide universal and equitable access to digital production devices, broadband connectivity, and cyber security.

In the modern era, learning systems must universally and equitably equip students with modern digital learning and production tools, broadband connectivity, and cyber security. In 1995, this commitment was a novelty; today it is imperative.

Of the many stated purposes of organized educational systems, one that might meet with general agreement is this: To ensure students achieve ample academic proficiency by mastering current learning content and consolidate the requisite knowledge, skills, and aptitudes to successfully master future learning challenges. Digital Age learners will simply need to gain more knowledge and master more skills than any previous generation (Schaeffer, Dykstra, Irvine, Pigozzi, & Torres, 2000).

Education systems have responded in kind, as evidenced by the explosion of computers, Internet technologies, and one-to-one laptop programs in K–12 education (Downes & Bishop, 2015; Snyder & Dillow, 2012). However, the preponderance of evidence suggests that the effect of digital tools on student learning is downright dismal (Cheung & Slavin, 2011; Cuban, Kirkpatrick, & Peck, 2001; NEA, 2008; Richtel, 2011).

Disrupting Low-Impact Technology Use

The impact of educational technology tools on student achievement has not matched the potential. Hattie (2017) analyzed over 10,200 studies exploring various

aspects of computer technology on student achievement in a recent meta-analysis, determining that the average impact of computers on student achievement is a surprisingly low effect size of ES = .34. By way of comparison, an effect size of ES = .40 represents the average amount of learning productivity gained over one academic year. Effect sizes above ES = .40 are clearly desirable, while effect sizes falling short of this average indicator are not. The meager effect size of technology on student learning is well below Hattie's (2008) "Zone of Desired Effects."

When powerful and expensive technologies are used to simply digitize elements of the dominant "Tell and Practice" model of instruction—that is, when teachers tell their students what knowledge is, and what knowledge is important to memorize—it becomes more obvious why one can expect such a low impact on student learning. Sadly, digitizing the dominant "Tell and Practice" model of instruction represents the most common way that technologies are used in our classrooms, rendering many learning systems, particularly those serving our neediest populations of learners, digitally rich, yet innovatively poor.

Critical Commitment 2: Build and sustain a common language for a 21st century pedagogy.

Clearly a new pedagogical language is needed that better addresses students' innate capacity for deeper learning and transferring their knowledge for the betterment of humanity. Synthesized from four decades of compounding research, the T3 Framework offers a common language for a 21st century pedagogy. Evidence suggests that very large gains in student achievement are possible when digital tools are leveraged to enhance highly reliable instructional and learning strategies. The T3 Framework for Innovation increments the use of technology in the realm of teaching and learning into three hierarchical domains: T1) Translational, T2) Transformational, and T3) Transcendent (Magana, 2017).

T1 Translational Technology Use

The T1 Translational technology domain reflects the most common ways that digital tools are used in schools. Translating tasks from an analog into a digital form adds value in terms of increasing efficiency, accuracy, and time savings. The two elements in this domain are T1.1) Automation, in which administrative teaching and learning tasks are automated, and T1.2) Consumption, in which teachers and students access and consume digital content knowledge and information from online sources or other electronic media.

There is strong alignment between the T1 Translational technology domain and tasks associated with accessing and acquiring surface-level knowledge. A plethora of digital tools, apps, and online environments can serve to enhance students' interactions with surface-knowledge acquisition. T1 Translational technology use is not trivial use, but neither should it be considered an ultimate stopping point; however, far too many educational systems limit their uses of technology to this entry- level domain.
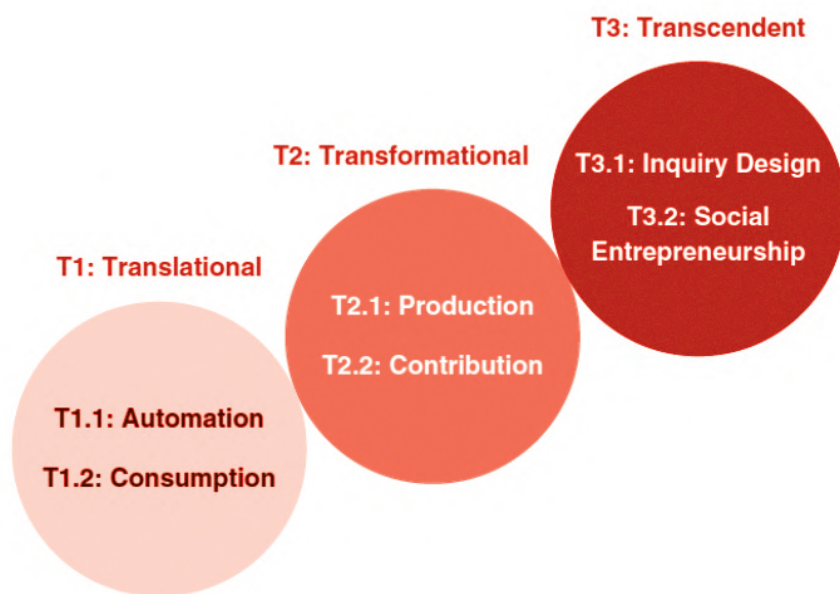
Figure 1: The T3 Framework for Educational Innovation
(Source: Disruptive Classroom Technologies, Magana, 2017).

T2 Transformational Technology Use

The elements and strategies in the T2 Transformational technology domain enact significant changes in both learning tasks and the students performing those tasks. "Transformational technology use in education reflects the intentional application of digital technologies to unleash students' learning expertise, in ways not possible without technology, to achieve ever higher levels of knowledge and mastery" (Magana, 2017, p. 39).

The two elements of the T2 Transformational stage of technology use are: T2.1) Production and T2.2) Contribution. The strategies in the T2.1) Production element guide students to use technologies to produce mastery goals (Visible Learning ES = .68) that help them monitor, track, and visualize their effort (VL ES = .77), progress, and emotions during their learning journeys. Students are also guided toward producing digital representations of their declarative and procedural knowledge to make their thinking and learning pathways explicit to themselves and their teachers (VL ES = 1.29). By using digital tools in these ways, students are afforded powerful forms of self-generated feedback (VL ES = .70) that serve to enhance their abilities to evaluate, reflect on, and self-regulate their cognition, emotions, and learning behaviors as they progress toward their mastery goals (VL ES = .75). In combination, these learning strategies serve to enhance students' abilities to appraise their own learning growth through self-reporting (VL ES = 1.33), to enhance their sense of self-

efficacy (VL ES = .92), and to integrate their prior knowledge and abilities to master current learning (VL ES = .94)—all critically important influences of Visible Learning.

Moreover, the digital thinking and learning products they produce serve as scaffolds to help students more agilely store and retrieve knowledge into and from longer-term memory by developing metacognitive strategies (VL ES = .60). Over time, effectively executing the strategies also helps students become more skilled at considering, compiling, and archiving specific strategies that help them express and represent both surface- and deeper-level understanding of new content knowledge.

The strategies in the T2.2) Contribution element scaffold students' uses of digital tools to design, create, share, and curate digital tutorials with the express purpose of teaching others what they know. This is inherently transformational, because in effect, they have transformed from consumers who simply recite content knowledge to intentional knowledge contributors. More specifically, they become interdependent contributive learners, who produce archivable and accessible digital tutorials that help them deeply consolidate knowledge by making their thinking and learning visible to their teachers and peers. These strategies allow students to transfer their knowledge into unique and useful contexts, thus demonstrating, modeling, and communicating their deeper understanding of content knowledge (VL ES = .86).

The strategies in the T2 Transformational technology domain also guide students to comment on each other's learning tutorials and to capture rich, student-led learning discussions focused on mastering content knowledge (VL ES = .82). Such cloud-based digital learning discussions can be easily archived and accessed at any time in a child's learning life, giving students the extraordinary ability to contributively engage in cumulative reviews with their own thinking and learning products, available at their fingertips (VL ES = 1.20).

Student-generated contribution products also afford learners the opportunity to continuously explore the similarities and differences between their previously held understandings and newly gained conceptions of content knowledge. T2 Transformational technology use elucidates how digital tools can accelerate students' mastery of current content knowledge—not just by becoming their own teachers, but by helping every student become his or her own learning sensei, continuously endeavoring to master knowledge content and how he or she learns best at the surface, deep, and knowledge-transfer phases of learning. This is the harbinger of wisdom generation.

The strategies in the T2 Transformational domain of the T3 Framework were observed to have an effect size of ES = 1.6. (Haystead & Magana, 2013; Haystead & Marzano, 2009, 2010; Magana, 2013; 2016; 2019). Such a large effect size is equivalent to an additional four years of academic achievement in a single year.

T3 Transcendent Technology Use

The findings which underpin the strategies in the T2 Transformational technology use domain are more descriptive and provide guidance regarding

preparing students to master current learning. However, the strategies in the T3 Transcendent technology use domain are designed to prepare students to master future learning. While this is equally important, it is much more predictive in nature.

At the dawning of this digital era, it is no longer sufficient to ask students what they want to be when they grow up, as the jobs to which they will aspire may likely not yet exist. A far more important question to pose to today's learners is this: "What wicked problem matters to you, and what are you going to do about it?" Wicked problems are tantalizing because they are ill-structured, highly complex, intractable, multifaceted, and as yet unresolved (Rittel & Webber, 1973). Affording students opportunities to wrestle with wicked problems provides students authentic and meaningful contexts for transferring their newly acquired and consolidated knowledge toward improving their world for the betterment of humanity (VL ES = .86).

Transcendent technology use begins with student passion and concludes with students engaging in designing original lines of inquiry, transferring newly acquired and consolidated knowledge, and applying social entrepreneurship strategies to solve wicked problems that matter to them. These learning strategies are intrinsically motivating for students (VL ES = .69). Thus, the strategies in the T3 Transcendent technology use domain push past the boundaries of prior experiences and expectations for education systems.

The two elements of T3 Transcendent technology use are T3.1) Inquiry Design and T3.2) Social Entrepreneurship. The strategies in the T3.1) Inquiry Design element scaffold students' uses of digital tools to identify, investigate, hypothesize, and design resolutions to wicked problems that matter to them. The strategies in the T3.2) Social Entrepreneurship element guide students to intentionally and contextually wield new and emerging software coding environments and communications platforms to iteratively generate and scale more robust digital solutions to the wicked problems that matter to them.

Moreover, doing so will empower students to become leaders for action who make a significant contribution to their local and extended communities (Magana, Henly, Murphy, Rayl, & Travis, 1996). This represents an entirely new domain of strategies that are possible only when students mindfully wield digital and cloud-based production technologies. Arguably, we are only just beginning to scratch the surface of what's possible when students' limitless passions and purposes are catalyzed in educational settings.

Critical Commitment 3: Build and sustain capacity for Meta-Learning.

The students at Cyber School became "Meta-learners" who learned how to learn, unlearn, and relearn. These students shifted their focus from just memorizing old knowledge towards building the 7 habits associated with Meta-Learning. In 1995 these Meta-Learning habits seemed futuristic; today they are imperative.

What is Meta-Learning?

Meta-learning is a term I coined to describe the innate human capacity to learn how to optimize how one learns, unlearns, and relearns as needed and informed by ever-changing circumstances. Meta-learning treats the process of learning how to optimize one's learning as a fundamental literacy. Taken at face value, a reasonable claim can be made that, like other literacies, meta-learning can be attained, developed, and refined with time, practice, and ample feedback (Magana, 2022).

Many are familiar with the concept of metacognition, which is the process of thinking deeply and reflectively about how one thinks or how one has come to know what one knows. If metacognition is thinking deeply about one's thinking, then meta-learning is learning deeply about one's learning. It is logical then to consider meta-learning as the process of thinking and reflecting deeply about how one learns, to harness this higher-level consciousness to control the optimization of one's learning—to experience learning in the zone. Finding one's learning zone is a function of developing and mastering seven specific meta-learning habits. Doing so will empower one in the process of becoming a highly agile learner who consistently achieves optimum learning performance.

The 7 Meta-Learning Habits

In an era of such rapid change, learning systems would benefit from adding a layer of meta-learning to any existing or prospective curricula. Such a shift would add significant depth and reflection for learners to better understand not only the content they are learning, but the processes by which they come to acquire, consolidate, and transfer conceptual understanding and meaning.

The 7 Meta-Learning Habits
1. Meta-learners commit to personal mastery goals.
2. Meta-learners monitor and regulate their emotions, effort, and progress.
3. Meta-learners leverage past experiences as building blocks for current and future learning.
4. Meta-learners are highly social, active participants in contributive learning communities.
5. Meta-learners use conceptual frameworks to contextualize new learning content.
6. Meta-learners connect, categorize, and reflect upon new learning content.
7. Meta-learners are the source of their own meta-feedback loops.

(Source: Learning in the Zone: The 7 Habits of Meta-Learners Magana, 2022)

These 7 meta-learning habits are also strongly supported in the extant research literature about what works in education (Bransford et al. 2000; Bruner 1968; Hattie 2008; 2012; Magana and Marzano 2014; Marzano 2008; Marzano and Pickering 2012). In my research work, I wanted to find out whether these seven meta-learning strategies were correlated with finding one's optimal learning zone and attaining effortless mastery. Recent breakthrough findings strongly suggest that developing these seven strategies are indeed correlated with an acceleration of learning performance (Haystead and Magana 2013; Magana and Marzano 2014; Magana 2016; 2017; 2019).

These findings provide a road map to help learners develop the meta-learning habits that unlock their limitless capacity for self-reflection, self-regulation, self-determinism, and self-actualization. Such capacities will better prepare students not only for current learning challenges but for the uncertain learning challenges they will encounter in the future.

Critical Commitment 4: Develop future-focused curriculum pathways for all students that are driven by students' needs, interests, and passions.

Cyber School faculty and students co-developed Personal Growth Plans (PGPs) for every student based upon their academic needs, their interests, and their passion for improving their world. Such a focus helped connect students' cognition and emotions to find their passions and purposes. Rather than asking students what job they aspired to get, students were asked, "What wicked problem matters to you, and what are you going to do to solve it?" This helped students realize that their educational attainment was less an end than a means to improving their world for the betterment of humanity. In 1995, the developing personalized learning pathways for all students was groundbreaking; today it is imperative.

Shifting to A Future-Focused Curriculum

There is very little known about what is left to discover. However, many curriculum pathways simply privilege the surface acquisition of old knowledge. Sadly, such rigid adherence to the memorization of old knowledge leaves little time to nurture student wonder and imagination. By only following existing learning pathways, students are robbed of the opportunity to learn how to forge their own learning pathways into knowledge domains in which very little is known. Learning systems must provide students ample opportunities to apply their deeply acquired knowledge as a tool to solve wicked problems that matter to them.

The meaning of the word curriculum can be traced from the Latin word currere, which means to run. The Romans further developed it into a new word, curriculum, to describe the racecourse on which ancient Romans would drive their horse drawn chariots around and around, at death-defying speeds. In the 19th century, the modern use of this word appeared to describe a course of learning—a pathway of knowledge acquisition that students followed to attain that knowledge. Today students, not unlike the Roman counterparts, follow these pre-determined learning progressions,

exercising their abilities to memorize and retrieve knowledge that is already known. A curriculum that privileges the temporary acquisition of surface knowledge will not prepare students to think critically, innovatively, or creatively.

Today's students will inherit a world with more volatility, uncertainty, chaos, and ambiguity than any prior generation. Education systems can no longer expect to prepare students for such a rapidly changing future by following curriculum content, resources, and designs of past centuries. Instead, considerable effort must be made to design more future-focused curriculum pathways. Life in the modern era demands that students learn to co-develop curriculum pathways that combine their passions and purposes. This will provide ample opportunities for students to learn how to become cartographers of new knowledge landscapes.

Critical Commitment 5: Provide students multiple opportunities to demonstrate mastery.

Cyber School offered students flexible scheduling while providing multiple avenues and opportunities for students to demonstrate content mastery. Students responded enthusiastically to this highly responsive approach and redoubled their commitments to realizing their academic goals. Students reacted to teachers' heightened expectation by demonstrating heightened responsibility and interdependence. In 1995, flexible scheduling and mastery learning seemed radical; today it is imperative.

Student Generated Assessments

Much has come to light about the benefits of formative assessment as feedback for improving learning (Marzano, 2007). A powerful formative assessment approach includes student-generated assessments (Magana & Marzano, 2014). Student-generated assessments originate from within students' own sets of cognitive constructs and can take multiple forms. Shifting the tasks of producing authentic formative assessment representations from teachers to students is illustrative of transformational technology use, because this allows students the opportunities to become the designers of multiple means of representing what they know, what they can do, and how they think about what they know and are able to do (Meyer et al., 2014).

Previous generations of learners typically kept scrapbooks filled with reports, writing samples, photographs, or other learning artifacts tucked away in dusty boxes. Using free cloud-based hosting technologies, today's learners can readily archive and access digital "process-folios" containing multimedia knowledge products created over the course of their lifetimes. By constantly reviewing those products, students establish and realize their own personal goals for achieving mastery.

Students can curate authentic online "learning museums," complete with exhibits cataloguing their digital knowledge products. This process of reviewing

their knowledge products will prompt students to naturally engage in reflection, metacognition, and knowledge revision by comparing the similarities and differences between older and newer exhibits of their knowledge. By deliberately conducting error analyses of their knowledge exhibitions, learners can continually update and revise their knowledge products, and through the process of iteration, generate entirely new ways of representing what they know and are able to do.

Moreover, students can share, reflect on, and comment on each other's digital learning museums, making elaborations of new learning pathways explicit to themselves and others. Imagine a class where every student is fully invested in the success of every other student—both socially and academically. This reflects the concept of interdependent contingency: the development of a classroom where every individual recognizes his or her own interdependence and connectedness to everyone else in the classroom system (Magana & Marzano, 2014).

Realizing the T3 Framework Effect

Educational systems would benefit from a road map with crystal-clear goals, and just enough mileposts to allow creativity to flourish over prescriptive, lock-step compliance. This is perhaps one of the most valuable attributes of the T3 Framework for Innovation in education: It is a precise, yet tempered guide, designed to both stimulate the realization and determine the impact of collective teacher efficacy, through agile and adaptive implementation of the elements and strategies in the framework (VL ES = 1.57).

Compounding evidence suggests that implementing the strategies in the T3 Framework with reasonable fidelity will likely increase the impact of digital technologies to unlock students' limitless capacities for self-regulation, self-determination, and contributive learning (Haystead & Magana, 2013; Haystead & Marzano, 2009, 2010; Magana, 2016, 2017). A reasonable inference can be made that such capacities will serve to better prepare today's students, not only for current learning challenges but for the future learning challenges they will encounter. Educators and leaders can use the T3 Framework to build rather than rely upon pedagogies and curricula of the past. Doing so not only will disrupt the historic pattern of low technology use in education, but will serve to unlock students' potentials, passions, and purposes for limitless learning.

Reading this document is the first step for educational leaders, teachers, and stakeholders to make the 5 Critical Commitments necessary to ensure learning continuity in an era of rapid change. The second step is to share this vision document with colleagues and stimulate discussion. The third step is to galvanize action. Learning systems can use the 5 critical commitments to establish meaningful growth goals, track systemic progress towards these goals, and evaluate yearly growth and learning impact. Those willing to take these steps will lead schools forward in such a way that minimizes future learning disruptions, builds limitless learning capacity, and reverses the negative impact of learning loss.

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Future Curriculum: Requirements and Challenges

Dr. Saleh Salem Al-Busaidi

Dean, College of Education, Sultan Qaboos University, Oman

◆◆ Abstract

Humanity is going through great twists that it has never seen before. There is a large and accelerating transition to the age of information, digitization and the Fourth Industrial Revolution. We are also witnessing economic and social crises due to climate changes and the spread of epidemics, and a decline in morals and authentic societal values. Since education plays a major role in changing societies and achieving development, the current situation requires us to reconsider our educational curricula in terms of content and delivery (teaching methods). The selection of learning content is one of the most important, and even the most difficult, decisions at the same time. The decision to choose the content depends on our view of the source of that content, whether it is the student (with respect to his skills, knowledge, interests and desires), or the curriculum specialist (with his basic knowledge about the subject matter and skills), or the community (with the skills it needs for the labor market). Based on our view of what the learning content should be, the curriculum is defined and developed. The content of each subject is usually dealt with in isolation and separately from other subjects.

During the past decades, there have been many proposed models for curriculum design, but the eternal question remains: What should be learned? This question has continued for decades. However, with the complexity of life, and the need to look at the world in a different way, characterized by an understanding of the intertwined and complex relationships between the various sciences, the question becomes: is it possible to continue dealing with learning content in the traditional way? This paper will highlight the requirements of the future curriculum. The lecturer will give an overview of the future challenges and the change they require in the curriculum. The paper will stress the importance of departing from the old template in defining learning content. In addition to paying attention to the content, the paper will address the methods of teaching and learning, which is an essential element in the success of any educational curriculum. In order to ensure that the content is implemented in the right way, we must pay attention to the training of teachers and students. For example, teachers must be trained on active learning methods, problem-based learning and other modern teaching methods that focus on the student and make him interactive and positive.

Empowering Teachers to be Future-ready: Curriculum, Pedagogies and Technologies

Dr Chua Bee Leng

National Institute of Education, Nanyang Technological University, Singapore

◆◆ Abstract

In recent years, the world has been subjected to many disruptions, including the COVID19 pandemic and geopolitical tensions. These challenges have also accelerated technological advancement and change, allowing for greater global connectivity. Today's world is fast-paced, and there is an eminent need to prepare our next generation for the uncertain future. Education needs to be rethought, reimagined, and redesigned to equip our learners with the competencies and values required to thrive in the constantly changing world. With the changing role of education, future-ready educators have to be values-anchored, and possess the knowledge, skills, and competencies to develop every learner holistically to his or her fullest potential. They are architects of learning environments, facilitators of learning, shapers of character, creators of knowledge and agents of educational change. This paper will articulate the competencies we need to develop in our students to prepare them for the future. In addition, it will share teacher education enablers such as coherent and rigorous programmes that are values-based and evidence-informed. This will provide student teachers with a broad repertoire of pedagogies to meet the diverse needs of their learners, and to harness technologies to enhance students' learning. In addition, this paper iterates the importance of meaningful partnerships with education institutions and industry partners that provide authentic interdisciplinary learning experiences for the student teachers to apply their knowledge to real life and embrace multi-perspective learning.

◆◆ Introduction

The COVID-19 pandemic has exacerbated challenges on climate change, social divide, and accessibility to education. At the same time, it has also accelerated technological advancement and change, allowing for minimum learning disruption and greater global connectivity. However, the pervasive use of online learning has widened the digital divide among learners, as those without access to technology and the internet have faced challenges in participating in remote education. In addition, the isolation, fear of contracting the virus, and loss of jobs and income have led to anxiety and stress, impacting mental well-being globally.

As the world resumes normalcy, it is timely for us as educators and academics to revisit some key questions. Key questions include 1) social divide vs equity in education, 2) digital accessibility vs digital divide 3) technology vs pedagogy in the classroom, 4) meaningful use of technology vs just in time use of technology, 5) teacher agency vs student agency, 6) teachers' need to change mindset vs want to change mindset, 7) students learning for grades vs learning for life and 8) top-down support by school management vs bottom-up initiatives by teachers.

Moving forward, these crises, challenges, and technological developments have also created opportunities for educators to reflect on our education system and how we prepare our learners. As we reflect on the above key questions, it is timely for us to re-imagine, re-envision, and re-design education to prepare future-ready learners. To prepare future-ready learners, we have to develop future-ready teachers.

Future-ready learners

As we move into the 22nd century, how do we prepare our learners to be future-ready? What are the skills, values, dispositions, and knowledge bases for them to thrive in the 22nd century economy? According to World Economic Forum (2020), the top 15 skills of 2025 include analytical thinking and innovation, complex problem-solving, resilience, emotional intelligence, technology use, persuasion, and negotiation. The Organisation for Economic Co-operation and Development (OECD) Learning Compass 2030 is a dynamic learning framework for education›s future that students can use to empower themselves to create the future they want and to navigate and strengthen their well-being (OECD, n.d). The framework comprises of core foundations, knowledge, skills, attitudes and values, transformative competencies as its key components, and a cycle of anticipation, action, and reflection (OECD, n,d). In Singapore, critical core skills were also identified for lifelong learning. These include the skillsets required for thinking critically, such as problem-solving, sense-making, creative thinking, and transdisciplinary thinking. It is also pivotal to equip individuals with the ability to interact with others, such as collaboration and communication skills. In addition, to stay relevant in today's knowledge economy, it is essential to develop a global perspective, be adaptable and agile, and acquire digital fluency skills (SkillsFuture, n.d).

For students in schools, the Singapore 21st Century Competencies framework identifies a set of core values and competencies that we need to equip our students to thrive in a fast-paced world (MOE, n.d). The core values of respect, responsibility, resilience, integrity, care, and harmony are at the centre of the framework which guides us to provide a holistic education to our students. They are the foundation of Singapore's shared national and societal values and shape our students' beliefs, attitudes, and actions (MOE, n.d). The framework also articulates a set of social-emotional competencies necessary for our students to develop positive and healthy identities, regulate their emotions, establish positive relationships with others, make responsible decisions, serve and contribute to others and the community (MOE, n.d). The identified social-emotional competencies are self-awareness, self-management,

responsible decision-making, social awareness, and relationship management. In addition, we nurture critical and inventive thinking skills, communication, collaboration, and information skills, civic literacy, global awareness, and cross-cultural skills in our students. Anchored in core values and with the developed social-emotional competencies and skillsets, we aim to nurture our students to be confident, self-directed learners, concerned citizens, and active contributors to society (MOE, n.d).

Future-ready Educators

To prepare future-ready learners, we need to develop future-ready educators. National Institute of Education (NIE)›s initial teacher preparation is a value-based teacher education programme to develop future-ready teachers. Our 21st teacher education model (TE21 V3SK) is strongly anchored on a three-pronged set of values: commitment to the learner, the profession, and the community (NIE, 2022). Under commitment to the learner, we believe that all children can learn, value diversity, and aim to develop every child holistically (NIE, 2022). Under commitment to the profession, student teachers strive for continuous learning, aim for high standards, act with ethical conviction and uphold their teacher personhood (NIE, 2022). Under commitment to the community, student teachers are engaged with national and global issues, build collaborations and partnerships with parents and industries for students' engagement and contribute to society (NIE, 2022).

The skills and knowledge bases needed for a 21st century teaching professional are wrapped around the central pillar of the three sets of values. The dynamic interaction of skills and knowledge will help future-ready teachers build competencies and the ability to make connections across different fields. The list of skills includes critical and metacognitive skills, creative and innovative skills, digital literacy, research literacy, and self-regulation skills (NIE, 2022). The knowledge bases include multicultural literacy, global and environmental awareness, health, and mental well-being (NIE, 2022). All these are necessary to develop student teachers' competencies, a set of professional standards, and goals required to meet the complex demands of the future teaching landscape. Specifically, the competencies are classified into three dimensions: professional practice, professional growth and development, and leadership and agency (NIE, 2022). Under the TE21 model, there is a clear listing of the desired roles of our student teachers. Student teachers are shapers of character, creators of knowledge, facilitators of learning, architects of learning environment, and agents of educational change (NIE, 2022). These desired roles help student teachers see the relevance of their learning to the broader national ecosystem and nurture them to be responsive to national needs and global trends. Local and global challenges such as climate change and geopolitical tensions suggest we need to "educate the next generation about environmental and sustainability issues, as well as global political and citizenry issues" (Ng, 2020, p.7). As such, student teachers need to be trained to facilitate discussions on environmental conservation, climate change, and issues on citizenry, race, religion, bullying and cyber well-being. With the exacerbating local and global issues, we hope our student teachers can adopt a 'want

to change mindset' to create new value in education for sustainable development and are community-builders who are self-directed and lifelong learners (NIE, 2022).

The above-mentioned TE21 V3SK model underpins NIE›s programmes and courses› design, delivery, and enhancement. In addition, we transform teacher education in NIE through the five 'Ps' - deepening Professionalism, strengthening Practice, broadening Pedagogies, and developing Perspectives (Liu, 2022). The Professional Practice and Inquiry (PPI) course is an example of a core course in NIE that develops our student teachers› five Ps right at the start of their initial teacher preparation programme.

Professional Practice and Inquiry (PPI) Course

The PPI course is a "meta" course in NIE to nurture student teachers with a clear teacher identity, who are able to reflect upon their roles as educators, inquire into their practices, and draw on theories and research to refine their pedagogical approaches aimed at improving the engagement and learning of their students. This course comprises of weekly one-hour lectures across 10 weeks. During the course, student teachers are taught on topics such as (1) understanding the "why", "what", and "how" of the PPI, (2) formulating and articulating their teaching philosophy, (3) understanding the fundamentals of good teaching and learning (e.g., subject mastery, understanding students and how they learn), and sharing their conceptions of it (4) integrating and aggregating their learning across the different courses and practicum, (5) articulating the connection between theory and practice, (6) understanding the inquiry process, and (7) using relevant data to substantiate and inform their inquiry. Under this initiative, student teachers learn both for and from teaching. This facilitates reflection and inquiry across all the content curricula and practicum experience (Liu, Koh & Chua, 2017). Student teachers are engaged in an intentional and continuous cycle of evidence-based inquiry, action, improvement, and refinement (Dana & Yendol-Hoppey, 2008; Liu et al., 2017).

As part of the PPI course, student teachers are required to build their digital portfolio. The digital portfolio is an electronic collection of learning artifacts relating to the student teachers' professional development and achievements (Gray, 2008). It is used as a vehicle to (1) facilitate the articulation of their teaching philosophy, (2) share their conception of what teaching and learning entails, (3) integrate and aggregate their learning across NIE courses, and practicum (4) make visible their inquiry into their practice especially during their Focused Conversations (FCs) and pre- and post-practicum conferences with their school mentors and NIE Supervisor (NIES) respectively. The school mentors assist in integrating the student teachers into the school culture and environment and guide them by advising, observing, and providing feedback on strengths and areas of improvement for their classroom practice. They also evaluate the progress and performance of the student teachers during their practicum experience. In addition, they also facilitated the FCs, which are planned and structured time for student teachers to share, reflect and inquire about their classroom practices. The role of the NIES is that of a supervisor, counsellor,

evaluator, and liaison person as he/she guides the student teachers in classroom teaching and management, lesson planning and enactment, and consolidation of learning. As an advocate for the student teachers, the NIES also counsels them on their professional growth and progress.

The varying roles of the school mentors and NIES are part of the PPI structure to provide opportunities for student teachers to share and discuss their teaching experiences, engage in purposeful reflection, and nurture habits of inquiry into their teaching. The course provides student teachers with opportunities for constant planning, monitoring, and reviewing of their classroom practices with the structure afforded within the practicum experience. The PPI course and the digital portfolio are seamlessly weaved into the student teachers' practicum experience. The digital portfolio is a learning portfolio for the student teachers when they are in NIE, showcase portfolio during their practicum attachment, and teaching portfolio when they enter the teaching fraternity as beginning teachers. It is evident that through the PPI initiative, student teachers assumed ownership of their learning and professional development, which prepares them well for the education fraternity. They are reflective practitioners who can reflect, adapt, and innovate pedagogies aimed at holistically developing their learners. Through these inquiry cycles, student teachers not only deepen their professionalism, but are constantly developing multi-perspectival thinking, strengthing their practice and broadening their pedagogies. With regard to broadening pedagogies, technology is a powerful tool to innovate pedagogical approaches and assessment practices.

Technology in Education

Technology has been widely harnessed to minimise disruption and ensure continuity in teaching and learning during the pandemic. Educators worldwide must quickly equip themselves with just-in-time technological skills and tools to design and conduct online teaching for their students. However, with hybrid learning here to stay in our education system, we need to ponder on the meaningful use of technology in education. Educators can ride on this opportunity to re-examine the pedagogical approaches used in a blended learning environment and how deep technological advancements such as Artificial Intelligence (AI), learning analytics, Virtual Reality (VR), Augmented Reality (AR) can be used to faclitate students' learning. Recently, Singapore Ministry of Education (MOE) is developing an AI automated-marking system designed to assess open-ended responses such as those for short-answer questions and essays for English language assignments.

The AI automated-marking system will focus on grammar, spelling, and syntax errors while the teachers will mark for content, structure, ideas, and creativity. This development aims to facilitate prompt and personalised feedback for students to monitor and regulate their own learning. At the same time, it allows teachers to use the personalised comments to better guide and facilitate students' learning. This AI system will also free up teachers to focus on other things, such as designing innovative learning environments and lessons for their students.

As we engage our students in technology-mediated teaching and learning environments, teachers must also be cognisant of equipping our students with the necessary self-directed and collaborative learning competencies. They will need these competencies for their asynchronous, self-directed, and synchronous collaborative online learning. Students are empowered to learn and exercise their agency. Educators also need to re-think the role of space and classroom design to facilitate inclusive and immersive learning experiences for our learners as hybrid learning becomes increasingly pervasive.

With the use of deep technology such as AI and learning analytics in teaching and learning, teachers have ethical issues to ponder. There are issues with privacy, such as the collection, storage, access, and use of student data. There are also issues with accountability and plagiarism. There are also fears that students may over-reliance on AI systems to obtain, collate and synthesise content knowledge for their learning. This may lead to a lack of conceptual understanding and a decrease in students' analytical and critical thinking skills. In such a teaching and learning environment, there is a continued need for teachers to focus on character development and values acquisition.

What fundamental conceptual disciplinary knowledge do we need to equip our students with to build and create new knowledge rather than rely on AI system to automate the process for them? Instead of asking students to write an essay, can we ask students to critique the article generated by the AI system, identify their gaps and improve on it? In this case, we are assessing students' higher-order thinking and metacognitive competencies.

AI has become a ubiquitous presence in our daily lives. From smart speakers and home appliances to self-driving cars and virtual assistants, AI has revolutionised various industries. In recent years, AI is playing an increasingly significant role in education. Moving forward, educators must re-think what and how to teach, and what and how to assess in AI-enabled classrooms.

◆ Conclusion

As we prepare future-ready educators for future-ready learners and harness the affordances of technology for pedagogical innovations in the classroom, there is an eminent need to revisit the "why" and "what" of learning (Ng, 2020). We need to prepare our next generation to be flexible, adaptable, and resilient in an increasingly volatile, uncertain, complex, and ambiguous world. The focus of education must shift from academic content acquisition, and grades focused to interdisciplinary and authentic learning with an emphasis on developing 21st century competencies and lifelong learning skills. Learning is not longer confined to the classroom. Students can learn from work attachments, field trips, and service learning, where they solve authentic tasks and have hands-on experiences. Increasingly, we need to forge synergistic partnerships with public agencies, technologists, and industries to

provide real-world problems for our students to work on and the technological tools and resources to enhance their learning experiences. Accordingly to Ng (2020), these are "timely change occurs in anticipation of the future - it is change launched from a position of strength rather than one of desperation" (Ng, 2017, p.42).

The quality of the education system depends on educators committed to quality teaching and learning to develop our students holistically. According to Tan et al (2012, p.6), a teacher is "not a teacher of the subject but more importantly a teacher of the learner and a preserver and custodian of societal values. The teacher's role is to "edify, educate, inspire and care for his/her students" (Ng, 2020, p.7). As such, we need to help teachers crystallise their teacher identity and develop their commitment to the learner, profession, and educational fraternity (NIE, 2022). Schools are safe environments for students to learn, interact, and grow with a focus on their well-being. At the same time, it is also a place for teachers to build meaningful relationships with their colleagues and grow professionally. School leaders should continue to provide professional development opportunities for their teachers and affirm their commitment to their learners and the fraternity. They should empower teachers to exercise their agency to propose teacher-led bottom-up school improvement initiatives and provide top-down support for them. As we look into the timely changes for our education system, it is also essential to build on existing structures, processes, technology, and human resource planning for a robust education system that is agile and flexible for us to reconfigure in times of crises and challenges (Ng, 2020). We need to strengthen these "timeless constants" or enduring fundamentals (Ng, 2020) in our education system.

As Albert Einstein said "in the midst of every crisis, lies great opportunity", let us all take this pandemic calamity as an impetus to re-think, re-imagine, and re-design our current educational system to better prepare the next generation of learners.

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The Future of Teacher Quality: Transformations for a Changing Future

Dr. Abdulrahman Almedaries

Director General of the UNESCO Regional Center for Quality and Excellence in Education, Saudi Arabia

◆◇ Abstract

This paper aims at demonstrating the fundamental shifts in the quality of teachers in response to a changing future whose challenges and requirements are difficult to predict, and contributing to achieving SDG4, which aims to: «Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all». In charting the future transformations of teacher quality, the paper is based on studies and research conducted by the UNESCO Regional Center for Quality and Excellence in Education (RCQE) during the period 2015-2021. The most important of these studies are: "Inclusion of Teacher Policies in Educational Systems in the Arab World", "Teacher Preparation and Qualification Systems in the Arab World", "The Project of Successful Arab Practices in Teacher Quality: A Case Study", "Evaluating the Teaching Performance of General Education Teachers in the Arab Countries", and "Foreseeing the Future of Education Quality in the Arab Countries for 2050 and Beyond".

The results of these studies carried out by RCQE on teacher quality in the Arab countries have shown that the teacher remains the core of «the quality of education now and in the future», despite the great transformations in education resulting from the development of technology and the applications of artificial intelligence and its uses for learners. The paper focuses on key areas of transformation for a changing future, the most important of which are: the shift in the policies of teaching profession, making it more attractive to attract talented teachers, the shift towards enhancing the quality of teacher education to respond to a digital world, and working in a learning environment that faces unpredictable challenges.

The paper concludes that making the teaching profession more attractive and ready for a changing future requires working on the shifts in the field of enhancing the quality of policies and systems related to teachers' work, to ensure creating innovative environments for teachers, enabling them to inspire their students, in order to enhance the quality of their learning.

Conference Proceedings

Based on the lectures, papers, and discussions of the conference, the following ideas can be inferred as a summary of the participants' conclusions on the conference themes:

First: The prevailing sentiment among the speakers and participants is that current education systems face a challenge in keeping up with the rapid changes of our modern world and in preparing today's generation for an uncertain future. In face of climate crisis, technological advancements, complexity of the modern world, changes in the workforce, lack of trust in public institutions, rise of intolerance and hate speech, and the spread of fake news, it is apparent that formal education cannot adequately address these challenges nor provide children and youth with the necessary knowledge, skills, values, and attitudes to create a prosperous, peaceful, and sustainable future.

Considering these challenging historical circumstances, our education system, based on the factory model, is no longer relevant for the present nor the future. Thus, It is necessary to reevaluate the objectives of education and critically examine our traditional educational concepts and practices. We need to adopt a creative and innovative mindset that can bring about a radical change in our educational system, far from the familiar practices of the past two centuries. Due to the information and communication revolution and the significant advancements in digital technologies, artificial intelligence applications, and work automation, we cannot rely on the current educational systems that were designed to meet the needs of individuals in the industrial era.

The second conclusion drawn is that education is limited by its outdated structures in a rapidly changing world, and as a result, the education system must be restructured to increase its flexibility and adaptability to the constantly evolving needs of individuals and societies. The participants agreed that digital innovation is crucial in this restructuring process. Given the global trend towards digitization in all aspects of life, students must acquire digital competencies to continue learning and working in the future.

While technology is a critical component in restructuring education and facilitating digital transformation across all aspects of modern life, it is important to recognize that it cannot function effectively in a suboptimal educational system, and it cannot replace the role of educators in achieving ambitious learning objectives. Therefore, there is a need for innovative educational policies that transform the nature of education in terms of institutions, content, practices, and roles of key players. Any successful attempt at integrating technology into education should avoid implementing fragmented technological solutions. Instead, we need to adopt a comprehensive digital transformation strategy that leverages technology as part of a broader systematic effort to create an equitable, effective, appropriate, and sustainable education system for lifelong learning.

Third, in a world characterized by rapid change, education faces the challenge of equipping present-day students with the skills and knowledge necessary to navigate

an uncertain future. This presents a series of significant questions, including: What subjects and skills should be taught in schools? What competencies and skills do they need for work, citizenship, and life in the twenty-first century? and what teaching and learning methods are best suited to impart these competencies? These questions were a focal point of the conference and continue to be a subject of study and consideration among educators and curriculum experts around the world.

The conference reiterated the concerns of educators who believe that current curricula and teaching and learning environments are inadequate for meeting the educational needs of present-day youth. As a result, the conference called for a shift in focus from imparting fragmented and rigid knowledge to equipping students with skills that enable them to continue learning throughout their lives using self-directed learning methods. The conference also emphasized the importance of providing students with competencies necessary for living and working in a society founded on understanding, solidarity, respect for diversity, and conscious citizenship. Additionally, there was a call for balance in human beings' relationships with other beings and with mother nature.

Fourth, to adapt to the needs of the rapidly changing future, there needs to be a corresponding change in the curriculum design and teaching, learning, and assessment strategies. Traditional educational curricula with unchanged design and content selection methods can no longer prepare students for the future. The way people access, exchange, and produce information has changed with the advent of the Internet, resulting in a significant shift in learning methods over the last two decades. While most children and youth are immersed in this digital world with access to limitless learning opportunities, many schools have not kept pace with these changes.

According to the available evidence, there is potential to achieve significant progress in student learning and achievement by making full use of modern digital tools and implementing targeted and effective artificial intelligence techniques in education. However, achieving such progress requires a reevaluation of educational curricula and resources, using appropriate technology-based strategies for teaching, learning and assessment, and redesigning learning environments to incorporate both face-to-face and online learning methods.

To effectively employ the blended learning approach, education systems must shift their focus from "indoctrination" carried out by the teacher to «learning» carried out by the student with independent motivation and self-direction. As a result, it is necessary to personalize learning, acknowledge informal paths of learning and the acquisition of knowledge, and even incorporate these self-directed learning paths into school-based learning activities. These learning paths can enrich curricula, ignite students' passion for knowledge, and encourage lifelong learning.

Fifth, the future of education calls for a reorganization of curricula, contents, methods, and tools that rely on digital technology, while adopting learner-centered learning models that empower students with self-learning skills in the context of lifelong learning. Teachers have a crucial role to play in this transformation, which

does not imply marginalizing their contribution to achieving the goals of education, but rather redefining their roles within the new learning environment. However, some participants in the conference expressed concerns about the current level of competence of many teachers in employing digital technology efficiently in the teaching, learning, and assessment processes. Although the teachers' competence is organically linked to the efficiency of the education system as a whole, attention is usually drawn to teacher education programs and in-service training programs when searching for answers about the limited efficiency of teachers' performance.

The new roles of teachers are associated with new competencies that they must possess in order to succeed in performing these roles. Therefore, teacher education and training institutions need to update their programs to keep pace with the profound transformations in the concept and nature of education in this era, and the demands of preparing future teachers. However, the responsibility for professional development does not rest solely on teacher education and training institutions. Teachers themselves have the responsibility of continuing their professional development through self-improvement methods. The school community can also play a crucial role in this regard by fostering a spirit of cooperation, innovation, and experimentation among its members. Teachers have shown during the Corona pandemic that they are trustworthy and capable of fulfilling their duties. Therefore, they need to be given the confidence and support they require to succeed in educating our children.

Accordingly, and based on the ideas and discussions presented at the conference, we urge education officials, specialists, and practitioners to consider the following guidelines and suggestions for developing innovative education in an era of change:

1. Encouraging open discussion and dialogue about the future of education, involving all stakeholders in educational affairs, and conducting research to develop education in line with the needs of the time, that meets the aspirations of new generations for a prosperous future.

2. Moving away from the traditional factory model of education towards a new model that aligns with the advancements of the post-modern era and the knowledge-based economy, considers the varying interests, inclinations, and learning styles of students, and prioritizes providing quality education for everyone.

3. Revising the goals, curricula, and contents of education to provide learners with the skills they need to succeed in a world characterized by volatility, uncertainty, complexity, and rapid change.

4. Connecting education to real-world problems, reconsidering academic disciplines, and relying more on cross-disciplinary learning, which gives learners the opportunity to reach a deeper understanding of life with its complexity and intertwining, and a greater ability to find innovative solutions to its problems.

5. Updating the rigid and outdated structures of the education system, and

adapting them to changing concepts of time and space. This includes the redesign of learning environments to include virtual spaces of the internet, examining innovative ways to benefit from technology in education, and reconsidering inflexible school schedules and rigid structures.

6. To achieve a harmonious approach towards digital education, it is necessary to simultaneously capitalize on its advantages while critically examining its associated concepts and practices. Furthermore, continuous research and discourse are required to gain a better understanding of the societal and individual implications of digital transformation in education, and to identify the most suitable methods for integrating technology in education in a way that aligns with the overarching educational objectives of human progress.

7. To adapt to recent advancements in digital education tools and technology-based teaching, learning, and assessment strategies, teacher education and training programs should be improved for preparing and qualifying teachers before and during their service. This should include enhancing their understanding of the conditions and criteria for integrating technology into education in a meaningful and sustainable manner.

8. Improving the technological infrastructure of schools, guaranteeing fair access to digital devices and high-quality internet services for all students, and upholding the values of equality and social justice when providing digital education opportunities.

9. Creating collaborative relationships with private enterprises, technological corporations, and industrial establishments, to increase possibilities for utilizing technological tools and resources in improving education, boosting students' learning environments, and equipping them better for the future.

10. To boost the trust of students, teachers, and the community in the school, it is essential to broaden the range of people who participate in the decision-making process. Consultation with all concerned and stakeholders in education should be done, and efforts should be made to ensure that all parties comprehend the objectives, structures, developmental initiatives, and the roles expected of them in education.

To conclude, despite the challenges, education has the power to bring about positive change and development, and we must invest in innovative concepts for education to meet the needs of future generations. This is the hopeful message we wanted to convey to everyone regarding the future of education, instead of focusing on negative and discouraging predictions. There is substantial proof that education can bring about transformation and guide changes towards the betterment of individuals and societies. However, realizing the potential of education and the power of knowledge necessitates utilizing all our intellectual capacities, resources, and research institutions to generate innovative education that align with the needs of future generations. This was the ultimate aim of our conference and the driving force behind the choice of its theme.

Appendix (1):

Conference agenda

First Day: 29 November 2022

Time	Program
9:30 – 10:30	**Opening Ceremony**
	• Opening address by his excellency **Dr. Mohamed Bin Mubarak Gomaa**, *Minister of Education in Bahrain* • Welcome address by his excellency **Dr. Abdulrahman Bin Mohamed Al-Asimy**, *Director General of the Arab Bureau of Education for the Gulf States (ABEGS)* • Opening remarks by his excellency **Dr. Suleiman Al-Askary**, *Director of the Gulf Arab States Educational Research Center (GASERC)* • Speech by **Ms. Costanza Farina**, *Director of the UNESCO Regional Bureau for Education in Beirut*
10:30 – 11:40	Session 1: Global trends and the future of education
	Moderator: Prof. Adulsalam Al-joufi, *Advisor, Arab Bureau of Education for the Gulf States*
10:35 – 11:00	**Prof. Sohail Inayatullah**, *UNESCO Chair in Futures Studies, Professor at Tamkang University, Taiwan* **Topic:** Educational futures in times of disruption: The break-out or back to business as usual?
11:05 – 11:25	**Dr. Sobhi Tawil**, *Director of Future of Learning and Innovation at UNESCO* **Topic:** Global trends and the future of education
11:25 – 11:40	Discussion
11:40 – 12:00	**Break**
12:00 – 13:05	Session 2: Restructuring the education system: exploring innovative digital solutions
	Moderator: Prof. Abdullah Ambusaidi, *Undersecretary of the Ministry of Education, Oman*
12:05 – 12:25	**Prof. Mark Brown**, *Director of the National Institute for Digital Learning, Ireland* **Topic:** Unboxing Digital Transformation: Reshaping Education for Better Futures
12:30 – 12:50	**Prof. Hamdy Abdelaziz**, *Dean, School of e-Education, Hamdan Bin Mohammed Smart University, UAE* **Topic:** Innovative digital solutions for re-engineering education in the Arab world
12:50 – 13:05	Discussion
13:05 – 16:00	**Lunch Break**
16:00 – 18:30	Workshop
16:00 – 16:20	Introducing the activities of the workshops
16:20 – 18:00	**Two parallel workshops on:** • Developing digital educational resources • Teachers professional development to integrate digital technologies in education
18:00 – 18:30	Discussion

Second Day: 30 November 2022

Time	Program
9:00 – 10:05	Session 3: Curriculum: content, resources and design
	Moderator: Prof. Abdulazez Al-Ruwais, *Supervisor of program management at the Arab Bureau of Education for the Gulf States*
9:05 – 9:25	**Dr. Anthony Magana**, *Oxford Research Encyclopedia Scholar, CEO Magana Education* **Topic:** Curriculum: Content, Resources, and Design
9:30 – 9:50	**Prof. Saleh Salim Al-Busaidi**, *Dean, College of Education, Sultan Qaboos University, Oman* **Topic:** Future Curriculum: Requirements and Challenges
9:50 – 10:05	Discussion
10:05 – 10:30	**Break**
10:30 – 11:35	Session 4: Teacher education: new competencies and roles
	Moderator: Prof. Ibrahim Al Naimi, *Undersecretary of the Ministry of Education and Higher Education, Qatar*
10:35– 10:55	**Dr. Chua Bee Leng**, *Associate Dean, Professional Practice, Office of Teacher Education, National Institute of Education, Nanyang Technological University, Singapore* **Topic:** Empowering teachers to be future-ready: Curriculum, Pedagogies and Technologies
11:00 – 11:20	**Dr. Abdulrahman Almedaries**, *Director General of the UNESCO Regional Center for Quality and Excellence in Education, Saudi Arabia* **Topic:** The future of teacher quality: transformations for a changing future
11:20 – 11:35	Discussion
11:35 – 11:50	Closing remarks by his excellency Dr. Suleiman Al-Askary, Director of the Gulf Arab States Educational Research Center

Appendix (2):

Speakers' biographies
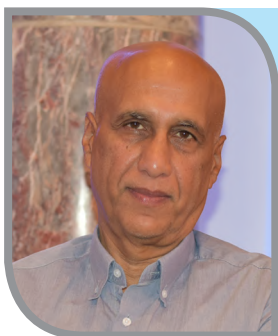
Prof. Sohail Inayatullah

Sohail Inayatullah, a political scientist and futurist, is the UNESCO Chair in Futures Studies at the Sejahtera Centre for Sustainability and Humanity, Malaysia. He is also Professor at Tamkang University, Taiwan and Associate, Melbourne Business School, the University of Melbourne. He teaches from www.metafutureschool.org where his courses include Become a Futurist: Futures 101 and Personal Futures: the CLA of the Self. In 2021, he was virtual futurist-in-residence with the government of Abu Dhabi, Culture and Tourism.

His most recent books include Asia 2038 (2018 - in English, Mandarin, and Korean), with the Asian Development Bank, Futures Thinking in Asia and the Pacific: Why foresight matters for policymakers (2020); and The End of the Cow and other Emerging issues (CFAR, 2022). He is listed in the top 2 percent of the world›s scientists as measured by the highest impact of citations.

In the last two plus years, he has worked with ANZ Banking; the OECD; The Food and Agriculture Organizations, the United Nations; Mitsubishi Motors; Catholic Education Australia; the Government of New Zealand; the World Health Organization; the Government of Egypt; The Asian Development Bank; Globe Telecom; ISESCO in Tunisia; Queensland Police; EDOTCO, Malaysia; the Office of the President, the Government of Argentina; Impact Investment, Brazil; the Korean Development Institute; the United Nations Economic and Social Commission of Asia and the Pacific; INTERPOL; the Philippines Senate; the National Disabilities Services; Edmund Rice Education Australia; Powerlink, Queensland; Brisbane Grammar School, Queensland; Walter and Eliza Hall Institute for Medical Research, Australia; the Australia Tax Organization; Groupo Zap, Brazil; the Korean Global Forum for Peace, and, Gurukul International.

His focus is on helping nations, international organizations, corporations, communities, and individuals create their alternative and preferred futures.

Dr. Sobhi Tawil

Sobhi Tawil (PhD) is Director of Future of Learning and Innovation at UNESCO. He has over 30 years of experience in teaching, education policy analysis, research and program management with diverse institutions and organizations, including the International Committee of the Red Cross (ICRC), the Graduate Institute for International and Development Studies (Geneva), the Network for Education Policy Research Review (NORRAG), and the International Institute for Higher Education (Rabat). Sobhi Tawil holds a PhD in Education and Development and a Masters in Comparative Education from the University of Geneva.

Prof. Mark Brown

Professor Mark Brown is Ireland's first Chair of Digital Learning and Director of the National Institute for Digital Learning (NIDL) at Dublin City University, Ireland. Mark is a Senior Fellow of the European Distance and eLearning Network (EDEN) and also serves on the Management Board of EDEN Digital Learning Europe. Additionally, Professor Brown serves on the Supervisory Board of the European Association of Distance Teaching Universities (EADTU). Originally from New Zealand, Mark continues to maintain strong "down under" links and up until recently was Vice-President of the Open and Distance Learning Association of Australia (ODLAA). In 2017, the Commonwealth of Learning recognised Mark as a world leader in the field of Open, Distance and Digital Education. Shortly before the outbreak of the COVID pandemic, Professor Brown was Chair of the 2019 ICDE World Conference on Online Learning in Dublin. In 2020, Mark contributed to the European Commission's Higher Education Consultation Group on developing a EU-wide policy response to the burgeoning area of micro-credentials. In 2021, Mark completed a state-of-the-art literature review on the growth of micro-credentials on contract to the European Commission. In 2022, Professor Brown has been working with the OECD to review quality assurance processes for new models of online and blended learning and Mark also has a contract with Quality and Qualifications Ireland (QQI) to develop new Statutory Quality Assurance Guidelines in this area. More information… https://www.dcu.ie/nidl/director-nidl

Prof. Hamdy Abdelaziz

Professor Hamdy Ahmed Abdelaziz is Dean of the School of E-Education, Hamdan Bin Mohammed Smart University, and Director of the UNESCO Program in Curriculum Design and Development in the Arab Countries. He holds a PhD in Curriculum and Instructional Design, from the University of Arkansas, USA; and a professorship in e-learning and distance education. He has authored and published more than 10 books in the fields of e-learning, brain-based teaching, and teacher licensing standards. He also published more than 50 research papers in international and regional journals and conferences. Professor Hamdy Abdelaziz has supervised and discussed many master›s and doctoral theses in Arab universities. He served as Head of the Training and Courses Department at the Deanship of Community Service and Continuing Education, University of Tabuk, Saudi Arabia. He also worked as Director of the Distance Education and Training Program at the Arabian Gulf University, Kingdom of Bahrain. Professor Hamdy Abdelaziz supervised the National Center for E-Learning in Egypt, and participated in the development of a strategic plan for e-learning in the Egyptian universities. He was a member of the National Committee for E-Learning Standards, and the National Committee for Teacher Examinations in Egypt. He has prepared many models of teaching, learning and assessment that are used internationally. Professor Hamdy Abdelaziz received Khalifa Award for Education (2014), as a distinguished university professor at the level of the Arab world. He is a keynote speaker at international conferences and seminars in the field of e-learning and smart education.

Dr. Anthony J. Magana

Dr. Anthony J. "Sonny" Magana III is a digital age learning pioneer. In 1995, Sonny created and served as principal of Washington State's first CyberSchool—which is still serving the needs of at-risk students. He is an Oxford Research Scholar, award-winning teacher, and best-selling author. Dr. Magana's first book, Enhancing the Art and Science of Teaching with Technology has become a modern classic. In next book, Disruptive Classroom Technologies, he introduced the T3 Framework as a next generation learning model for a new era. Synthesized from four decades of pioneering research, the T3 strategies were shown to reliably accelerate learning productivity and have been called: "A brilliant breakthrough in our understanding and use of technology for learning," by Professor Michael Fullan "A visionary work that is insightful and inspirational," by Dr. Robert Marzano; and "A major step forward; Dr. Magana's T3 Challenge is credible, powerful, and exciting; let's do it!" by Professor John Hattie. His highly anticipated upcoming book, Learning in the Zone: The 7 Habits of Meta-Learners is scheduled for publication in July 2022.

An avid musician, yoga practitioner, and mountaineer, Sonny was awarded the Milken Family Foundation Educator Award, the inaugural Washington Governor's Commendation for Educational Excellence, the EdTech Digest Global Education Leadership Award, and was named one of their top influencers in education. He holds a Bachelor of Science degree from Stockton University, a Master of Education degree from City University, and an Administrative Credential and Doctorate in Educational Leadership from Seattle University. He has successfully summited the highest peaks in his home state of Washington.

Prof. Saleh Salem Al-Busaidi

Prof. Saleh Salem Al-Busaidi is a Professor of curricula and teaching methods of English at the College of Education, Sultan Qaboos University, Oman. Prof. He is currently the Dean of the College of Education at Sultan Qaboos University. Previously, he held the position of Director of the University's Language Center from 2010 to 2016. He is currently teaching undergraduate and master's courses and supervising master's and doctoral students at Sultan Qaboos University and abroad. He obtained Bachelor's degree in Teaching English as a Foreign Language from Sultan Qaboos University in 1995, Master's degree in Teaching English as a Foreign Language from the University of Exeter, United Kingdom in 1997, and Ph.D. in Curriculum Studies from the University of Illinois at Urbana-Champaign, USA, in 2003. Prof. Saleh Al Busaidi participated in many national and international conferences and seminars. He has also published many articles and books in the fields related to English language teaching and learning. His main research interests are learners› autonomy, problem-based learning, curriculum development, scholastic/academic skills, academic readiness, and program evaluation.

Dr. Chua Bee Leng

Dr. Chua Bee Leng is the Associate Dean for Professional Practice (Office of Teacher Education) at the National Institute of Education (NIE), Nanyang Technological University (NTU), Singapore. She is also a Senior Lecturer with the Psychology and Child & Human Development (PCHD) Academic Group. She received her Doctor of Philosophy (PhD) from NTU, Singapore. Her research interests are Teacher Education, Digital Portfolio, Mediated Learning, Problem-based learning, Technology-mediated learning, Motivation and Cognition.

In addition to her work at the NIE, NTU, she regularly shares her expertise in subject disciplines such as educational studies and instructional pedagogies with schools and educators, locally and globally.

She is currently the President of the World Education Research Association (WERA), President of the Educational Research Association of Singapore (ERAS) and Vice-president (Asia-pacific) of the International Association of Cognitive Education and Psychology (IACEP). She is also the Executive Editor of the journal of Educational Research for Policy and Practice (ERPP).

Dr. Abdulrahman Almedaries

Dr. Abdulrahman Almedaries is the Director General of the UNESCO Regional Center for Quality and Excellence in Education, Saudi Arabia. He holds a PhD in the field of quality assurance from the Illinois Institute of Technology in Chicago, USA, in 1994. He lectured in the field of quality assurance at the Illinois Institute of Technology in Chicago from 1992 to 1993. Dr. Almedaries worked as an assistant professor in Administration, and undersecretary for the Department of Administration, at the College of Sharia and Islamic Studies in Al-Ahsa, Saudi Arabia, from 1994 to 1996, and served as Director General of the General Administration of Education in the Eastern Province of Saudi Arabia from 2005 to 2017. Dr. Almedaries worked as the Chairman of the Administrative Council for Quality at the Prince Muhammad bin Fahd bin Abdulaziz Quality Center in Al-Ahsa Governorate from 2001 to 2005, and then as Chairman of the Quality Advisory Council at the same center from 2005 to 2014. Dr. Almedaries served also as a member of Board of Directors of the Saudi Arabian Scouts Association from 2006 to 2015. He has a license as a Certified International Quality Assessor and Advisor from the European Foundation for Quality Management (2008). He served as Chairman of the Committee for the Development of Job Performance Evaluation for Teachers in the Ministry of Education (2008), and Secretary General of the Prince Jalawi bin Abdulaziz Musaed Award for Social Excellence (2011). Dr. Almedaries is also a permanent honorary member of the Smart Business Academy in Sweden since 2015, and the Undersecretary of the Ministry of Education, Saudi Arabia (2017). Dr. Almedaries is a quality ambassador and advisor to the National Quality Ambassadors Program, in the Saudi Standards, Metrology and Quality Organization since 2020. He was arbitrator for the King Abdulaziz Quality Award in its fifth session (2020). He served as the co-chair of the international team of teachers (2018-2022), and participated in many other local, regional and international activities.

Appendix (3):

Moderators' biographies

Prof. Ibrahim Saleh Al-Nuaimi

Prof. Ibrahim Saleh Al-Nuaimi is the Undersecretary of the Ministry of Education and Higher Education in Qatar, and a member of the Executive Council of the Arab Bureau of Education for the Gulf States. He holds a PhD in Chemistry from the University of Southern California, USA, in 1983. He began his academic career as an assistant professor, then an associate professor, until he became a professor of organic chemistry at Qatar University in 1996. He held several academic and administrative positions, including: Dean of the College of Science at Qatar University (1990-1994), President of Qatar University (1994-1999), and founder and president of the Dutch CHN University in Qatar (2000-2006). He chaired the founding committee of the Community College in Qatar in 2008, and he established the college in 2010, and became president of the college from its inception until 2018. He was appointed, by Emiri Decree, as Undersecretary of the Ministry of Education and Higher Education in 2017. He founded the Qatar Scientific Club in 1986, and was its president since its establishment until 1990. He founded and chaired the Doha International Center for Interfaith Dialogue since its establishment in 2007 until now.

Prof. Abdullah Ambusaidi

Prof. Abdullah Ambusaidi is a professor of Science Education. He received his PH.D. from Centre of Science Education at Glasgow University, UK. Currently he is the undersecretary for Education at the Ministry of Education, Oman. He worked before at Sultan Qaboos University and held several positions such as Director of the Center for Humanities Research, Dean of Postgraduate Studies, Assistant Dean of the Faculty of Education and Head of the Department of Curriculum and Instruction at Faculty of Education.

He has supervised more than 80 master›s and doctorate degrees in science education at Sultan Qaboos University and abroad. He has participated as external and internal examiner for more than 50 masters and doctoral dissertations. He has more than 130 published and accepted research papers, both in Arabic and English, in well-known international journals.

He has six books in science teaching widely used by teachers. He also participated in writing chapters on teaching science, environmental and health education in both Arabic and English. He also participated, with a number of educators from inside and outside Oman, in translating two books in teaching science from English to Arabic.

He is a consultant and trainer for many educational development projects in Oman, including TAMAM Project (school-based development) and Green Schools Initiative. He is also a leading researcher of various educational projects, such as school garden project, ecotourism project, health education project and the Omani Heritage Project in the school curricula.

He presented several papers and attended more than 40 conferences and seminars, locally and internationally, in the field of science education and sustainable development. He is a member of the editorial board of several educational journals at the local, regional and international levels.

Prof. Abdulsalam Al-Joufi

Prof. Abdulsalam Al-Joufi held the position of Minister of Education in the Republic of Yemen from 2003 until 2011, and he is currently advisor at the Arab Bureau of Education for the Gulf States. He holds a PhD in chemistry from United Kingdom in 1993. He held several university positions in Yemen, including the Dean of the College of Education, Sana'a University, and the College of Education, Ibb University. He also served as Vice President of Ibb University and Sana'a University. He has thirteen research published in international scientific journals, and three books. He has actively participated in the organization of many regional and international scientific and educational conferences. He participated in supervising and discussing a number of master›s theses, and has a presence in the press by publishing many articles dealing with higher education and community issues.

Prof. Al-Joufi was a member of many scientific and professional committees at the regional and global levels, including: the Steering Committee of the Global Partnership for Education, the Steering Committee of the Arab Program for the Improvement of Education at the Arab League Educational, Cultural and Scientific Organization (ALECSO), the Advisory Board of the Regional Center for Quality and Excellence, and the SDG-Education 2030 Steering Committee, and the Steering Committee of the International Task Force on Teachers for Education 2030. He chaired several international conferences, including the General Conference of ALECSO in its seventeenth session, and the 48th International Conference on Education in 2008.

Prof. Abdulaziz Mohamed Al-Ruwais

Prof. Abdulaziz Mohamed Al-Ruwais is a professor of curricula and teaching methods at the College of Education, King Saud University, and the supervisor of program management at the Arab Bureau of Education for the Gulf States. He received his PhD in Curriculum and Instruction from Ohio University, USA, in 2000. He held several positions at the Ministry of Education in Saudi Arabia, including: Director of the Curriculum Development Department, General Supervisor of the Department of Secondary Education, and General Manager of Curricula. Dr. Abdulaziz Al-Ruwais has many research papers and studies published in Arab and international journals in the field of teaching methods in general, and methods of teaching mathematics in particular.

He was a member of several committees, including: the Technical Committee for Curriculum Development in the Saudi Ministry of Education, the Advisory Committee for Secondary Education, and the King Abdullah Project for Education Development. He is a member of some scientific and educational institutions, including: the American Association for Supervision and Curriculum Development (ASCD), the National Council of Teachers of Mathematics (NCTM), the Science and Mathematics Association at King Saud University, and the American Educational Research Association (AERA). He also participated in many conferences and seminars inside and outside Saudi Arabia.

Appendix (4):

Conference Organizing Committee

The Scientific Committee:

1. Dr. Suleiman Ibrahim Al-Askari (Chairman of the Conference Committee)
2. Mr. Ali Ahmed Bubshait (Chairman of the Scientific Committee)
3. Dr. Said Ismail Omar (Member)
4. Dr. Ahmed Fahmy Al-Suhaimi (Member)
5. Dr. Ahmed Zeinhom Nawar (Member)
6. Dr. Shaima Abdel Fattah Turki (Member)

The Administrative Committee:

1. Mr. Faeq Ali Al Mulla (Chairman of the Administrative Committee)
2. Mr. Anwar Abdul Latif Al-Tayeb (Member)
3. Mr. Ashraf Sayed Youssef (Member)
4. Mr. Moamen Mahmoud Hassan (Member)
5. Mr. Muhammad Ahmad Abu Rawash (Member)
6. Mr. Ibrahim Ahmed Abu Shanab (Member)
7. Mr. Amr Ibrahim Abu Rayhan (Member)
8. Mr. Omar Kamel Orabi (Member)
9. Mr. Bader Al-Weheeb (Member)

Appendix (5):

Conference Photos