



Future of learning: Blended learning?

Digital blending learning
as a catalyst for education
transformation



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Introduction



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Education systems around the world had to adapt to the seismic changes brought on by the Covid-19 pandemic, causing a digital shock and a transition to distance and e-learning. Many countries had to quickly migrate to online and e-learning solutions, transitioning curricula, classes and lectures onto digital platforms. Whilst dealing with an ever-evolving challenge of maintaining education continuity in the face of adverse circumstances, the past eighteen months have provided an opportunity to assess the future of learning within the education system and make a step change in its evolution.

Beyond the short-term changes that we can observe as we emerge from strict lockdowns and movement restrictions in many countries, there is evidence to suggest many industries will not be the same as they were before, education included. The shift in consumer behavior, economic priorities and the implications of the accelerated digital transformation in organizations will require students at all levels to obtain new skills that are relevant in the digital world we live in now and that of the future. This includes developing adaptable skills for emerging jobs and industries that have yet come to fruition.

This study considers the evolution of blended learning for it to become more digitally enabled, embracing Virtual Reality and immersive approaches. It aims to present a model of how digital blended learning can be part of education transformation.

This digitally enabled approach to blended learning is applicable throughout the education landscape, for universities, Technical and Vocational Education and Training (TVET) and K-12 schools. We also consider the wider questions around the future of the education landscape to discover whether it is still fit for the future.

This publication has been developed after much consideration of what could and should be done to reimagine the education system across the world. We believe there is much of our thinking that is worthy of further consideration for application within the Middle East and hope that our findings cause education leaders to consider what it could mean for their regions, and how we can reimagine our own education system and the role that digital blended learning has within it.

Executive summary

Changes to teaching and learning approaches have historically been slow and incremental. To meet the challenges of today's digital economies, education methods and systems may no longer provide a fit-for-purpose set of delivery solutions. The Covid-19 pandemic and the subsequent digital shock have therefore provided an opportune moment to reimagine learning and the education system over the long-term and implement solutions on a shorter timeline to meet the current and future economic needs and reposition learning to ensure students become capable, employable and qualified as a result of their education.

We believe that adopting blended learning practices that embrace digital and immersive approaches to learning will provide a step change for learners to become more qualified, capable and employable members of today's and the future workforce.

To make this a reality, governments need to act as a catalyst for change by providing the infrastructure for public, private partnerships (PPPs) to reimagine education and the role of education technology (EdTech) and to use digital blended learning as the building block within a new way of delivering learning.



Digital blended learning alone will not provide the catalyst for a reimagined education system. To reimagine how education can be delivered will require the education ecosystem to learn how to unlearn so that it can adapt to the future needs of the economy, preparing students not only for life and their working lives but also in order to fulfill students' learning aspirations.

The underlying concepts and transformation approaches will have subtle differences by segmentation of the education sectors with universities, TVET and K-12 schools. Indeed, it could be seen that as students' progress through the education system, the level of digital blended learning increases and becomes more sophisticated.

An education ecosystem must operate interdependently so that the vision of developing a qualified, capable and employable workforce can be realized. To achieve this, there are several critical success factors that need to be realized if we are to progress on this journey.

If we are to succeed in reimagining the future of education delivery, then digital blended learning could be seen as a first incremental step in making this a reality. It will require governments to invest and be the facilitators and drivers of change, forming and mandating an autonomous organization within or outside the government, that works across government and coordinates with industries and employers to deliver a new

education and learning reality. It will require PPPs to stimulate the market and drive innovation. It will also require industry and employers to collaborate with the education system to design a relevant curriculum offer and be part of the shaping of the future of learning. Lastly, it will require teachers and lecturers to adapt to a new 'what' and 'how' of delivering learning, moving from being the holder and imparter of knowledge to the facilitators of the student's choice of learning.

We are at a crossroads of education delivery, we have a choice; do we go back to the way education was delivered pre-pandemic or do we take this opportunity to take a large step forwards and shape the future of learning?



Blended learning

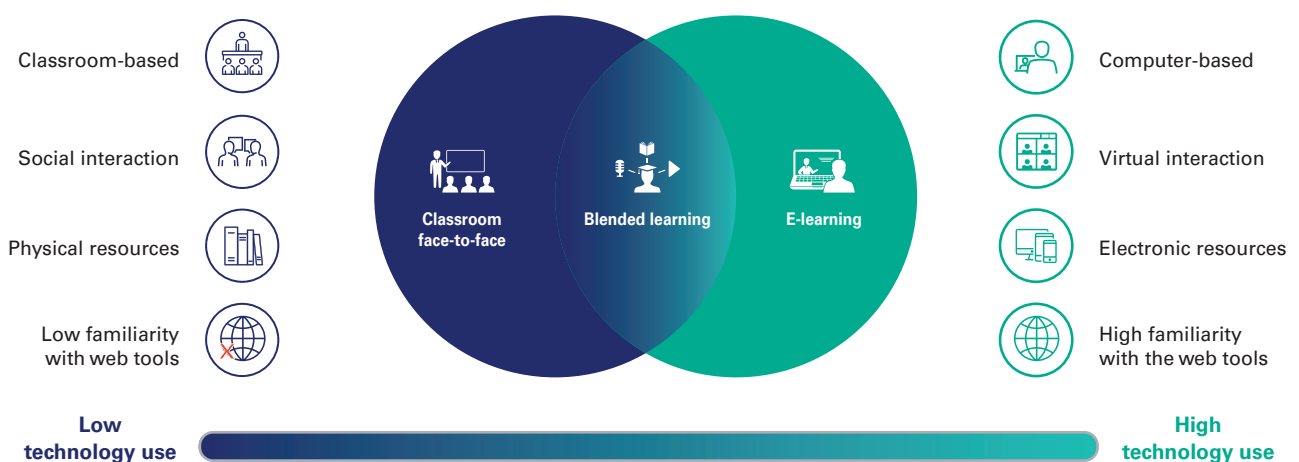
In recent years, educators have been employing online technologies for remote, distance and e-learning delivery models. These technologies aim to address some of the limitations that traditional face-to-face teaching models entail, such as the physical presence requirement of students in classrooms. With the onset of the Covid-19 pandemic, e-learning became a necessity for all education sectors, requiring policymakers, universities, TVET institutes, schools, and educators to reengineer classroom-based models, and quickly adapt traditional learning into e-learning.

Technology-enhanced e-learning has for some time been a major global trend and has gathered momentum with the advancements of online learning platforms and the introduction of Massive Open Online Courses (MOOCs) offered by universities. These learning methods are now also progressing within K-12 and TVET.

In recent years there has been significant growth in the EdTech sector offering qualifications and learning material for K-12 and TVET through eLearning solutions. The significant rise in EdTech aimed at the school market has grown exponentially and has opened a market of suppliers and education providers. The underlying technology and curricular content have however not yet been fully integrated into mainstream delivery of learning. Especially before the pandemic, it was merely in addition to traditional approaches of learning or as a guide to homework. Today, in many countries, blended learning is increasingly considered as a cornerstone to many education transformation programs.

Traditional blended learning combines the benefits of classroom-based learning and integrates the benefits of online digital learning, as illustrated in Figure 2.

Figure 1: Blended learning as hybrid between classroom-based and online learning



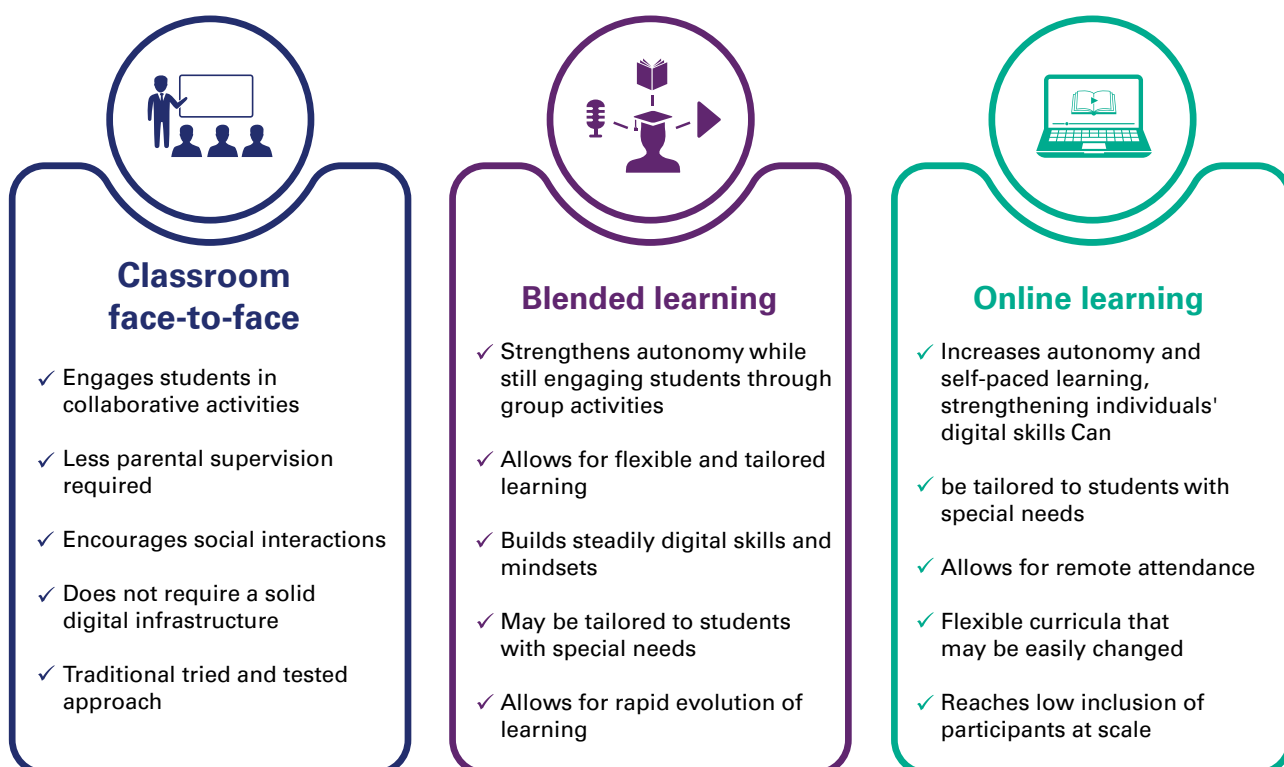


Blended learning defined

Blended learning can be defined as a hybrid model that lies at the intersection of the physical classroom-based learning and the fully online learning models. Blended learning is the integration of technology, online learning, and Virtual Reality (VR) into the classroom and beyond.

The inclusion of blended learning is within and beyond the classroom, with e-learning in this example not requiring delivery within the classroom. E-learning tends to offer remote and distance learning via teacher-led interaction or self-directed study which can be at home or at remote locations.

Figure 2: Benefits of different learning systems





Blended learning allows for flexible class time where students have access to content that engages them through technological and digital means. This approach to curriculum delivery also allows for a personalized approach to the specific needs of individual students by engaging them in learning approaches and activities that target their individual learning styles and needs. It has the ability to strengthen an individual's autonomy of learning, which can improve engagement and resulting learning outcomes.

The blended learning approach appears to have many benefits. However, we consider that whilst can be implemented as a standalone activity it will not be enough to reposition education delivery in a digital and changing world, and we need to consider further how we deliver the curriculum, what curriculum we offer and when we deliver it.

It is important to mention that blended learning does not restrict students from the important social interactions with each other. Students may still enjoy the sense of being in a formal teaching environment and working in a group, which are learning approaches that are critical for developing social and educational skills and in the longer term, life and employability skills.

Both face-to-face and blended learning have advantages for students which nurture and develop differing competencies. Blended learning enables student-centric learning, increases engagement in learning, and builds autonomy and digital skills. Teaching and learning should embrace a new digital reality that includes a student-centered multi-sensory approach that takes account of students differing learning styles. Learning should evolve by integrating innovative, digital, experiential, and immersive learning approaches within a much more digitally enabled blended learning manner.

How we deliver learning and the evolution to digital blended learning

Blended learning before the pandemic was much discussed but not fully integrated or practically adopted across education systems. Historically, teaching and learning delivery models were designed around the teacher or lecturer standing at the front of the class imparting knowledge and confirming understanding through practice, revision and testing.

During the pandemic the education system was unprepared for the shock to the system that the transition to a 100% online learning delivery model created. The swift transition to communication platforms such as Microsoft Teams and Zoom created challenges to student engagement and content delivery. Teachers and lecturers quickly attempted to adapt and refresh approaches so that content was more suitable for on-line learning delivery.

This was simply a transition from the classroom to the virtual classroom with a reliance on parents and guardians to facilitate and assist in learning. This was for many a difficult experience as they did not have the digital or learning content knowledge.

Whilst this approach had its challenges with regards to delivery consistency, standards and parental involvement, it has proved to be a valuable tool in learning delivery through this period of digital shock. As we prepare for institutions to reopen, we are now presented with an opportunity to assess the lessons learnt moving from almost 100% classroom face-to-face delivery to 100% online learning.

Whilst blended learning is not new, its integration within mainstream learning has been limited.

Simply moving back to the old way of doing things will produce the old ways of learning and provide a workforce with old skills in an evolving economy.

Reimagining the balance of education delivery and the integration of digital delivery within the curriculum is a logical need and next step. The utilization of VR, immersive learning and digital delivery should be

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considered, both in the context of a formal learning, teacher/lecturer-led in-classroom setting, and in the informal learning environment, with self-directed and autonomous learning.

The evolution of blended learning to digital blended learning needs to take incremental and quick steps in its integration into mainstream day-to-day delivery of education within and outside of the classroom, thus creating a new balance and mix of learning delivery. This will allow the education system to grow and adapt, providing resilience against future disruption for all stakeholders and meet the challenges of a new digital world.

Figure 3: The evolution of traditional blended learning toward a seamless and fully integrated digital imagined learning approach



This new balanced mix of delivery methods would be varied dependent upon the level of education setting and the subject content, though there are no reasons that this approach cannot be considered and widely implemented.

Blended learning in different segments of education

The underlying concepts and transformation approaches have subtle differences by segmentation of the education sectors; universities, TVET and K-12 schools with each having its unique opportunities, barriers and challenges to future adoption of digital blended learning. The common requirements across all segments will be three-fold:

1. The further adoption of digital technologies to support the **development of digital, employability and soft skills** to meet the economic need.
2. To allow for **individualized learning** which caters for learners' different learning styles and needs.
3. Enhance and enrich the learning experience to **encourage aspirational learning** in order to fuel creativity and innovation for the future.

Each segment needs to consider what the future could and should be and how it will meet the above requirements and in particular how it will enable their current and future learners to become qualified, capable and employable. The differences between these segments can be summarized as follows.

Higher education is more mature in its development of blended and digital learning solutions.

This is attributed to its increased capacity, access to technology, and general infrastructure. Although this can be developed further, with more student-centric learning, faster integration of digital platforms, and digital delivery for campus based and off-campus students. Further integration and changes to the curriculum are required to improve core employability skills around digital skills, employability, and soft skills.

TVETs with a very hands-on vocational nature may appear to prevent the inclusion of blended and indeed digital blended learning. The digital delivery of practical modules provides unique challenges in the learning process of physical skills. However, underpinning knowledge could easily be adapted and with current and future immersive learning mediums developed for training aircraft pilots through simulators, virtual bridges to train ship captains as well as virtual battlefields illustrate that this can be achieved. With the advancement of technologies, this should not be a barrier to digital integration in this sector. Like in higher education, further integration and changes to the curriculum are required to improve core employability skills around digital skills, employability, and soft skills.

For **K-12 institutions**, the e-learning journey has begun with the response to Covid-19. It now needs to make a step change in adoption of digital blended learning. There is an opportunity to capitalize on these gains to evolve and reimagine the curricula and its delivery. This requires a willingness for change from what was, to what could be, and should be.



Developing and implementing a digital blended learning approach

In order to make future students and learners qualified, capable and employable, we need to consider the integration of digital blended learning into curriculum delivery. This may not be enough on its own and to achieve the above, we need to consider why we need to change, what curriculum we need and how required changes should be implemented within the education ecosystem to make digital blended learning a reality.

Content of education needs to change: meeting the needs of the future workforce to make learners qualified, capable and employable

Economies are changing and evolving to meet the needs of societies and capture the benefits of technology in the transformation of how organizations work. Changes within the external business operating environment have already started to impact traditional employment patterns. With the rapid move forward of emerging technologies including the impact of automation and Artificial Intelligence (AI), changes to the workforce will escalate the case and need for change in the skills and knowledge required to be employable- both for those in the current workforce and students that will enter the labor market in the future.

Delivery of education needs to change: utilizing innovative technologies and learning approaches

Without fundamental change to the delivery of education, the future workforce may not be equipped with the skills and knowledge to contribute meaningfully to the economy. The emergence of new technologies in society, education and learning delivery has set new expectations of what and how people learn. The extrapolation and speeding up of technology solutions and their adoption in society will inevitably increase the speed of change required in the economy and therefore the education system's needed responses. If change is going to become exponentially quicker, the education system will be left behind and not be reflective of the society and economic world in which we live.

The academic year and education system in focus

To meet future challenges we need to reimagine the whole of the education system not only in the context of digital blended learning, or the use of technology in curriculum delivery, but also when and how it is delivered.



The academic year has not changed dramatically over the decades. It was created for a period or an economy that have significantly evolved since then. If we started with a blank piece of paper would we design the academic calendar and the education system in the same manner? As such, to address this challenge, we need to answer several critical questions, and while we do not pretend to have the answer to them all, these ought to give food for thought.

1

Do the current approaches to the curriculum need to be considered and reimagined so that they meet future societal, learner and economic needs?

2

Do we need to continue with the traditional school, TVET or university terms, days and weeks timetable – is this reflected in the current and future work environment?

3

How do we overcome rural and remote learning and the issues of digital poverty?

4

Do we still need to be building large scale campuses where learners attend for only parts of the year leaving the physical infrastructure unused?

5

What would the impact be on the physical resource as well as the teaching and lecturing staff of any proposed changes?

6

What would an education delivery model look like and what are the benefits, barriers and solutions to making a difference?

These are just a few thought-provoking questions that we need to debate and consider. We need to learn from the past but only to prepare and shape the future of the education system. Whilst the above questions are a means to start the debate on reimagining the education system, we need to be practical and consider strategy and operational reality and consider short, medium, and long-term transformation opportunities.

In the short-term, moving to technology-enabled delivery and digital blended learning would be the first critical steps to start the transformation journey. This model would take the best of the traditional

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approaches to learning whilst embracing new and emerging technologies into its delivery in a blended learning manner.

A reimagined curriculum

The current qualification portfolio, particularly in schools, has evolved marginally over time. The delivery of a general education based on core subjects remains a critical component of the school-based system. This general broad-based education provides the building blocks for further and future knowledge development. However, the next evolution of personalized learning pathways must consider further streaming of vocational and academic pathways. The current balance and mix of subjects in K-12 need to evolve to have a more student-centric approach and include pathway structures. These academic and vocational pathways should integrate digital, soft and employability skills. Adopting such approach leads to greater resilience in students' ability to embark on dynamic career routes and move around freely in the changing future economy.

Within TVET, the presumed barriers to digital blended learning should be overcome by the creation of pathfinder vocational subject adoption and cascade through other subjects. As technology advances, so will the ability of immersive learning- new entrants to the market can be encouraged by governments. There are many examples that can be built upon in aviation, maritime and defense training. Flight and bridge simulators were once deemed difficult to replicate and are now mainstream and will evolve into more dynamic and wider applications.

Within higher education, the focus on research and high-quality teaching and learning are at the very core. Critical thinking is an additional factor of consideration, as we need individuals that can reflect on societal change and contribute to the strategic economic development. The concept of digital blended learning should be a fundamental design feature in academic program development strategies and integrated into mainstream research and day-to-

day learning. The greater autonomy of learning given to graduates and post-graduate students should enhance the experience and preparedness for the world of work or future study and research.

Progressive integration of experiential, virtual reality and immersive learning

The traditional approach, with a teacher/lecturer standing in front of the classroom imparting their knowledge has changed little over time. The evolution from chalkboard through whiteboard to smartboards, and from overhead projectors and acetate sheets to PowerPoint presentations, shows how slow the adoption of technology has been within the education system.

There is a plethora of publications on education and learning theory and all have some form of merit in meeting individual learning styles. However, experiential and immersive technology-based learning as a combination with traditional classroom approaches would appear to produce a hybrid learning

approach. These approaches can accommodate differing learning styles and allow the student to learn how to learn and how to apply that learning.

Technology in society

The general perspective of technology, and the way societies interact with it, has duly changed over time. The adoption and wide implementation of technology is now a simple fact of life and is influenced by trends such as application-based interactions with suppliers and banks, online shopping, gamification, augmented reality and wearable gadgets. These are all aimed in some form or another at simplifying the interaction with the user, often limiting cost of delivery in the process. All these developments have an implication for organizations who deploy it, changing the nature of work. Education is not exempt from these changes and much more could be achieved using technology in supporting the education ecosystem, integrating it into the curriculum and learning approaches, with the below concepts as examples.



Gamification

Game play has traversed the realm of recreation and has infiltrated commerce, productivity, and education, proving to be a useful training and motivation tool. Like smart gadgets, the hardware, also gamification concepts help with creating a fun and memorable learning experience. Educators can also work with game developers on embedding learning concepts in games that students already use, making education for many students a more desirable experience.



Augmented Reality (AR) and Virtual Reality (VR)

VR offers immersive digital experiences that can simulate the real world whilst AR merges the digital and physical. Together, these two technologies represent a seismic shift in how curricula are not only be delivered but also experienced and re-imagined, thereby allowing educators to develop immersive teaching modules and programs.



Smart gadgets and wearable technology

Smart gadgets, like the iWatch, Fitbit, Google Project Glass, are now being ubiquitously used in our daily lives to enable us to conduct healthier lifestyles and stay connected in a device-less manner. These gadgets can be leveraged by educators to create interactive, connected and sport activities for students in a more fashionable, fun and memorable manner, thereby embedding learning in regular daily lives or vacation periods for students and parents.



Artificial Intelligence (AI) and Machine Learning (ML) and Learning Analytics

These technologies can be used to create customized programs that cater for the different students' abilities and conduct predictive analysis to measure its impact. They also help in intervening when students are struggling and provide personalized learning process and style.



Benefits of digital blended learning

Traditional teaching has been criticized as being a one-size-fits-all approach. We are also now becoming more aware of K-12 students and adult students have differing learning styles. An example is the raft of notable successful people in science, literature, business and the arts who have in later years of life been diagnosed as dyslexic, and often have stories to tell about their failings at school. This is not a deficiency of intelligence, motivation or creativity but rather the result of a traditional approach that did not fit with their ways of learning. Blended learning may more easily accommodate these differences. New teaching methodologies can be built into e-learning and blended learning platforms that enhances the learning experience.

Digital blended learning provides a number of major benefits over face-to-face teaching. Intelligent algorithms built into the software to modify the content offered on the responses of the student, as with adaptive technologies, can identify areas of strength and development. This method can produce targeted learning styles and approaches or simply appropriate repetition of a topic to ensure retention of information.

Another major benefit is the breadth and depth of knowledge that can be made available to the student which the teacher or lecturer may not have at hand. If a student has a particular interest in a subject, the learning experience can be enriched by providing more depth of knowledge or by linking to similar themes and using immersive technology to see and experience the subject. This enrichment facility would be useful at all levels of education.

The overarching benefit however, is that by engaging students in a more interactive and personal manner, motivation and interest in learning will increase, which in turn will have a positive outcome on retention, qualification and learning outcome achievements.

It would however be a mistake to imagine that technology replaces the teacher or lecturer and that students can just be left alone and learning will happen. Teachers and lecturers need to play a crucial role in understanding their students' abilities, selecting appropriate technology-based learning tools, monitoring the students' progress and their learning choices to ensure that the school curriculum is covered in its broader sense, ensuring well-balanced education is achieved.

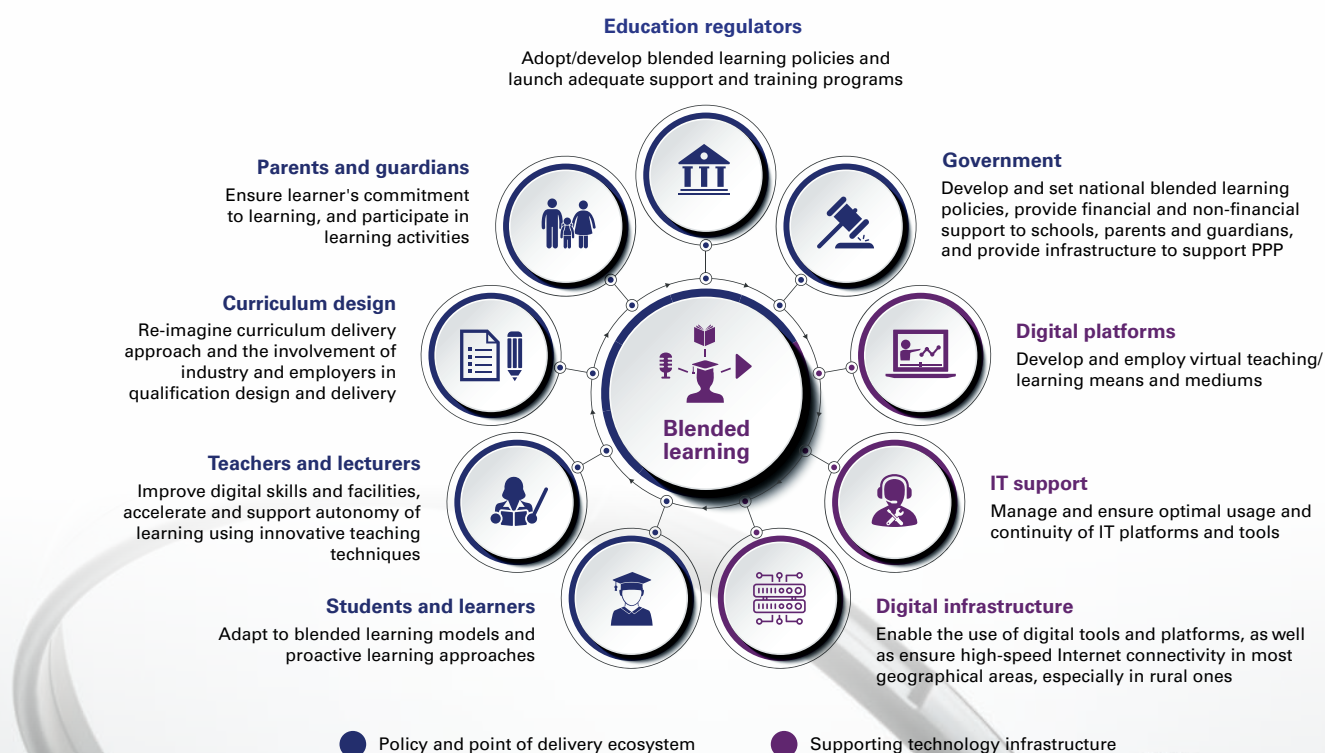
Digital blended learning and its integration and use as a catalyst for education transformation

Digital blended learning can be implemented without the need for significant change at the macro level within the education ecosystem. However, the benefits of this concept, and the subsequent improvement in student engagement and cascading benefits to the wider economy may not be fully realized without a more formalized and structured approach. Digital blended learning can be used as a starting point and an integral part of a much wider and more beneficial process of education transformation. In the following section, we explore the education ecosystem, its engagement within education transformation and the integration of digital blended learning.

To better understand the requirements for turning this approach into operational reality in the context of a digital blended learning ecosystem, we have developed a framework that considers the key stakeholders and their interdependence in implementing a digital blended learning approach within the context of a wider education transformation program. Much of the areas discussed are equally applicable to a structured approach to the implementation of digital blended learning.

Each part of the ecosystem has a vital role to play and several critical success factors need to be achieved to realize the benefits of the digital blended learning model.

Figure 4: Blended learning ecosystem



Digital blended learning delivery

Parents and guardians

Parents and guardians play a critical role in supporting students in a digital blended learning reality, particularly those supporting early years and K-12. One of the perceived barriers to successful implementation would be the attitudes and beliefs of parents who have experienced a traditional approach to education. The barriers for many parents could be their perception of the role of the teacher or lecturer imparting knowledge through theoretical or written learning. They may have formed opinions and views on what was good for them must be good for their children. During the pandemic it became evident that many parents' own digital skills may not be at a sufficient level to support e-learning, making it difficult to support their children's learning journey.

Any parental involvement in their child's formal enrolled education will vary according to ability, willingness and the time constraints that parents face. This could lead to inconsistencies across groups of learners which the aim of face-to-face learning within school environment was designed to remove. However, the evidence around the benefits of parental involvement in supporting learning is well-documented. The use of digital blended learning and more innovative approaches to the use of technology for home study or homework, as illustrated above, may present several challenges in its adoption.

In order to overcome these challenges, we would suggest the implementation of a **Parental Engagement Program (PEP)**. Such program would be aimed at parents to upskill them in digital delivery of learning so that they can support students when learning takes place outside of the classroom. The main outcome of this program is assisting in a cultural shift in parental support of core school-based learning and upskilling parents in digital skills that can be utilized in their everyday life and in the workplace.

Students

While students' adaptability to new learning methods may not be as straightforward as it appears, student engagement in the learning experience will evolve from receiving knowledge to participating and having a sense of ownership of learning. It is easy to generalize that students are already engaged in e-learning, using computers/tablets and are often involved in gaming. However, limited or no access to technological devices and internet creates a digital divide leading to digital poverty of groups of students, and can limit blended learning opportunities outside the classroom. **Digital poverty presents a significant challenge for governments in becoming more inclusive and allowing for social mobility. Accessibility to technology and communication tools impacts all levels of the education system.**

Whilst the use of technology may be seen by students as largely a passive or recreational activity, introducing more digital elements into the curriculum presents a connection of digital skills adoption to the learning environment creating positive reinforcement of learning. Given the variety of differing learning needs we believe a one-size does not fit all and that personalization of learning is needed. One way is to develop detailed **Individual Student Learning Plans (ISLPs)** taking the individuals' learning needs and styles into consideration.

This tailored learning approach, and the creation of ISLPs will present the teaching professionals with the choice of what and how best to construct learning for individual students.

While we acknowledge that ISLPs are not new, we would argue that they are currently not utilized as effectively as they should be and that their benefits are not fully realized. The development and implementation of ISLPs, and tailoring a more student-centered approach will require them to evolve significantly in importance and day-to-day use. ISLPs can be informed by data gathered through participation in e-learning and blended learning activities and give the teacher a much clearer picture of student's strengths and areas for development. These factors having a positive outcome on meeting individual learning styles and learning outcomes.



Government

Governments act as catalysts of change providing strategic direction and setting out policy to their departments and supporting organizations. Providing a socio-economically relevant and viable education offer requires departments to work together to provide the framework and policy guidance. This then will facilitate that the education system delivers an appropriate workforce, equipped with the needed skills and as a result supporting economic growth. Whilst this appears logical, we see that in many cases the education system operates in a 'supply-to-market rather than a demand-led model' – churning out graduates that are not necessarily matched with the requirements of the job market, let alone to drive future-oriented research and development. Whilst we accept that not all learning has to be based on an economic approach, the failure to implement more of a demand-led model does create more skills gaps in the market.

One of the main barriers to achieving the above is the siloed nature of government departments and the differing levels of integration around an economic approach to the supply of education and its operational implementation.

To overcome this, we propose that **governments should consider a single point of authority and ownership of any education transformation activities.** This organization should have the ability to operate across the government and remove any siloed behavior. It should be mandated to work across government, the wider public sector and the private sector to facilitate partnerships that integrate economic and employer involvement in education system design and that of its qualifications and delivery. Such an entity should make the education offer economically relevant whilst still allowing providers to fulfill their social ambitions, this being particularly relevant in TVET and academia.

The role and responsibility of such an organization is to develop and implement an employer-led strategy that would include and integrate a digital blended learning approach to the delivery of a newly defined education and learning offer.

Curriculum design

Who develops the curriculum and how it is delivered are critical factors to the success or failure of education transformation and to the implementation of a digital blended learning strategy. The implications of our rapidly evolving world will present challenges to the current curriculum content we have in place today. Providing a general core education base will continue to be the foundation for school systems as preparation for future employment. This core general education base includes traditional areas such as literature, language, mathematics, biology, physics and chemistry. However, we see the need to integrate digital, employability and soft skills within every level within K-12. Whilst these core learning topics in K-12 give a solid academic base to learning, the integration of the academic and vocational routes should be considered for year 10.

As seen in some countries such as Norway and Sweden, this academic and or vocational streaming gives wider options for students to follow routes that are suitable to their learning style and needs as well as preparing them for differing parts of the employment market. To develop this further will require the voice of academia and the voice of employers to collaborate on what underpinning knowledge should be developed to give a rounded education to year 10, with then the option of following an academic or vocational pathway between years 10 to 12. In TVET and academia, it should be mandated to have a growing employer voice to transform the system from taking it from a supply-led to demand-led approach.

Whilst this core curriculum mix between academic and vocational pathways are important, its delivery in a digital world needs to be reimagined. Of concern in traditional methods of delivery is how learners with differing

learning needs are met. As mentioned previously, whilst we accept that individual learning plans can be created, meeting the needs of learners with learning differences appears not to be with effectively.

According to Dyslexia International, as much as 7 to 10 percent of the population has some form of dyslexia, though other evidence this might be even higher. Students experiencing dyslexia require differing levels of learning support for identified individual learning needs. Each country can do a simple equation to realize that just in the case of dyslexia, what the size of the issue within their country might be. The figures give cause for concern and focus.

Currently, many learners who do not fit the traditional mode of delivery are sent to special educational needs (SEN) departments where alternative delivery methods are practiced. This approach often has a stigma attached to it for individual learners, when in most cases it is not due to the lack of intelligence or learning ability, but rather around the individuals learning style that are not met in the traditional classroom setting. The introduction of a digital blended learning approach and ISLPs that includes experiential and practical elements to the curriculum, combined with data provided by AI participation evaluation creates the opportunity to assess how individual learners can be taught using different mediums. This may also reduce the SEN label that many students currently have and are held back with in schooling and in society.

In the context of curriculum design and delivery methods, the use of real-world examples and immersive and experiential learning approaches and activities assist not only dyslexic learning but offer other learners a chance to apply and experiment through learning. Whilst this approach and learning theory are not new and to a large extent based on the work of David A. Kolb, who published *Experiential Learning: Experience as the Source of Learning* in 1984, the key messages seem to be in today's teaching to test delivery approach. Similarly, in Singapore, the use of real-world examples to teach math has proven to improve engagement and performance outcomes. Therefore, integrating learning theory into design-based learning (DBL) solutions would appear to meet the foundation of learning and translating this into twenty-first century curriculum delivery platforms.

Teachers and lecturers

Arguably the largest transition requirement will be for teachers and lecturers. Any changes to qualifications and the curriculum take a significant level of upskilling of those delivering it. **Adding the complexities of digital blended learning and ISLPs will require new skills and delivery methods for teachers and lecturers.**



Dependent upon the digital literacy of teachers and lecturers, the transition to a more digital and innovative way of delivering content may challenge the culture and traditional ways in which they have previously delivered learning. For many teachers, embracing this change will provide them with the tools and skills to deliver their subject knowledge in creative ways that they as individuals will find more rewarding – particularly if they are involved in the ideation of the new delivery methods. However, for some, the leap from traditional holders and presenters of knowledge may be difficult or undesirable. This transition period may result in some turnover of teaching and lecturing staff and create knowledge loss from subject areas that are traditionally difficult to recruit into.

It is evident that the introduction of digital blended learning into the mainstream of education will be its introduction in initial teacher training within institutional induction programs, as well as a national approach to incrementally upskilling the digital skills of teachers and lecturers via online and physical blended learning development sessions. This should be seen as a national government program, supported by regional and local digital skills champions who can act as lead facilitators and point of reference in master-class development at a subject level. By taking this approach, teachers and lecturers will be engaged in the ideation and creation of the changes required to curriculum delivery innovation.

Education regulators

Education play a crucial role in the redesigning of curricula and redesigning of its delivery. At the same time, they can be a source of bureaucracy and delays, driven in part by legacy processes, procedures, and policies. **Enacting change will require a multi-faceted approach that considers effective buy-in, clear definition of roles and responsibilities, and a clear path for delivery of innovative changes be it in the technology or content.** This required change will include fit-for-purpose methodologies, policies, and procedures that can be implemented by empowering administration and regulatory bodies with the remits, responsibilities and resources required. This could include standardization of approaches, providing funding, managing expenditure and investments of education EdTech.

A critical success factor is that government empowers and holds education regulators responsible and accountable for its refreshed mandate. This will only be achieved by providing the mandate for change and staffing these entities with capable and qualified

personnel, motivated by innovative breakthroughs, instigating change and provided freedom to challenge existing norms in the pursuit of positive change.

Digital infrastructure

Since lockdowns were enforced, there have been significant improvements in the technological and digital infrastructure of many countries. Governments around the world working with private sector providers have significantly increased the capacity of their systems to cope with the increasing demands for e-learning. However, whilst there has been progress there is still much to be improved upon.

With the increase in demand of remote learning platforms and the respective infrastructure, digital equity and equity of access have come to light with national disparities on internet connectivity and access to the required technology.

In addition, costs of increased internet usage and requirements for computers and tablets to facilitate connected learning have created levels of digital poverty as not all access is equal.

The demands of a digital blended learning offer and the integration of new and emerging technologies into school, TVET and university curriculum delivery methods will place interesting demands on the network and also create the need for the implementation of new technologies and hardware, like VR headsets, 5G connectivity, digital projects and next generation monitors.

This will come at a cost, especially if standardization, which in itself is a difficult feat, is not achieved. Aside from purchasing investments, also ongoing maintenance and training costs need to be considered.

With the introduction of such level of technology across education providers, there will be an increasing need for technical support. At a national level, this will require a network of data centers along with centralized provision of content. Regionally, this will require data and relay centers and distribution hubs for devices, while on a local level, there needs to be implementation and maintenance support.

A critical success factor in addressing digital poverty and access for all will be the provision of a solid digital infrastructure by governments. This will require public private partnerships to support the increased demands of 5G and future networks, and the scaled purchase of IT and delivery mediums.



Summary of critical success factors

In this section, we have shed our light on the critical success factors that will make digital blended learning a reality. Whilst these observations are important, they are not exhaustive and provide a skeleton on which actions and critical success factors can be identified and built upon in the continual evolution of digital blended learning. Below is a summary of some of the critical success factors identified along with their key stakeholders and the suggested action.

Stakeholder	Critical success factor	Suggested action
Government 	Ownership of change	Formation of a government entity with the remit and responsibility to work cross the government and facilitate education transformation that includes digital blended learning Facilitate PPP integration in the design and delivery of qualifications and the digital infrastructure to support it - Invest in and develop required infrastructure to support ISLPs that utilize AI data to inform student-centered learning - Subsidize access to technology and devices
Parents and guardians 	- Cultural shift towards blended learning - Digital upskilling	Dedicated Parental Education Programs (PEP) that addresses the required cultural shift and digital upskilling of parents to support K-12 learning at home
Students 	- Tailored student-centric approach - Addressing digital divide	Support programs for students that help illustrate the use of digital blended learning and AI data to tailor learning pathways
Teachers and lecturers 	- Transition of teachers and lecturers to the blended learning environment - Cultural and mindset shift - Digital upskilling	- Introduction of digital blended learning in teacher training and within induction programs - National approach to incremental upskilling of teacher and lecturers in subject specific digital content - Identification and promotion of regional and local digital skills champions that are subject matter trainers in the delivery and facilitation of digital blended learning
Curriculum design 	- Redesign and repurposing of curriculum to suit a new mode of delivery - Involvement of industry, employers, awarding bodies, curriculum design	Involvement and integration of industry to continually review economic and skills needs so they are reflected and actioned within the education ecosystem Involve employers to work with qualification awarding bodies in the design of qualification content and its digital delivery Inclusion of digital skill, coding and employability skills in the core school curriculum and digital and employability skills included in TVET and university programs Promoting lead educationalists to work across awarding organizations, employers, and industry to support relevance of qualifications and curricula
Education regulators 	- Capable and qualified staffing within organizations - Smart regulation to promote innovation	- Defining fit-for-purpose methodologies, policies, processes, and procedures - Incentivize and attract qualified and capable individuals to join administrators and regulators
Digital infrastructure 	- Availability and viability of communication networks - Access to required IT for relevant stakeholders	- To facilitate public private partnerships that innovate both digital learning content and the support infrastructure required to deliver digitally re-imagined education - Scaling of purchase of IT and delivery mediums, subsidizing costs for families in low-income groups - Access to 5G networks and future digital communication channels

Adopting digital blended learning

This publication presents a roadmap and model for the transformation of education systems, with a key role for adapting digital blended learning.

As we emerge from the pandemic, we can either go back to how things were, or take this moment in time to opt for fundamental change, and embark upon a journey that reimagines what the future of learning could be and the benefits that this would create in a changing world. The future of work seems fundamentally changed, while technological advanced is changing society in many respects.

Education systems needs to evolve quicker to support the needs and ambitions of societies and economies.

We believe that the recommendations of this study could certainly be transferred and aligned to the unique challenges and indeed unique opportunities that are faced across the Middle East. Considering the critical success factors, we have the opportunity to reimagine our education systems and look to apply what is relevant and applicable from this report and make a step change in the evolution of our education system.





Roadmap to implementation

The overhaul of the education system to operate in this new normal will require a multi-faceted approach which takes into consideration the needs of the future labor market and the education ecosystem. From the government perspective, the implementation of a new education system will require:

01



Robust and transparent education and skills strategy and policy,

informed by the needs of the economy, industry, employers, teachers, parents, solution providers to allow for progressive policy implementation and regulation balanced with flexibility for the industry to develop and innovate.

02



Structural responses including setting up a cross-government body that facilitate the required changes across government departments and coordinates PPPs that develop the required infrastructure, technology, training, and standards of solutions being implemented.

03



Social measures to allow equitable access to blended learning platforms, bridging the digital divide and supporting families with the transition. This being particularly important for equitable learning opportunities in smaller villages and villa schools.

In response to the global pandemic, elements of the above have already begun to be thought about and/or implemented. Whilst this is a positive approach, the level, scale and complexity of the education systems in the Middle East will have made it difficult to qualify and quantify the levels of actual student experience and learning attainment achieved. It is time to take a leap forward, reimagine the future of education and work incrementally and quickly towards realizing the benefits of what the education could and should be, and how it contributes to the generation of qualified, capable and employable citizens.

These marked changes need to be reinforced and institutionalized through a central authority that has the required mandate to question the status-quo and advocate for the long-term evolution of education. This can take the form a taskforce embedded within the Ministry of Education or become an independent commission equipped with the necessary expertise to understand existing

challenges and provide recommendations on strategic direction and implementation of solutions.

Its central position within the ecosystem will mean that it can interface and catalogue the expectations of policymakers and regulators, as well as the needs of teachers and students, through to the ambitions of the private sector. The governance of such a body will dictate its remit, however in an ideal state it would operate with a high-level of autonomy and objectively define priorities and solutions befitting of the needs and principles outlined earlier in this paper. Once established, this proposed body can implement the critical success factors necessary for the education ecosystem.

The future of education is in the hands of the current leadership, and choices made today will not only impact the education landscape of tomorrow, it will shape the economic and societal fabric of the country. Turning the challenges of the pandemic into opportunities for reform, we have the chance to evolve the education system for good.

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