Digital Transformation in the Education Space: A Review of the Impact of New Technologies on Middle East Education

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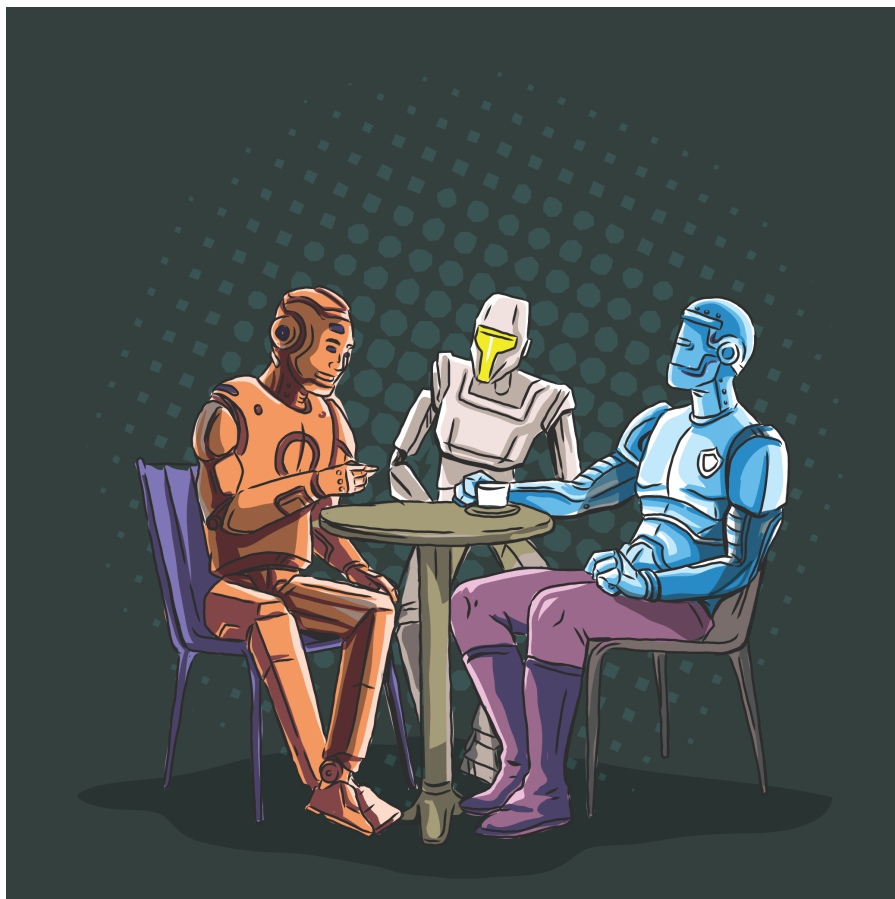Haroun Khwaja - Senior Counsel - Digital & Data
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The Middle East Education sector is

undergoing huge transformative change as technology is adopted and applied at incredible speed. This article captures a number of these changes with a focus on the adoption of new, and disruptive technologies.

How Artificial Intelligence can Develop the Natural Intelligence of Students

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In March 2019, Sheikh Mohammed bin Rashid, the Prime Minister of the UAE and Ruler of Dubai announced that a new generation of schools will be built in the UAE at a cost of AED1.5 billion. These schools will include laboratories for machine learning and artificial intelligence ('AI').

This aligns with both the UAE's national strategy on innovation and the UAE's national strategy for AI (which was the first of its kind in the region and indeed, the world), where education has been identified as a priority sector.
However, AI in the education sector is not just about what students are taught, it is about how they are taught. Here are four ways AI and machine learning may change how education looks in the future:

1. Smart Content

'Smart content' such as digitised textbooks and new learning platforms are being developed. Smart content also encompasses other virtual content such as video lectures and conferencing. AI interfaces can enable teachers to create electronic curricula and distribute educative information across a wide range of devices.

2. Differentiated and Personalised Learning

AI will allow personalised electronic tutoring customised to the learning styles and particular needs of the student. The traditional curriculum is designed to suit as many students as possible. For students in the top 10 percent and the bottom 10 percent, AI can be used to provide testing and feedback to those students to give them challenges they are ready for, identify gaps in knowledge and re-direct them to new topics when appropriate.

3. Global and Remote Learning

AI can facilitate learning from anywhere and at any time. Furthermore, AI has the potential to support students with homework and exam preparation at home with advanced tutoring and study programmes.

4. Administrative Efficiencies

Educators spend a lot of time on grading exams and reviewing homework in addition to interacting with their students. AI can expedite teachers' administrative responsibilities. At a minimum, this would give teachers more time to spend with students. Software providers are still coming up with new and improved means of AI assessing and grading work.

Exactly how AI will enhance and change educational system practices remains to be seen but, in a world where students are constantly interacting with technology in all other aspects of their everyday lives, AI 's digital and dynamic nature clearly offers opportunities for student engagement that are not always available in the fixed environment of the classroom.

The Growth of Middle East NRENs

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NREN stands for National Research and Education Network. NRENs can operate on a national, regional and also international level, and are responsible for providing networking and e-services to benefit their education and research facilities. They promote collaboration between research institutions and the exchange of resources, as well as connecting research institutions internationally, through interconnecting with other NRENs. Specifically, NRENs provide the high bandwidth (Gbps) connectivity required for particular types of research, such as large-scale simulation, image data transfer, high performance computing, grid computing, etc.

As the Middle East higher education sector increasingly develops its research capabilities, NRENs will become more and more important in driving this development. A number are already well developed. These include, amongst others, Ankabut in the UAE and SARInet in the Kingdom of Saudi Arabia.

Ankabut, UAE

Ankabut is the UAE's NREN, linking the UAE's universities together with others around the globe. The initiative was started here in the UAE by Khalifa University. Its purpose is to provide cutting edge network infrastructure to learning and research centres in the UAE, and engage with other institutions at the international level in the sharing of resources and assistance.
Ankabut is a good example of how NRENs are developing, from previously simply offering connectivity services to now additionally offering innovative research and education centric IT services such as cloud and professional services as well such as IT consultancy and project management services.

ASREN

From a regional Middle East perspective, ASREN is the Arab States Research and Education Network, the organisation that co-ordinates NREN organisations in North Africa and the Middle East. They are responsible for assisting others with and developing network connectivity. Its counterpart in Europe would be the pan-European GEANT network.

SARInet, Saudi Arabia

SARInet is the Saudi Academic Research and Innovation Network, established by the King Abdullah University of Science and Technology (KAUST) and the King Abdulaziz City for Science and Technology (KACST). SARInet is administered and operated by KACST. A link from SARInet to the GÉANT network has been operational since 2011.

Middle East NRENs, like their international counterparts, face a number of challenges. The provision of high bandwidth connectivity services is expensive. As research demands grow, along with the size of the datasets needed for such research, the cost of running and developing these networks increases. Universities and research centres are not customers with deep financial pockets. As a result, NRENs are challenged to build and develop their network infrastructure, and related services, as cost effectively as possible. Added to this is the changing face of data privacy in the Middle East. As new laws and regulations come into force covering everything from the handling of particular types of data (e.g. health data) to new data localisation requirements, NRENs' management and sharing of data needs to be carefully reviewed. Finally, as the value of research to Middle East universities increases, NRENs need to be fully aware of, and prepared for, cybersecurity threats and issues.

EdTech Starting Up

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Technology use for education of school children is becoming integrated into curricula in the Middle East as it is worldwide. No longer is there a single class for computing; there are classes for coding, and children use computer games to learn spelling, comprehension and mathematics, among other things. Children also participate in pen-pal type applications to communicate with their peers on tailored cloud-based electronic mail, message boards and chat rooms, and can learn skills like origami and chess using apps and websites just for them.

The EdTech sector that supports this increasing technology usage is growing rapidly in the Middle East. According to Forbes, there are around 270 such start-ups in the MENA region.[1]

Best practice for adopting EdTech in schools will help not only to protect the interests of schools, students, parents and teachers, but may be a valuable marketing tool for potential EdTech start-ups selling into this space.

In considering best practice, schools and EdTech providers will need to consider data protection issues like any planned targeting or profiling of students using data submitted to EdTech applications. Related issues to consider will include the right of inspection, review and correction of student education records, provision for the electronic transfer of student records in the event a child moves to another school; and setting out when information may be disclosed to third parties more generally. The issue of parental consent is also important and EdTech providers and schools should consider how to manage this. Enabling parents to opt-out of commercial use of children's information or third-party use, without any disadvantage to the student, needs to be factored in.

In the absence of EdTech-specific data protection legislation in the MENA region, being compliant with international best practice (e.g. US EdTech requirements), may be a point of differentiation for EdTech companies bidding for work in schools in the region.

The cost of dealing with a technology security breach is high given the sensitive setting, with potential civil and criminal penalties attached in addition to the reputational and brand damage for education providers (and the technology providers). Technology providers and schools need to agree responsibility for cybersecurity, adequate training and awareness for teachers, children and parents, along with appropriate protections, regular monitoring and updating of the computing equipment and software, supported by clear accountabilities.

In terms of agreements between EdTech start-ups or mature firms with schools, they should cover at a minimum the use, deletion, or porting of student records/data in case of any future discontinuation by the school, or a merger or acquisition of the company; payment model and terms; ownership and use of intellectual property including any moral or analogous rights of children as authors; and any local law or school-specific procurement requirements (also discussed in this article).

[1] Suparna Dutt D'Cunha, Forbes.com, "Why The Middle East's Booming Student Population Makes It A Perfect Site For Education Tech Startups" 19 March 2018
(
https://www.forbes.com/sites/suparnadutt/2018/03/19/edtech-startups-are-plugging-an-innovation-gap-in-education-in-the-middle-east/#7b8c85c84fa4).

Using Social Media for Good, Instead of Evil – Some Tips from a Media Lawyer

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There can be no doubt that the advent of social media has provided a boon in relation to opening communication channels for students. They can use social media to connect with any person in their class about the curriculum, post queries directly to a teacher without waiting for an appointment and generally share their learning experiences with each other. Any tool that promotes such positive interactions amongst students must be encouraged.

However, social media use comes with responsibilities, particularly in the Middle East.

Students must understand that there are laws that affect their daily online interactions. To help parents and teachers with this discussion, here are our top 5 tips for online responsibility:

1. **BE CAREFUL WITH ALL PHOTOS**: Be very wary of posting or sharing images of other people without their consent. This has criminal implications in many countries in this region. If a complaint is raised it will be taken to the police. The image need not be, of itself, controversial to trigger this reaction. Obviously posting images of a teenager who has been drinking is not appropriate nor is it legal, but neither is posting a photo of that same teen simply walking down the street. Remind your students that if they are asked to take any image down, they should do so immediately.
2. **GOSSIPING CAN HAVE A HEAVY PRICE**: Students love to gossip, but placing rumours or even true

stories about another person online, in such a way that their reputation is harmed, can have serious legal consequences. Remind students to keep it offline; if they absolutely must say anything at all.

3. **PORNOGRAPHY HAS A BROAD MEANING**: Any images that are sexual in nature, including partial nudity, will be considered to be pornographic. Pornographic images are not tolerated in the region. If such an image is of an underage person (that is, under 18) then the law takes an even more serious view of the actions. Note that, for this law to be triggered, the offending act can be as benign as simply receiving and keeping the image on a phone. A person does not have to take the image, or even distribute it, to be caught by the terms of the law. If such content is sent to a student, tell them to delete it and immediately ask the sender not to repeat that action.

4. **EXTORTION IS A CRIME ONLINE AS WELL**: The simple act of telling someone that there will be repercussions if they do not (for example) send a certain type of selfie will, in itself, constitute criminal activity. This sort of activity is extremely common with the perpetrators often feeling that they are not breaking the law. They are.

5. **ANTI-SOCIAL BEHAVIOUR IS NOT ACCEPTABLE**: It is imperative, in all communications, to be mindful of the social standards of the region. Behaviour such as excessive swearing, spreading rumours about unbecoming conduct or generally encouraging sinful activity will be considered to be illegal and can be considered to be criminal in extreme cases.

With fines ranging up to one million dirhams and jail time being prescribed for many of these matters, it is always a good idea to remind students of their responsibilities under the law, and to each other. Social media content lives forever, and the conduct of the person that instigated the activity will also remain as part of their reputation for a very, very long time.

IoT in the Education Space

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With the implementation of the Internet of Things ('IoT') Regulatory Policy in the UAE in March 2019, all services and products involving IoT in the education sector will be governed by the IoT Policy.

The IoT Policy applies to all persons concerned with IoT in the UAE, including but not limited to: (1) Licensed telecommunications service providers (i.e. Etisalat and du); (2) IoT Service Providers (as defined in the IoT Policy); and (3) IoT Service users including individuals, businesses and the government.

Key features of the IoT Policy include:

• an IoT Service Provider has to register with the TRA to provide IoT Services (with providers of "Mission Critical IoT Services" having additional registration requirements);
• there are data localisation requirements. Data that is classified as 'secret; sensitive; and/or confidential' is to be stored primarily in the UAE. However, such data may be stored outside of the UAE if the destination country meets or exceeds any data security and user protection policies followed in the UAE.
• there are additional requirements for Radio and Telecommunications Terminal Equipment ('RTTE') which provide IoT Services.

A good example of the application of IoT in the Education space is the Robot Avatar designed by Avatarion, a Swiss company, that builds robots connected to the Microsoft Azure IoT Hub. It provides students with connectivity to the classrooms when absent from school via full video and audio connections. The student

uses a tablet to control the robot's movements, speech, send images to classmates and answer questions by raising the robot's hand and speaking through a connected microphone and speaker.

Can't Fake it on the Blockchain

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Readers may recall a Law Update article written last year titled '***[Faking It: The Fall-out from the Bogus Degree Epidemic](#)***'. The article highlighted the surge in people passing off fake degrees worldwide, including in the MENA region, and the risks to employers who have staff holding fake academic qualifications, as well some measures taken by regulators and employers to address the issue.

There is real potential for the use of blockchain platforms by universities, colleges and schools to counter this problem by building institutional trust in the authenticity of their qualifications through the immutability and time stamping functions of the distributed ledger technology. Here are some of the reasons why:

1. a private, closed blockchain solution is like a globally shared database except it does not have two of the four classical database functions (i.e Update and Delete) so as to preserve a record of all transactions/events that have taken place on the platform;
2. its private nature provides only for a limited number of users (in this case, the legitimate educational institutions) to write data/upload records or documents to the blockchain; and
3. its closed (permissioned) nature means only a few users (for example, in the case of a university, the graduates and specific potential employers to whom they allow access) can read the data on or documents uploaded to the blockchain. An open (public, permission-less) blockchain platform that allows the general public to access the platform, read the data and view the documents would increase a candidate's chance of being discovered; however, that could also give rise to privacy issues and risk to their personal data (e.g. name appearing on qualification) being misused, or even worse, result in identity theft.

A great example of the application of blockchain can be found in Bahrain where the University of Bahrain ('UoB') has stepped up as a leader in its field by utilising blockchain technology to verify, authenticate and ensure student-data security. See our article titled '***[Education Bahrain: A Round-up of some Key Developments in the Kingdom](#)***' on this.

Start-ups are increasingly looking to leverage blockchain technology to provide verification of university degrees, employment history, and other professional credentials, thereby giving employers reliable information about a given candidate. The platforms will allow recognised universities, employers, and training service providers to upload source-verified credentials about an individual each time that individual completes a qualification or undertakes employment. The information will be time stamped and any changes to a qualification linked, creating a historical chain of education that cannot be faked.

These business models can be based on a token payment system (based on a crypto-currency) that is intended to incentivise educational institutions to upload credentials about its students. By paying a tokenised fee, hiring businesses can use the platform to view the credentials of, and recruit, suitable candidates. Universities, colleges and schools are given some of the fees so as to encourage them to continue uploading the information about its students to the relevant platform.

The ultimate success of what may end being a plethora of such competing platforms remains to be seen and questions around data protection yet to be resolved. However, it may make sense for governments in the region looking to bolster the credibility and attractiveness of its educational system to consider the possibility of developing and operating such a platform for the qualifications granted by educational institutions based in their respective territories.

Incentivising Education Enrolment with Blockchain Technology

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Blockchain technology has the potential to serve as a powerful tool in promoting enrolment in educational institutions located in underprivileged communities, where families often keep their children out of school to work and contribute to the household income. Such families value short-term monetary incentives over long-term education for their children thereby perpetuating the cycle of poverty. Blockchain technology allows tokenising the education system with crypto-currencies to incentivise education in such communities. The mechanics are simple. Attend and participate in school to receive crypto-currency reward tokens.

Automated systems and biometric technology are able to track and record students' attendance and participation in schools. In return for attendance and participation, students can be rewarded with crypto-currency tokens which they are able to use for purchasing food, healthcare services, financial aid amongst other things, from partner organisations. Having such an incentive in place will not only help increase attendance and participation of students in educational institutions in underprivileged areas; but will also pave the way for greater socio-economic prosperity. Since different levels of education have varying student enrolment rates (i.e. primary schools generally have the highest rate and high schools the lowest), education can be incentivised with a multiplier. Primary school students will get a smaller reward in comparison to middle school students who will get a smaller reward in comparison to high school students.

This system will help blockchain based education incentives to operate with maximum efficiency in achieving the objective, i.e. to promote education and reduce poverty. If done on a scalable level, the results can be exceptional. Although one major limitation of this incentive system is the small number of partner organisations which, in turn, limits the variety of commodities and services which can be exchanged in return for crypto-currency tokens by the students. Greater participation from partner organisations can help ensure the effectiveness of such blockchain based incentive programmes.

Procurement of Education Technology by the Public Sector

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In most countries across the Middle East, and elsewhere, the public sector is primarily responsible for the provision of primary and secondary schooling, and for much of the tertiary education sector. In this context, where most 'clients' will be government sector education providers, vendors of educational technology solutions need to be aware of the types of issues they may encounter in a government procurement context. For vendors investigating opportunities in Middle East markets, it is important to be aware that different requirements may apply depending on the jurisdiction or the entity involved.

We regularly work with educational technology vendors seeking to supply software and related services to government entities, or negotiating the terms of government contracts they have already been awarded. Such vendors are often unaware of local government procurement rules that prescribe specific requirements for contracts entered into by government entities. As a result, a lot of time and effort is spent on trying to negotiate points that are basically 'non-negotiable'. It is essential that vendors contracting with government entities take into account the local government procurement laws, so as to properly manage their own expectations and commercial risk.

Ensuring compliance with government procurement requirements can be made all the more difficult because of the fact that such requirements have typically been drafted with civil construction type projects in mind, rather than software licensing or sophisticated information technology services. As a result, and in combination with a client who is adamant that their terms must be accepted 'as is', it can be very difficult to find common ground. Additionally, where variance from the government's standard terms might require approval at a very high level (such as Ministerial approval, approval from the Ruler or some sort of Royal Decree), it can be very difficult to convince a client that its terms are not 'fit for purpose' in the context of a technology project.

Examples of the types of issues that vendors may encounter include:

- a need to go through a formal bid process – sometimes after the vendor has been told that the client is happy with their solution and wishes to sign;
- a requirement to submit bid bonds and performance guarantees via a local bank;
- a requirement to grant licences or perform services via an entity set-up in the jurisdiction; and
- a requirement that the governing law of the contract be the local law of the relevant government entity, and that local courts within such jurisdiction have exclusive jurisdiction over disputes.

These are a snapshot of the types of issues that may need to be considered more closely in the context of contracting with government entities on technology projects in the education sector. Fortunately, in some instances, there is a realisation that old fashioned procurement rules are not suitable for technology projects. Revised rules or greater flexibility may arise in some jurisdictions or circumstances, although it cannot be said that this is as widespread as would be ideal. Any businesses looking to contract with government entities in the Middle East would be well advised to make sure that their contracts have been considered with local government procurement rules in mind.

Al Tamimi & Company's [TMT team](#) regularly advises customers and suppliers in the Education sector across the Middle East region For further information please contact [Martin Hayward](#) ([m.hayward@tamimi.com](#)) or [Nick O'Connell](#) ([n.oconnell@tamimi.com](#)).