10 IMU E-LEARNING FOR THE FUTURE

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10.1 Introduction

Over the last decade, the world of practically every field from business, banking to the printing press are increasingly being transformed through the acceleration of new disruptive technologies, globalisation, fierce competition and innovation.

Higher education is no exception (Beaudoin, 1998; Allen& Seaman, 2007), and for those institutions who do not innovate, take advantage of new disruptive technologies, rethink their learning models and spaces, and adapt to the human capital needs of these fast evolving changes taking place in the business world and society, will increasingly face irrelevance and potentially bankruptcy in the coming years. To deal with the massive changes and disruptive innovations taking place in the world of education, the IMU must strive to continuously innovate and take the lead in both blended and online learning in the coming years to be relevant and spread its wings to enrol more students from around the world.

This means that we need to rethink how we are currently using e-learning and technology for learning and teaching, and embrace quality learning trends such as personalised learning, mobile learning, collaborative learning, e-portfolio assessment, learning analytics, mastery learning, online assessment (formative and summative with constructive feedback), simulation, gamification, MOOCs/OERs and virtual hospital to amplify and transform the students' learning experiences.

The IMU's new and evolving 'TEST-Learning' framework will continuously remind us to use technology to redefine and transform the way we facilitate learning and teaching. Today, enhancing and transforming students' learning experiences is no longer an option. It is the only way to survive and prosper in the coming years and decades.

10.2 Future e-Learning Trends

What will e-Learning (or learning) look like at the IMU in 2020?

Which disruptive technologies and learning methods should the IMU focus on to transform and get a leading edge over other learning institutions by 2020?

Based on the disruptive changes in educational technologies over the last decade (e.g. Social Media, Cloud Computing and Mobile Learning), it is not so straight forward to predict exactly the right direction or tools to select for the future. However, there are certain patterns and themes that we can derive and synthesise from the existing trends and future predictions to guide us (Johnsonet al., 2013; Schubarth, 2013).

Firstly, we need to keep in mind that by 2020, most if not all learning we do will involve using some form of technology, and that the letter 'e' will gradually disappear from the word 'e-LEARNING'.

Let's look briefly at seven key e-learning trends that will impact how learning might look like in 2020:

- **Openness**
  More and more quality Open Content, Open Educational Resources (OER) and Massive Open Online Courses (MOOCs) from top universities and companies around the world will be made available freely for anyone to reuse/remix (using Creative Commons License) or learn from (including copyrighted materials which will not allow reuse/remix) (Rosen , 2012). As such the ability to curate, validate (for copyright or reuse clearance when needed), remix (learning content) and then infuse such content into the course design (and curriculum) will increasingly become an important skill to master.

Universities are already exploring how to use MOOCs as part of a blended or flipped designed course, whereby students are required to study content from related MOOC course(s), and then use the F2F sessions (tutorials) with the on-campus lecturer/facilitator for more enriched learning activities, which could include discussions, group work, lab exercises, etc. (Bruffet al., 2013). In other words, the MOOC replaces the lectures and most of the course-related reading materials (Think of it as a real-time interactive social e-book). As such, lecturers can focus more of their time on designing and enriching the student learning experiences, rather than being bogged down in creating e-learning content (which could be very costly, too).

Why reinvent the wheel (of content)? As everyone will have access to top-notch learning content (mostly for free), smart universities and academics will strive to acquire a competitive edge by focussing more time on designing quality learning environments and experiences, rather than developing content that already exists. Mastering the ability to find, reuse or remix content where possible (as core or supplementary materials), and then create content when necessary to fill-in-the-gaps or improve the quality, will be critical (Vignare, 2007). Yes, you will even have intelligent agents to assist academics with assembling content relevant for their students' learning outcomes and challenges.

- **Personalisation**
  As the field of 'Learning Analytics' evolves, learning systems will become more powerful in collecting and making sense of students' usage and input from online and offline learning activities (e.g. using Tin Can API standards). With the help of learning analytics, the system can more easily adapt and personalise the students' learning content, activities and paths. Academics will have intuitive visual dashboards, empowering them to monitor students' progress in real-time. They will have intelligent tools to predict the students' potential learning outcomes, and (auto) recommend preventive measures to help students struggling with various aspects of a course.

  The biggest challenge will be to integrate the data from the various systems students use in their 'Personal Learning Environments'. However, by 2020 most of these integration issues would have been resolved. As students will have access to all the system auto-generated feedback from their online interactions, it will be crucial for academics to master the art of providing value-added constructive feedback both online and offline,, which will encourage students to reflect deeper about their learning, and inspire further exploration beyond the subject.

- **Mastery**
  Personalisation will empower students to learn at their own pace guided by learning paths negotiated and co-created with their facilitators. By 2020, the semester system will not be relevant, or used by most programmes. Instead, students will move on to the next learning outcome, task, problem-set, or challenge only when they have completed the pre-requisite levels. Much of the learning challenges will be gamified with levels, and students will receive scores and badges as they succeed (or acquire other gamified elements to motivate learning). Where no pre-requisite is required, students will be provided the flexibility to learn based on interest to encourage self-directed learning, curiosity and exploration throughout their learning curriculum, which was negotiated and co-created with their facilitators. All their work and contributions will be integrated into their personal e-portfolios automatically, which will be the most critical aspect of the students' learning evidence, which future employers would be interested in before eventually employing them.

Students won't be striving for grades anymore but for completing the learning challenges, so that they can move on to the next one. Imagine the student having 120 learning challenges to complete, and once he/she has completed all those challenges, he/she will get the certificate or degree. Whether the student take 4 years, or 1 year is really up to him/her.

- **Mobile**

  Mobile learning is already a trend being implemented in various educational institutions, but will accelerate disruptively in the coming years, as we move into the era of innovation in wearable technologies. Not only will students be learning using their smart phones and tablets, but they will also be using their smart Glasses (of which Google Glass was an example), gloves, headsets, watches, and even suits to acquire more authentic and experiential learning experiences.

  Imagine a student in the lab working on an experiment getting personalised visual guidance from their Smart Glass as they carry out the various tasks. The augmented reality layer will provide all the necessary information required to fully utilise all the equipment in the lab with a blink of an eye (through augmented pointers, text, video tutorials, etc.). This will free up time for the facilitator to engage students in more complex learning activities to inspire deeper learning.

  Imagine being a lecturer knowing the names of all their students without even trying, thanks to facial recognition through your Smart Glass. Or recording your learning demo by a voice command, which you can then share directly to your students on YouTube within seconds (or even real-time). Although there will be confidentiality and privacy issues regarding the ease of record uninvited episodes, there is no doubt that such tools could impact the learning process positively (informED, 2013).

  Yes, imagine using intelligent gloves, which will enhance responsive feeling when performing surgery or interacting with lab equipment. It provides visual cues as you carry out your mission. The wearable technologies will evolve significantly by 2020, and the real challenge will be how to use such tools creatively and effectively to facilitate more authentic and engaging learning experiences for students.

- **Gamification**

  Gamifying or gamification of students learning activities and assessment using technology is a growing trend. Gamification is the process of using game thinking and game mechanics to solve problems and engage users (Zicherman, 2011). In learning terms, Gamification means turning the class content and the way students learn into a game with a rewards system, quests, experience levels, badges, and healthy competition. For example, Paul Andersen uses elements of game design to improve his AP Biology class (BozemanScience). The entire class revolves around Moodle (and Google Apps). Students complete levels to acquire experience points and move up the leader board. Gamification is used in applications and processes to improve user engagement, return on investment, data quality, timeliness, and learning (Herger, 2012).

  Current and past research indicates that video games help stimulate the production of dopamine, a chemical that provokes learning by reinforcing neuronal connections and communications. Interestingly, educational game-play can also increase soft skills in learners, such as critical thinking, creative problem-solving, and teamwork. This idea is the basis of the relationship between games and education (Johnson *et al.*, 2013).

- **Learning Analytics**

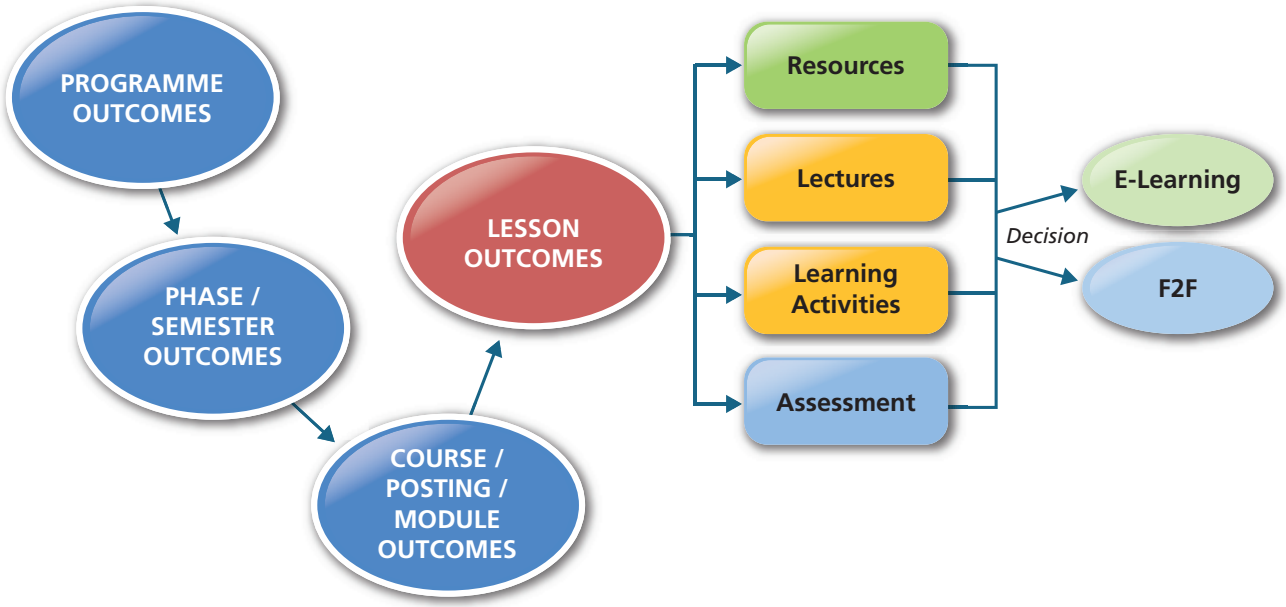
  Learning analytics is the field associated with deciphering trends and patterns from educational big data, or huge sets of student-related data, to further the advancement of a personalised, supportive system of higher education.

  The widespread adoption of learning and course management systems has refined the outcomes of learning analytics to look at students more precisely. Student-specific data can now be used to customise online course platforms and suggest learning resources.

  Universities are already employing analytics software to make the advising process more efficient and accurate, while researchers are developing mobile software to coach students toward productive behaviours and habits that will lead to their success.

  One of the most promising payoffs of this data is its potential to inform the design of instructional software and adaptive learning environments that respond to a student's progress in real-time, fostering more engagement in course material (Johnson *et al.*, 2013).

- **Learning (Design)**



As we will increasingly be overwhelmed with the amount of learning technologies at our disposal to transform learning, we should not forget quality 'Learning design' (and implementation), which will be the critical competitive factor that differentiates the best from the rest. Technologies can easily be copied and adopted.

But, quality 'Learning Design', which also involves human-to-human interaction, and the infusion of an innovative and inspiring learning culture is something that cannot be copied and adopted easily.

Quality learning design involves developing/reusing/remixing content that is aligned with learning outcomes, learning activities and assessment. Learning content should be chunked (1-5 minute units; remember 'Less is more') for all learning moments (and learning devices) with lots of interactivity and self-assessment embedded before, during and after, so that students can get immediate feedback, and personalised learning experiences guided by their actions as they learn. Learning through interactive e-books with video tutorials, simulation and self-assessments will be preferred compared to printed books.

Simulation (please refer to Chapter 13 for details) and scenario-based learning activities will be the norm by 2020. But to make it more authentic, these kind of learning activities will also take place through augmented reality or holographic visualisation using various devices. There will also be an increased focus on designing collaborative and social learning experiences for students both online and face-to-face (F2F), as team-based learning is also a critical skill to master for the working world.

Even in 2020, not all learning activities are appropriate to be done fully online, so we should always strive to find the right blend, whether it is online, or F2F or a combination of both. The key to success will be to find the right blend to stimulate more authentic learning experiences for the students in an engaging and effective manner.

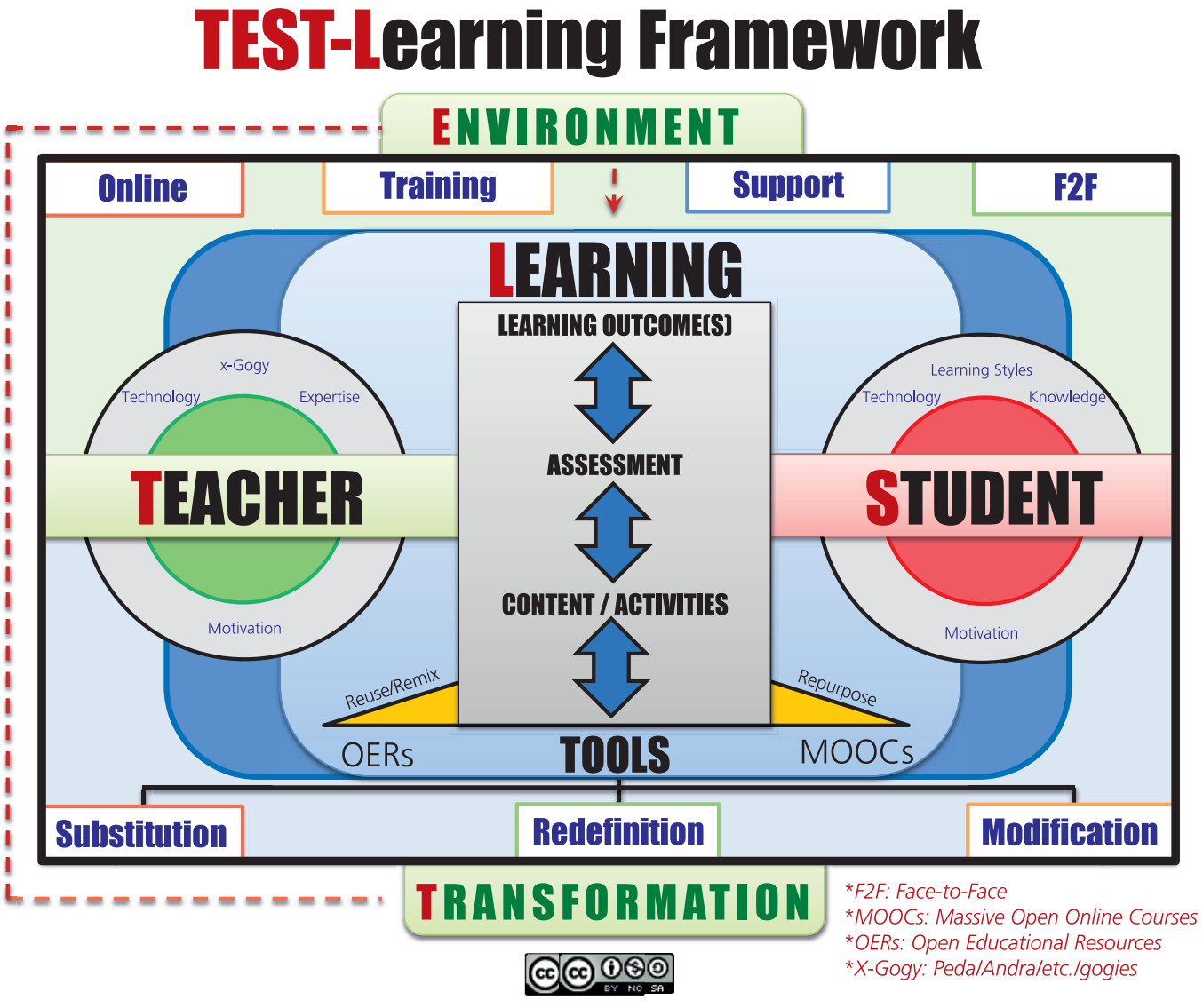
By 2020, the Flipped Classroom concept will be a common method, as (mini) lectures would be made available online (chunked nicely for mobile learning), and classroom learning would only be necessary when there are collaborative learning (e.g. PBLs) activities required (unless it is in the lab). Students will be mostly

learning together in various learning spaces around the campus, such as small discussion rooms, open spaces, and cafes. Students will get together often using various web-conferencing software (e.g. Google Hangouts), and facilitators will join in when necessary.

In addition, assignments and projects will link up students from different universities around the world to encourage inter-cultural and multi-disciplinary collaborative learning.

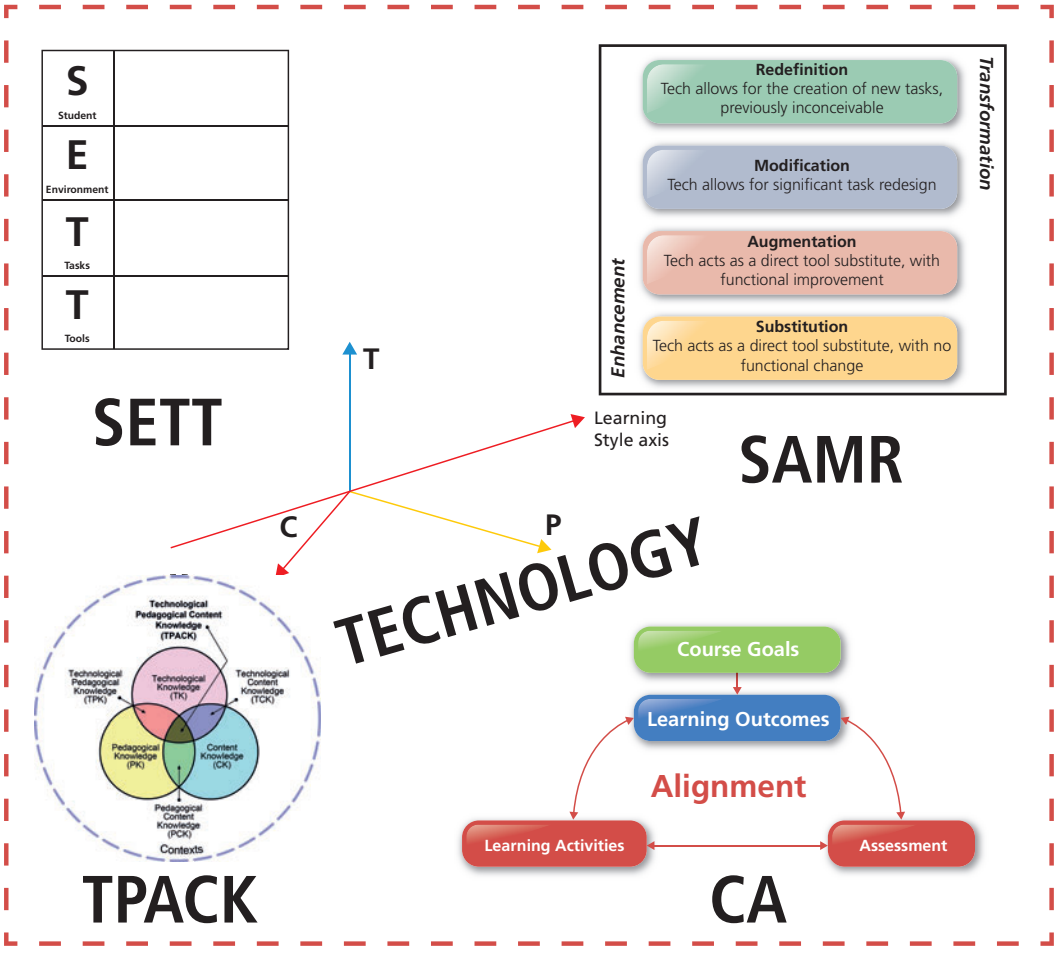
As you probably noticed by now, lecturers will no longer be the all-knowing keeper of knowledge who has all the answers. Instead, lecturers (or teachers) will be playing a critical role in the students' learning process, mostly through facilitation, coaching, guidance and/or mentoring. In other words, all these technologies won't replace the human teacher if she/he is ready to adapt to the new evolving world of learning.

Quality lecturers will be in high demand around the world, especially if they can design or facilitate relevant learning experiences that are challenging and fun for their students.



The TEST-Learning Framework (Alsagoff, 2013)

The TEST-Learning framework is a synthesised fusion of 5 existing learning frameworks:



More details: http://www.slideshare.net/zaid/21st-century-educators-workshop-at-uthm

The TEST-Learning framework is a comprehensive e-learning framework that identifies the essential components required to develop quality blended or fully online courses for the future at the IMU. The TEST-L acronym letters are sequenced in this manner, so that they can be easily remembered; not meant to be necessarily applied in chronological order.

Whatever learning tool or method we use, the focus should always be to improve the students' learning experiences, and strive towards designing learning activities and assessment, aligned with the learning outcomes we require students to learn.

Let's explore the TEST-Learning framework items in context with transforming IMU's learning and teaching environment:

No.	TEST-Learning Framework
1.0	**ENVIRONMENT**
1.1	**F2F (Face-to-Face)** Whether you are learning (or facilitating) in the campus or online, the environment should be optimised to the transformative student learning experiences that the IMU aspires to design. Meaning, the IMU needs to rethink the campus physical learning spaces to be more conducive for future learning designs (with less F2F lectures, which are increasingly in i-lecture format or facilitated online through webinars), and have more smart learning rooms, which can be easily rearranged to support various types of learning methods (Flipped classroom, PBL sessions, simulations, group discussion, meetings, debates, collaborative learning, etc.). In addition, the IMU needs to invest more to transform the students' experiential aspect of learning, which includes student clubs, residential life, internships and international experiences (e.g. more learning field trips within and beyond Malaysia). These aspects cannot be effectively moved online (Gallagher & Garrett, 2013). The WiFi or LiFi (Internet access from 'Light'...in the future) and technical infrastructure must be sufficient to support all the interactive online and technology tools that we increasingly will integrate into the F2F learning environments (classroom, discussion rooms, research labs, simulation labs, etc.) to engage students and capture their learning input, so that we can monitor their progress and tailor the learning content and activities to their learning needs and requirements.
1.2	**Online** By 2020, lecturers and students will increasingly be using various online tools and mobile devices to support their Personal Learning Environments (PLE), and optimise their learning experiences. However, the IMU would still need a central learning platform to capture and make sense of the students' online and offline learning experiences, so that lecturers (mentors) can monitor the progress, and students can get continuous feedback from their learning activities in various modes (online, F2F, system-generated, etc.). As learning designs in the future will move away from grading and final exams, to competency-based assessment, project-based learning, gamification elements (levels, badges, score, etc.) and e-portfolios, the IMU needs to strategically work towards this in the coming years, and invest (or build) systems that can support such learning environments efficiently and effectively. Whether courses are blended or fully online, the ideal will be that the future learning management system will have mechanisms and tools to capture relevant learning output taking place wherever it might happen (e.g. using Tin Can API), and support all types of computer devices that users may use.

No.	TEST-Learning Framework
1.3	**Training** Training faculty (and students) in creative and effective ways whether online or F2F will be a critical competitive factor for IMU's aspirations to become a leading university in Asia in the future. In particular, new faculty members will need to go through a proper induction programme (1-2 weeks) to adapt to IMU's innovative learning culture and learning methods. The F2F aspect of the training could be shortened dramatically (1-2 days for hands-on activities and application) if we can make the rest available as an online course. The online course will be made available at any time, while the F2F component could be arranged 3-4 times a year to assess and verify that faculty can use e-learning and are fully capable of facilitating students during interactive F2F sessions. In other words, for the online course component they can get certified at any time, but the F2F component part of the certification is scheduled to ensure availability of trainers and faculty members. Besides continuous training on various teaching and learning tools, the e-learning and teaching license programmes should be designed in a more integrated manner, and increasingly delivered in a blended (flipped mode) or fully online mode. They should not be seen as separate licenses, and instead fused together as part of a comprehensive training programme for all new (and existing) academic staff. Also, by doing so, this comprehensive training programme (online or blended mode) could be a money generating programme, which could bring in significant external revenue if designed innovatively with high quality.
1.4	**Support** The Learning Resources Department, whether library, medical museum or e-learning needs to design more effective and efficient ways to provide support, tailored to the needs of the students and faculty (FAQs, phone, e-mail, chat, QR Codes, etc.). Besides real-time support, we need to explore and invest in intelligent (virtual assistants) systems and build knowledge bases that can assist users anytime, especially for issues that have been resolved previously. Whether courses are blended or fully online, the ideal will be that the future learning management system will have mechanisms and tools to capture relevant learning output taking place wherever it might happen (e.g. using Tin Can API), and support all types of computer devices that users may use.

No.	TEST-Learning Framework
2.0	**LEARNING** (Design process)
2.1	**Learning Outcomes are:** What knowledge, skills or attitudes do the students need to demonstrate or show? • Measurable in a qualitative (e.g. rubrics) and/or quantitative (e.g. closed-ended questions) manner. • Stated clearly and written from the students' perspective (if possible, negotiated and even co-designed with the student). • Articulated and communicated to the students personally (online or F2F or recorded video). • Appropriately designed for the level of the course. Learning outcomes are integrated into the curriculum map and are of 3 levels (programme, course and module/unit). Assessment, learning activities and content should be built around the learning outcomes.
2.2	**Assessment** How will students demonstrate their mastery of those learning outcomes? There is a saying 'Learning drives assessment', and if you make it fun, relevant and more formative, you have a winning formula for the future. Today, and increasingly in the future anyone will have access to 'world class' content (mostly for free) in basically any field, and what is going to really differentiate the best from the rest, is how you design the students' learning experiences, and provide continuous formative and summative assessment to guide the students throughout the learning process. The key here is to strive to design authentic (as much as possible) or simulated assessment in safe environments. So, even before developing materials, academics should focus first and more on designing quality and more authentic learning experiences and assessment aligned with the learning outcomes. Much of these assessment developed can be made available online in the form of quizzes, projects, simulations, scenario-based learning and games, so that students can continuously assess their learning and keep track of their progress. Also, at university level students should be expected to discover, research and find relevant content mostly by themselves to support their learning, and as we move towards developing content according to cases and problem sets (rather that topics), this becomes even more relevant.

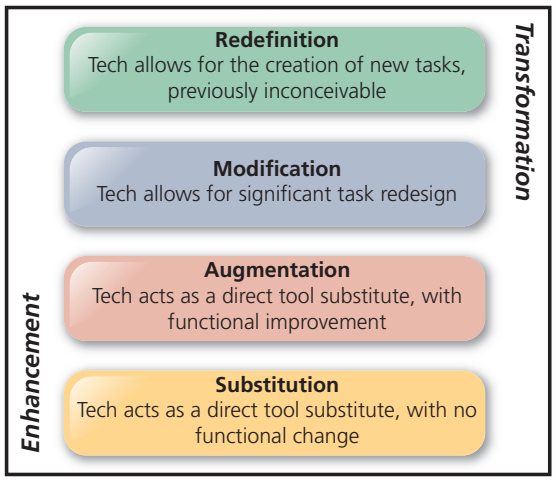
No.	TEST-Learning Framework
2.3	**Content/Activities** What type of learning content/activities do the students need to do to master the learning outcomes? Before developing, reusing, remixing or even purchasing learning content, the learning outcomes (for a course) should be clear, and also how students are going to be assessed to achieve the learning outcomes that have been set. Once that is settled, then one should focus on designing the learning activities (cases, problem-sets, challenges, etc.) and content to drive the learning experiences. Content can come in the form of OER, MOOCs (self-developed or reuse), i-lectures, simulations, games, slides, videos, journal articles, web resources, etc. Instructional content should be chunked into short learning nuggets (1-5 min), which can then be assembled like Lego into various modules as relevant or needed. The key here is to think reuse/remix before developing new content (Don't reinvent what exists, especially if it is free to use). More importantly, is to design the learning activities that will empower engaging and deep learning experiences aligned with the learning outcomes. Developing quality content and activities for fully online courses compared to blended or flipped classroom learning environments differs (in terms of learner needs and requirements), and the IMU needs to consider outsourcing, or building a stronger team, as we embark on developing online courses or MOOCs.
2.4	**Tools** What tools can we use to create/remix the content and/or empower the learning activities to achieve the learning outcomes? Once we know the learning outcomes and have decided ideally how we want to access students, then lecturers and students need to decide on what tools to use to develop content, learning activities, collaboration, and assessment. Increasingly, we will be overwhelmed with options, and therefore the IMU needs to design (or reuse) an evolving decision matrix/aid/guide/wizard to simplify the process of matching the appropriate tools to the various learning requirements (e.g. blog for reflective journal).

No.	TEST-Learning Framework
3.0	**TEACHER** (Role)
3.1	**X-Gogy** First, 'Teacher' is a comprehensive word (Umbrella term) that should not be confused with the practice of lecturing only. Being a teacher (lecturer in university context) means much more, and it includes playing the role as a facilitator, coach, mentor, guide rather than just lecturing and assessing the students on the course content. As we embrace the future, teachers need to rethink the way they teach, and the term X-Gogy is used to represent all the variations we can see today in andragogy/ pedagogy/ heutagogy/ technogogy, etc. In other words, we should not get lost in the 'gogies', but instead define what is the role of a teacher in transforming the students' learning experiences, and how teachers can acquire the right technology and X-Gogy skills to master this art. As such, faculty need to be continuously trained online and F2F to master the various skills and attitudes required to learn and teach in the 21st century.
3.2	**Expertise** Students will increasingly demand that their teachers (lecturers) are content (subject area) experts in their areas/ subjects, or have the ability to facilitate students in learning what they have to learn. As students will increasingly have access to 'world class' content, communities and sometimes even experts (through resource sites, OER, MOOCs, and social media) online for free, the least they can demand is that their courses are facilitated by content experts who need not necessarily be physically present in the same venue as the student.
3.3	**Technology** Besides having X-Gogy and content expertise, teachers need to be trained on how to integrate and use technology effectively to curate/create/remix content, facilitate, and assess learning both in online and F2F environments.
3.4	**Motivation** As the demand on what lecturers need to know and do to facilitate student learning will increase, it is paramount for the IMU to keep them motivated and inspired. To do so, the key will be to remove most non-teaching administrative tasks from academics (automate, improve efficiency, outsource or hire support), provide training (often), more research time, and incentives to innovate through a transparent and efficient reward systems (awards, KPIs, bonus, titles, etc.).

No.	TEST-Learning Framework
4.0	**STUDENT** (Role)
4.1	**Learning Styles** Ideally, content and learning activities should be tailored to the various learning styles students have, which most Universities will strive to achieve as we move into the future. Though, the real differentiating factor would be to embrace an approach that encourages students to master various learning styles, which will be required as they join the working force. Designing a learning styles evaluation framework for them to measure their various learning styles, and embedding it into part of the curriculum as essential skills for students to develop and to encourage lifelong learning skills using any style.
4.2	**Content** Spoon-feeding all the course contents required is depriving the student from becoming real independent learners with the ability to curate and create their own learning content from various resources, to make decisions and problem solve clinical cases and challenges embedded in the curriculum. The key is to find a balance, by creating the essential content (e.g. learning nuggets) to trigger students to research deeper into each subject area they are studying using various resources from i-Library databases and other web resources. This will not only enrich the student's learning experience, but also enrich group/team and classroom learning discussions, as each student would have explored varied resources and ideas before connecting. For most students to go beyond just studying the course notes and i-lectures, the graded assessment itself must capture and value this, whether it is closed/open-ended/project or e-portfolio based evaluations.
4.3	**Technology** Young students in general are tech-savvy (for social activities), but not necessarily information literate or learning-savvy (learning how to learn) using technology. Therefore, it is critical that students who need to learn these skills by getting training (online/offline) and getting exposure to good practices in curating, finding, evaluating, organising, collaborating and sharing their discoveries, experiences and research output using various technologies.
4.4	**Motivation** Students of today, are not necessarily motivated to learn by the same goals and things that students of the past had to. Self-motivation to learn plays a critical role to inspire deep and passionate learning, and therefore it is important for lecturers to understand how, and be able to facilitate engaging learning environments that are relevant, challenging and fun.

No.	TEST-Learning Framework
5.0	**TRANSFORMATION**

How do we know whether we are using technology to enhance or transform the students learning experiences?



The Substitution Augmentation Modification Redefinition Model (SAMR) by Dr Ruben R. Puentedura (Puentedura, 2012a) (Puentedura, 2012b) offers a method of seeing how computer technology might impact teaching and learning. It also shows a progression that adopters of educational technology often follow as they progress through teaching and learning with technology.

While one might argue over whether an activity can be defined as one level or another, the important concept to grasp here is the level of student engagement. One might well measure progression along these levels by looking at who is asking the important questions. As one moves along the continuum, computer technology becomes more important in the classroom but at the same time becomes more invisibly woven into the demands of good teaching and learning (Puentedura, 2012a).

The SAMR model has been infused into the TEST-L framework to push academics to rethink the usage of technology and drive them towards using technology in a transformative manner.

However, to simplify the differentiation, we have reduced the levels to 3 and adapted the SAMR model by leaving out 'Augmentation' from the model to now SMR.

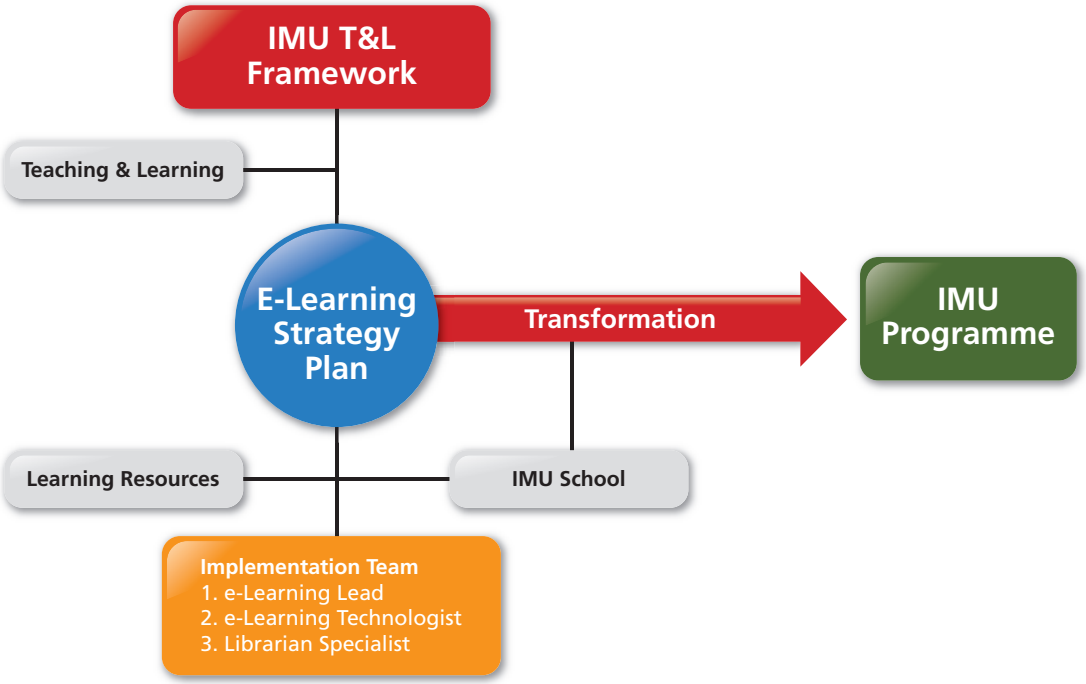
The SMR level is briefly explained with examples below:

No.	TEST-Learning Framework
5.1	**Substitution** Technology acts as a direct tool substitute with no functional change. Example: Reading a PDF file (article) instead of reading a hard copy version. Useful, but no major impact on the learning process itself, unless it can do things beyond the hard copy.
5.2	**Modification** Technology allows for significant task design. Example: The student's assignment is create a short video documentary about their field trip to the Apple factory. Then, they are required to share it online in the portal for other students to view and comment.
5.3	**Redefinition** Technology allows for the creation of new tasks, previously inconceivable. Example: Students are required to collaborate online (e.g. using Google Drive, Hangouts and Community) in multi-disciplinary teams with members from various countries around the world working on a specific project.
5.4	**Motivation** Students of today, are not necessarily motivated to learn by the same goals and things that students of the past had to. Self-motivation to learn plays a critical role to inspire deep and passionate learning, and therefore it is important for lecturers to understand how, and be able to facilitate engaging learning environments that are relevant, challenging and fun.
6.0	**CONTINUOUS EVALUATION & REDESIGN**
	The introduction of new learning innovations and technologies will accelerate in the coming years (shorter life cycles), and therefore the IMU must continuously and vigorously explore new alternatives to enhance and transform the learning and teaching environment. But, the main focus must always be on enhancing and transforming the learning and teaching environment for the better, and not for the sake of the technology itself.

10.4 The IMU's e-Learning Strategy

10.4.1 Purpose

This section provides guidelines on how each IMU School should prepare the e-learning strategy plans for their academic programmes and courses for the upcoming years.



10.4.2 Current Scenario

Currently, the e-Learning school champions are mostly responsible for working with the various schools to drive the e-learning agenda, and draft and finalise the e-learning strategy plans for the programmes with support from the e-learning team. No e-learning staff is directly assigned to assist, or work with them to give advice and finalise the implementation plans.

Several e-learning champions (new title: e-Learning Leads) do come and seek advice from IMU e-learning staff, but it is very much done in an informal manner without any clear guidelines and assigned responsibility on behalf of the e-learning staff.

This approach could be setting too high expectations on the identified e-learning champions (who have other academic priorities, too) to facilitate the implementation effectively for each programme. Also, not all of the identified e-learning school champions may have the knowledge and expertise in the area of e-learning to guide the various schools appropriately to make the right decisions and goals.

10.4.3 Future Implementation Approach

To transform and drive the teaching and learning environment using e-learning for the future at the IMU, this document proposes that each school will have an assigned e-Learning Technologist (one e-learning staff with expertise in e-learning) and Library expert to work with the e-Learning Lead to drive the e-learning agenda for each programme, and assist in preparing the e-learning strategy plan with advice and guidance.

The proposed e-learning Implementation Team for each programme will consist of a/an:

- **e-Learning Lead**
  The leader and school representative who will be responsible for leading and coordinating with the school to strategise how the programme should use e-learning to enhance or transform the learning and teaching environment. Each school will be responsible for identifying the e-Learning Lead(s) for their programme(s). The e-Learning Lead will work closely with the assigned e-Learning Technologist and Information Specialist to conceptualise the e-learning strategy plan (short and long-term) and monitor the progress as it is being implemented.

- **e-Learning Technologist**
  The e-Learning Unit will assign one e-Learning Technologist to work with each e-Learning School Champion to strategise and drive the e-Learning agenda forward for each IMU programme. The e-Learning Technologist should attend all School related meetings that discuss e-learning issues, and be pro-active in providing e-learning related advice and guidance. 50% of the e-Learning Technologist's KPI will be based on the e-Learning progress made by their assigned school(s). Some e-Learning Technologists will be assigned to more than one programme (or school), due to manpower shortage, and the extensiveness of the school's e-Learning requirements and needs.

- **Librarian Specialist**
  The Library Unit will assign one Library expert to be part of the e-Learning Implementation Team to provide guidance on how the (interactive) digital resources (e.g. e-books, simulations, images, videos) in the i-Library can be integrated and used to enhance the e-learning content for each course in the programmes. Some Library experts will be assigned to more than one programme, due to manpower shortage, and the extensiveness of the school's e-learning requirements and needs.

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10.6 Appendices

10.6.1 Definitions: Learning Technologies & Trends

- **Mobile Learning**
  "Learning that takes place via such wireless devices as smart phones, tablets, personal digital assistants (PDAs), or laptop computers."

  According to John Traxler, methodologies specifically aligned to the unique attributes of mobile learning and "Attempts to develop the conceptualisations and evaluation of mobile learning, however, must recognise that mobile learning is essentially personal, contextual, and situated; this means it is 'noisy' and this is problematic both for definition and for evaluation." According to him mobile, personal, and wireless devices (smart) are going to change the way we interact, communicate, commerce, collaborate and even learn; the relationships between education, society, and technology are now more dynamic than ever. (Traxler, 2005, 2010)

  The role of mobile learning tools and technologies in learning is becoming very important. Learners are equipped with a variety of Mobile Smart Devices (MSD). The learner of the 21st century with access to all these tools and technologies would not be sitting in the class in a passive mode and absorb knowledge. These new learners would like to have the same level of access, mobility, flexibility, immediacy, personalisation as they have while working or in their personal life. e-Learning model should be aligned with the IMU Learning Model. When we design e-learning we need to keep in mind that e-Learning is not going to replace our face-to-face learning. It will complement face-to-face learning.

  Mobile learning is the future of workplace learning and social learning. It is not the mobility of the technology that is important in mobile learning , but the mobility and flexibility of contents, facilitators and learners. Evaluating mobile learning is a challenge as learning takes place in different scenarios and context using different devices.

  We need to focus on having a blend of face-to-face, e-Learning, mobile learning, discovery-enabled learning, project based learning, peer supported learning, and collaborative learning activities while designing the programme.

- **Social Media**
  "Social media refers to the means of interaction among people in which they create, share, and/or exchange information and ideas in virtual communities and networks (e.g. Facebook, Twitter, Google+)..." *Wikipedia*

- **Personal Learning Environments (PLE)**
  "The term personal learning environment (PLE) describes the tools, communities, and services that constitute the individual educational platforms that learners use to direct their own learning and pursue educational goals." *Source*

- **Web Conferencing**
  "Web conferencing refers to a service that allows conferencing events to be shared with remote locations. These are sometimes referred to as webinars or, for interactive conferences, online workshops." *Source*

- **Flipped Classroom**
  "The flipped classroom is a pedagogical model in which the typical lecture and homework elements of a course are reversed. Short video lectures are viewed by students at home before the class session, while in-class time is devoted to exercises, projects, or discussions." (Initiative, E. L., 2012)

- **e-Portfolio**
  "An electronic portfolio (also known as an eportfolio, e-portfolio, or digital portfolio) is a collection of electronic evidence assembled and managed by a user, usually on the Web. Such electronic evidence may include inputted text, electronic files, images, multimedia, blog entries, and hyperlinks. E-portfolios are both demonstrations of the user's abilities and platforms for self-expression, and, if they are online, they can be maintained dynamically over time". *Wikipedia*

- **e-Books**
  "E-books offer new ways for readers to interact with content. An e-book that abandons the notion of reading from front to back, for example, encourages readers to take an active, self-directed role in how they learn. E-books incorporating audio, movies, and simulations facilitate deeper understanding of subject matter, while annotation features let users customise a text." *Source*

- **Simulation**
  "Simulation" is a technique, not a technology, to replace or amplify real experiences with guided experiences, often immersive in nature, that evoke or replicate substantial aspects of the real world in a fully interactive fashion. Gaba (2004) stresses that simulation should be interpreted as a strategy – not a technology – to mirror, anticipate, or amplify real situations with guided experiences in a fully interactive way.

- **Gamification**
  "Gamification techniques strive to leverage people's natural desires for competition, achievement, status, self-expression, altruism, and closure. A core gamification strategy is reward for players who accomplish desired tasks. Types of rewards include points, achievement badges or levels, the filling of a progress bar, and providing the user with virtual currency. Competition is another element of games that can be used in gamification. Making the rewards for accomplishing tasks visible to other players or providing leader boards are ways of encouraging players to compete. Another approach to gamification is to make existing tasks feel more like games. Some techniques used in this approach include adding meaningful choice, onboarding with a tutorial, increasing challenge, and adding narrative." *Source*

- **Wearable Technologies**
  "Wearable technology refers to devices that can be worn by users, taking the form of an accessory such as jewellery, sunglasses, a backpack, or even actual items of clothing such as shoes or a jacket. The benefit of wearable technology is that it can conveniently integrate tools, devices, power needs, and connectivity within a user's everyday life and movements. Google's "Project Glass" features one of the most talked about current examples — the device resembles a pair of glasses, but with a single lens. A user can see information about their surroundings displayed in front of them, such as the names of friends who are in close proximity, or nearby places to access data that would be relevant to a research project. Wearable technology is still very new, but one can easily imagine accessories such as gloves that enhance the user's ability to feel or control something they are not directly touching." *Source*

- **Situated Learning**
  "Situated learning was first proposed by Jean Lave and Etienne Wenger as a model of learning in a community of practice. At its simplest, situated learning is learning that takes place in the same context in which it is applied." *Wikipedia*

- **Massive Open Online Courses (MOOCs)**
  "A type of online course aimed at large-scale participation and open access via the web. MOOCs are a recent development in the area of distance education, and a progression of the kind of open education ideals suggested by open educational resources. MOOCs typically do not offer credits awarded to paying students at schools, but assessment of learning may be done for certification." *Source*

- **Open Educational Resources (OER)**
  "Open Educational Resources (OER) are freely accessible, usually openly licensed documents and media that are useful for teaching, learning, educational, assessment and research purposes." *Wikipedia*

- **Creative Commons (CC)**
  "Creative Commons helps you share your knowledge and creativity with the world. It develops, supports, and stewards legal and technical infrastructure that maximises digital creativity, sharing, and innovation." *Source*

- **Learning Analytics**
  "Learning analytics is an emergent field of research that aspires to use data analysis to inform decisions made on every tier of the educational system. Whereas analysts in business use consumer-related data to target potential customers and thus personalise advertising, learning analytics leverages student-related data to build better pedagogies, target at-risk student populations, and to assess whether programmes designed to improve retention have been effective and should be sustained — important outcomes for administrators, policy makers, and legislators. For educators and researchers, learning analytics has been crucial to gaining insights about student interaction with online texts and courseware. Students are also benefiting from the deliverables of learning analytics, through the development of mobile software and online platforms that use student-specific data to tailor support systems that suit their learning needs." *Source*

- **Tin Can API**
  The Tin Can API (sometimes known as the Experience API) is a brand new specification for learning technology that makes it possible to collect data about the wide range of experiences a person has (online and offline). This API captures data in a consistent format about a person or group's activities from many technologies. Very different systems are able to securely communicate by capturing and sharing this stream of activities using Tin Can's simple vocabulary (For more information: http://tincanapi.com/overview/).

- **Collaborative Learning**
  Collaborative learning is a situation in which two or more people learn or attempt to learn something together. Unlike individual learning, people engaged in collaborative learning capitalise on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work, etc.). More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and take on asymmetry roles

  i. (http://en.wikipedia.org/wiki/Collaborative_learning).
  ii. Need to focus on
  iii. Collaboration among peers
  iv. Collaboration with contents
  v. Collaboration with global experts
  vi. Collaboration with partner University

10.6.2: Case Studies

The International Virtual Medical School (IVIMEDS) (http://www.ivimeds.org/) and the Virtual Campus of the King's College of University of London (http://gktvc1.kcl.ac.uk/) are examples of e-learning training at the undergraduate, residency, and continuing professional levels.

At the national and international levels, a number of initiatives have emerged with the purpose of creating a digital repository of peer-reviewed electronic resources for public dissemination [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2631188/#B3]. Some of the examples include:

- MedEd Portal by Association of American Medical Colleges (http://www.aamc.org/mededportal)
- End of Life/Palliative Education Resource Centre by Medical College of Wisconsin (http://www.eperc.mcw.edu/)
- The Health Education Assets Library (HEAL, http://www.healcentral.org/), Multimedia Educational Resource for Learning and On-line Teaching (MERLOT, http://www.merlot.org), and
- Family Medicine Digital Resource Library (http://fmdrl.org).

10.6.3 Visualising Future Learning Experiences

How will the learning and teaching environment look like at IMU in 2020? This section, explores 4 cases (1 lecturer and 3 Students) on how a learning and teaching day might look like in 2020.

Lecturer - Medical School

The first case visualises how a lecturer (Dr Gunar, Medical School) from IMU experiences a working day at IMU in the year 2020. By 2020, most administrative activities are taken care of by virtual assistants (with artificial intelligence), meaning lecturers can focus 95% on their time on facilitation/coaching/mentoring, research and learning.

Time	Working Day
7:00 am	After Dr Gunar has had his breakfast, his virtual assistant displays on the tablet in a dashboard format (tablet) his students' progress through diagrams, charts, bars and tables (looks a bit like a Ferrari dashboard). Through color-coding he can easily see who are progressing well and who are not. If the student is under-performing, or not doing their assigned tasks according to their co-created and negotiated learning timetables he/she is automatically notified. After checking the daily progress dashboard, he gets a visual and oral briefing of his working day ahead by his virtual assistant. Today, he needs to update one online learning nugget (1-3 minute video tutorial), facilitate an online PBL and one F2F learning session with his students, attend a reflective practice session with his peers, and participate in an online research group session on a collaborative project, which also involves 3 Partner Universities. Busy day ahead!
7:45 am	At 7:40 am, he is alerted that Lee (student) is struggling with his project and would like to meet up as soon as possible, as his deadline is looming. As Dr Gunar is free at 8:30 am, he messages back to Lee via the Universities social networking hub (IMU@Social) about the scheduled time. Lee agrees within seconds.
8:30 am	Dr Gunar and Lee uses Google Hangouts to discuss Lee's project. Lee opens his Google Docs document and annotates where he is struggling, which seems to be the 3D modelling of correct surgery of the hip using laser treatment. Dr Gunar quickly points out the problem area, but does not reveal the answer. Lee realises by Dr Gunar's action what is wrong, and then tweaks it until he gets it right with the help of the nano-quick-research method provided by his virtual learning assistant. The mentoring session is finished within 15 minutes.
8:45 am	At 8:45 am, Dr Gunar spends 15 minutes to update his video tutorial on 'Cell Division', which included some errors earlier. How? He uses his Smart (Google) Glasses to view the errors, and then updates it on-the-spot using augmented reality, which enables him through hand movement (interactive gloves) to remove the errors and update it correctly. The moment the tutorial is updated correctly, the students are notified and they can access it from the e-Learning Portal.
9:00 am	At 9:02 am, he bumps into Dr Omar and has a light chat about some teething issues happening at the faculty. Time passes quickly, and it is soon time for today's online PBL session with his students.

Time	Working Day
9:30 am	At 9:30 am, the online PBL session starts. Dr Gunar instructs students to view the simulated virtual patient case trigger in IMU's 3D Virtual Hospital, and then break into online groups to discuss and solve the case after completing the mini-quiz. First, all students must complete the 5 questions (4 multiple-choice and 1 short essay) related to the PBL trigger within 10 minutes. Only after that, they are assigned to do group activity. The online discussion groups are auto-generated (randomly grouping students), and then they are free to interact with the virtual patient and all the surrounding virtual cues as they find an appropriate solution to the case. Dr Gunar can choose to give all the groups different virtual patient triggers, or the same trigger. On this occasion, he decided to give the same virtual patient trigger to see how the different groups deal with the same virtual patient (each group cannot see what the other groups are doing). There are 7 groups (5 students in each), and Dr Gunar is able to view 7 different screens from the facilitator's dashboard on his tablet, and then zoom in to any of the groups learning space as they interact with the virtual patient. Students can interact with the virtual patient by voice recognition or chat, but group members are recommended to discuss online among each other before interacting with the virtual patient. As such, Dr Gunar has assigned one leader in each group to lead the interaction with the virtual patient. All the online discussions are captured and archived, and then once the groups think they have found the right solution, they need to summarise their answer in a wiki document, which is automatically made available to Dr Gunar. To give the students more time to discuss further and reflect on their actions taken, Dr Gunar gives them 24 hours to submit their case reports. The interactive online PBL is over within 54 minutes, but students still need to hook up online to complete their case reports, unless they can complete them within the online session.
10:30 am	At 10:30 am, Dr Gunar takes a break with his colleagues at the Coffee House in the library.
11:00 am	At 10:55 am, Dr Gunar enters the learning room (at IMU campus) to get ready for the F2F learning session with his students. It is a round-the-table learning discussion, whereby students (only 10) are required first to present (in 2 minutes) each their findings from their individual projects, and then get immediate feedback from their peers and the facilitator. This learning session, encourages students to improve their presentation skills (being concise and precise), ability to give and receive constructive feedback, active listening skills, and build relationships in a team-mode learning environment. These kind of learning sessions usually goes on for 1 to 1½ hours, and are extremely popular among students.

Time	Working Day
12:30 pm	Dr Gunar is now exhausted (but excited), and heads of for lunch at IMU's super canteen (He chose not to reveal what he ate, but I can assure you it looked delicious).
2:00 pm	At 2:00 pm, Dr Gunar goes online (webinar) to attend and participate in a reflective learning practice session (6-8 lecturers) with his peers from IMU and four other partner schools to discuss how they are innovating their learning methods using various approaches and tools. This kind of sessions usually lasts about 60 minutes. Every week (during different times according to lecturers' schedules), groups are randomly generated (through the system) to meet up and share their best practices to encourage a culture of learning and sharing, which is essential in a learning organisation. To ensure that lecturers don't all come to the session empty-handed, all lecturers are required to prepare something for the sessions (an interesting article to discuss, a tool, a method, etc.). All this is shared in the Wiki (written reflections) or online folder (files shared) on the e-Learning portal.
3:00 pm	From 3:06 pm until 4:30 pm, Dr Gunar is busy working on his research project.
4:30 pm	At 4:30 pm, Dr Gunar goes home for a quick rest, before he plays a game of tennis (doubles) with a few of his good friends.
7:00 pm	At 7:00 pm, he has dinner with his wife at home.
8:30 pm	At 8:30, he attends an online research group session (webinar) from home with various researchers from IMU and 3 partner schools. They are working on a collaborative research project that might have a major impact on the world of education in the near future. As the session is so interesting and important, they go on until 11:00 pm. If you are working on a big project that might change the world of education, time flies! But at 11:00 pm, Dr Gunar is ready for some Delta-Brain-Wave sleep. Good night!

Student - Medical School

The second case explores how a first-year Medical student from Mexico (Diego) experiences a learning day at IMU in the year 2020.

Time	Learning Day
6:00 am	A brain-wave stimulating alarm clock wakes up Diego gently with gentle music pleasing to the ears. While brushing his teeth, the daily time-table of learning activities are displayed on his tablet device in front of him.
6:15 am	After a quick jog, Diego had his weekly online chat with his parents. He has his breakfast of nasi lemak, though he misses his mum's chilaquiles and burritos (especially after he has had a chat with them).
7:00 am	Diego has a quick look at his schedule for the day. During the morning he has three lectures, two of them back-to-back. He was able to review two of the lectures through the e-learning portal the previous night. These days, the module guides for his lessons has links to resources and he is expected prepare for his lessons before he comes to any class.
8:30 am	In addition to links to learning resources, the e-learning portal contains simulations and assessments. Diego had gone through one of the assessments the previous night and although he had scored rather badly in it, the feedback from the assessments gave him a good idea on which areas he needed to improve on. Diego likes these types of assessments, as it helped drive his learning and it approximates what could appear in his finals.
9:00 am	His first lecture starts at 9am and the lecturer began by summarising the main points of the lecture. This was followed by a discussion about related cases to the topic. Lectures in this form are much more interactive as students are able to see the application of the facts. Students are able to discuss the issues involved using the online forum and the Q&A allows students to clarify matters with their lecturers.
1:00 pm	Diego had queries on a side-topic which appeared during the lectures. He followed up by enquiring through the curriculum database and this led him to discover that some of what he wanted to know also appears in the nursing and pharmacy programmes. He was able to bookmark these lessons through the individualised learning plan which existed in the student portal and he set aside reminders for him to follow up later that night.
3:00 pm	The afternoon was spent working on a group project with the rest of his colleagues. Students are able to bring their own mobile devices and can work using collaborative applications.
6:00 pm	After an evening round of sports and games, Diego checks his mobile devices to see what is on for tomorrow's lessons. By looking at the online timetable, he could see the various lessons and links which he could look up.
7:00 pm	After dinner, Diego reviews the lessons of the day. He discusses with his friends, he forms book marks and links his lessons to his personal portfolio, and personalises lessons on his private online learning page on the student portal with his extracurricular achievements.

Student - Nursing

The third case explores how a second-year Nursing student from Sabah (Sarah) experiences a learning day at IMU in the year 2020.

Time	Learning Day
6:15 am	Sarah wakes up at 6:15 am every day. She uses a bio-feedback device during the night to ensure that she gets her 2-3 hour Delta-Brain-Wave sleep (so that her previous day's learning is properly digested into long-term memory). Before taking a shower and eating breakfast, she does her favourite 1-minute speed workout and daily 'Super Brain Yoga' (2-3 minutes) to stimulate her mind into Alpha mode for the day, which enables her to focus better and enhance her memory capacity for the learning day ahead.
7:00 am	At 7:00 am, she gets a 5-minute visual and oral briefing from her virtual learning assistant about the learning menu for the day from her smart tablet. Today she will be working with a multi-disciplinary team on a virtual patient case. The multi-disciplinary team consists of 5 students (including her) from various universities and countries around the world (a medical, a chiropractic, a pharmacy and a Chinese medicine student). She is really looking forward to this enriching multi-disciplinary and inter-cultural online learning experience.
8:00 am	At 8:01 am (Kuala Lumpur time) she logs into IMU 3D Virtual Hospital, and excitingly all the other members from her multi-disciplinary team are already online ready to discuss the virtual patient's case. The mission of this case, is to find the best treatment to deal with the patient's injured back. After the team discusses the patient's profile, history and lab tests taken earlier, they each share their concerns and provide their input on how the patient can best be treated to recover from the back injury and prevent it from reoccurring (unnecessarily). Sarah is really fascinated to learn how the medical, chiropractic, pharmacy, and Chinese medicine students would tackle the patient's back injury using their approaches to healing. The collaborative learning session lasts for 1 hour and 30 minutes, and everything of value is documented in an online wiki, which will be shared to their respective mentors after the session (and others as they like).
9:30 am	After the session, Sarah chills out with her friends and shares some of her insights learned during the online collaboration exercise.
10:00 am	At 10:03 am, Sarah sits down to document her own reflections on dealing with the virtual patient and multi-disciplinary team from around the world in her reflective journal (blog), which is part of her e-portfolio. She spends nearly an hour writing down her experiences and reflections regarding it.
11:15 am	At 11:15 am, she attends a 45-minute webinar by Professor Gogenham from Harvard University Medical School (one of IMU's partner schools) about the latest healthcare treatments in dealing with back injuries. Sarah is totally fascinated to listen to the Professor, and does not shy away from asking him a question through the chat window related to her earlier virtual case scenario.

Time	Learning Day
12:00 pm	After the webinar, Sarah is ready for a break with a friends, and heads off to the IMU campus canteen for lunch. She can't resist her favourite Tandoori chicken with butter paratha coupled with a glass of fresh kiwi. IMU's canteen was voted the best food court in the whole of Bukit Jalil in 2019, so students are basically spoilt for choice.
1:30 pm	At 1:30 pm, she has a small group learning session at IMU campus facilitated by Doctor Gunar (her mentor, too). The group session consists of 10 IMU students, and all experienced different multi-disciplinary team virtual patient cases during the morning. So, during this session, all the members share their stories and they discuss the outcomes, experiences and how each case was resolved. As the session was so exciting and enriched with many AHA-learning moments, it went on for nearly 2 hours.
3:30 pm	At 3:34 pm, Sarah goes to IMU gym for a 30-minute Pilate's session, which is led by Fatima (who is besides being an IMU student, also a certified Pilate's instructor).
4:30 pm	At 4:31 pm, Sarah logs onto IMU e-Learning Portal to explore the interactive simulated courseware on providing care for people with various back injuries. She does first the pre-test, and then she is assessed while doing the courseware module (2-3 minute intervals) and then finally assessed again after she has completed it (multiple-choice, fill-in-the-blanks, drag-and-drop, hotspot and short essay type questions). All this is formative assessment for her learning purposes, so she has nothing to worry about except learning. Besides, the formative assessment has embedded gamification elements, which includes scoring, levels and badges after completing various modules in the courseware. This daily formative assessment provides continuous feedback on her learning, and empowers her mentor to follow up on her progress as she learns. After an hour she has completed her formal learning day.
6:00 pm	at 6:02 pm, she returns to her hostel to relax a bit, before heading for dinner with her friends at KFC at 7:00 pm.
7:00 pm	While waiting for her friends to arrive at KFC, she can't resist watching a learning nugget (3-minute learning video) through her Smart (Google) Glasses, providing tips on how to establish a personal rapport with patients.
10:00 pm	She is done having fun with her friends, and then returns to her hostel. She watches her favourite TV programme before getting ready for sleep at 10:30 pm. However, before sleeping she gets her virtual assistant to recap what has been learned during the day, and then configures her bio-feedback device to sooth her into a 2-3 hour Delta-Brain-Wave sleep during the night to ensure that the learning taken place is internalised (as much as possible) into long term memory. Good night!

Student - Dentistry

The fourth case, explores how a Dentistry student (Joshua) experiences a learning day at the IMU in the year 2020.

Time	Learning Day
6:00 am	Joshua awakens to the sweet sounds of Beethoven's Ninth oozing out melodiously from his iPhone 10. The second the phone's motion sensor detects that he is sitting up, the music shifts to a fast-paced zumba beat and video-syncs with the television for him to complete his 15 minute workout. A quick shower and change with a few spoonfuls of cereal, and he's ready to hit the highway. While, cruising at 80 km/h on his way to IMU, he listens to a podcast about 'Trauma related to road accidents'. Traffic is at standstill at many places and his phone rattles of his list of activities for the day in the voice he admires most - his girlfriend's. As he approaches the IMU, and parks the car at the entrance, a lift door silently opens and whisks him and the car to the 12th floor parking lot.
8:00 am	After a 20-minute Q & A session with his lecturer based on the i-lectures, Joshua heads off to the library where his eye scan activates the computer which gives a personal greeting and displays the challenge for the day – a scenario of a patient in a Road-Traffic Accident (RTA). He must have the short and long-term management planned by the end of the day together with his other healthcare batch mates – from medicine, chiropractic, pharmacy, psychology and nursing. As they join him in the Collaborative Study Area, the discussion is lively and animated.
10:00 am	Time for the Sim Lab, and he heads there to perfect his implant placement skills via a haptic technology simulator. This is a patient case he has in the afternoon and he has to score 90% and above to be eligible to treat. He moves the tools effortlessly putting just the right amount of pressure on the bone drill as he hones in on the implant area creating a depth cut. Instant feedback from the simulator reassures him of a 97% score and suggests how he could have made it a full score. In the supervisors' area, his mentor Dr Lim monitors his progress and nods approvingly at him. Instead of only seeing the end product of the placed implant, Dr Lim can review the entire process, and give appropriate instruction too.
1:00 pm	It is lunch time, and Joshua breezes into IMU's cafeteria, grabs a steaming cappuccino from Starbuck's and a quarter chicken from Nando's, both of which he had ordered a half hour ago from his tablet. He joins his mates at the table and they discuss the case they have all been presented with. Each takes away their learning outcomes and agree to meet after class in the evening.
5:30 pm	Some of his multi-disciplinary colleagues have had to leave, but they meet up for video chat and they discuss the case. Joshua learns much from his other colleagues on the management of the RTA case and they learn much about facial and dental injuries from him.
7:00 pm	Joshua logs into IMU's portal and shares his reflections on the case of the day, and his colleagues and supervisor have a brief discussion on where he could have improved his communication with the patient rather than leave the patient to view the post-op instructional video alone.
8:00 pm	He religiously opens his Facebook and plays the Candy Crush Saga game before chatting with his friends on the frenetic activities of the day. Whilst doing that he is scouring PubMed for the latest publications on facial trauma to finalise his presentation to all the Deans of IMU the next morning. Joshua then goes off the grid to enjoy some quiet time with Dan Brown's The Da Vinci Code.