Queen Mary Academy

Exploring immersive technology use at Queen Mary in terms of creating a sense of flow in learning

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Executive Summary

This report presents the findings of a small exploratory study, conducted at Queen Mary University, which aimed to examine the learner perspective regarding the role of immersive technologies in fostering a sense of flow in the learning process.

As higher education institutions increasingly adopt immersive technologies, understanding their impact on learner engagement becomes vital for enhancing overall learning experiences. This study, conducted as part of the Queen Mary Academy (QMA) Learner Intern Programme (LIP), involved analysing findings from a focus group comprising learners representing a range of schools and institutes within the university. Participants commented on their experiences, thoughts and feelings relating to different immersive technologies, including Virtual Reality (VR), Powerpoint and lecture recording capture software.

The results indicate positive responses from learners for the use of these technologies, when they are used well, to facilitate comprehension of complex concepts. Twenty-four individual quotes are included in this report, providing a rich context with schools and institutes identified for each quote to provide educators from respective areas of Queen Mary specific insights they may wish to explore further. While learners spoke of limited exposure to VR at Queen Mary, the potential for co-creating immersive educational experiences were acknowledged.

To assist educators at Queen Mary in effectively integrating immersive technologies into their practice, recommendations, based on the study's findings, are provided by QMA Fellow Dr Usman Naeem (Senior Lecturer, School of Electronic Engineering and Computer Science):

- Asynchronous videos can help develop a sense of flow in the learning process, making it easier to understand complex concepts.

- Presentation tools are powerful, enabling educators to present concepts to learners through the use of visual aids and text prompts. Educators should pay close attention to how much content is added to slides, otherwise, this can be detrimental to the learner's learning experience.

- Presentation slides should illustrate real-world application examples, as this can help clearly explain complex concepts, and including self-assessment testing is also cited as being useful.

- Q-Review lecture recordings of large group sessions help facilitate student-paced learning activities. Audio podcast versions should be provided where cohorts include commuter students.

- Introduction of technologies to support the learning process should come with clear guidance and accompanying rationale for their use to aid engagement. This is particularly important for cohorts with mature learners.

- Educators must dedicate time to explore how emerging Artificial Intelligence (AI) tools can be incorporated into their courses/modules. If considering using VR, learners should be involved in the co-creation of any content/material.

This report concludes with reflections on the QMA Learner Research Intern Programme provided by the intern author of this report. This provides an insight into the attributes they developed within the initiative and the positive impact of co-creation.

Introduction and objectives

There have been many different views on immersive technology over the last few decades. **Slater (2009**) views immersive technology as technology that provides users with a high quality or volume of sensory information, whilst **Lee et al., (2012)** see immersive technology as a mode that makes the line between the actual world and the virtual world blur, creating a sense of immersion. These scholars emphasise the immersive character of the technology. In terms of educational theory, **Csikszentmihalyi, (1990)** proposes that when immersion and presence combine, a state of flow is created that is suggested to enhance a learning experience by enabling learners to become fully engaged and focused on the task at hand. The objectives of this exploratory study were to examine Queen Mary learner thoughts and feelings around the concept of flow, their experiences of being in a state of flow whilst studying at the university and how the technologies used by respective educators aid this sensation.

Literature review and prior reading

"Nearly every educator holds the primary, though often elusive, goal of facilitating students' deep engagement in learning activities" **(Schmidt, 2010).**

Flow theory, which combines the states of immersion and presence to enhance a learning experience, was first introduced by the psychologist Mihály Csikszentmihalyi in the 1970s. It is a state of optimal experience that occurs when an individual enjoys an activity they are undertaking, fully absorbed in the task at hand. Participants are motivated by the quality of the experience and flow occurs more often when the difficulty level is increased. Moreover, flow is present where tasks are intellectually challenging or involves risk as this brings together cognitive, physiological and affective aspects **(Biasutti, 2011)**. **Witmer and Singer (1998)** state that this psychological state, characterised by perceiving oneself to be enveloped by, included in, and interacting with an environment, provides a continuous stream of stimuli that promote deeper learning opportunities. One that engages our senses, captures the attention, and fosters active involvement **(Witmer et al., 2005). Shin, (2018)** proposes a model of immersion that depicts the interaction of these elements, as shown in Figure 1.

Figure 1: Model of immersion **(Shin, 2018)**
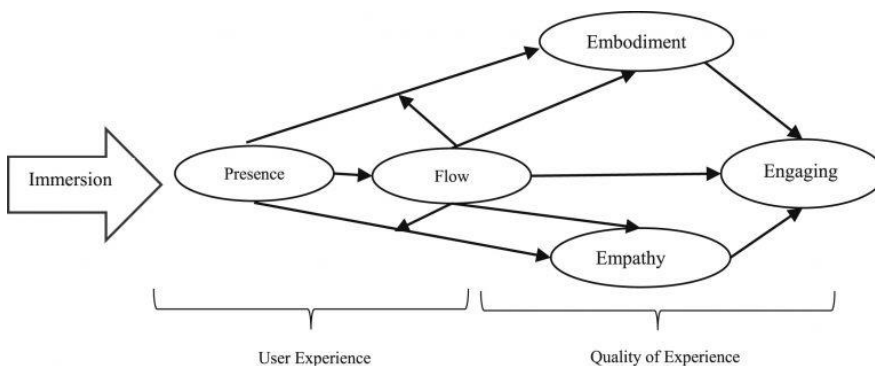
The COVID-19 pandemic forced universities to review their educative provision with new technologies, an increasing usage of online platforms and alternative ways to engage learners, together becoming *'the new normal'* **(Greve and Tan, 2021).** Technology that can create states of *immersion*, *presence* and *flow* would likely be of value in this context. **Salzman et al., (1999)** suggests that immersive technologies can help promote experiential learning, facilitate learning by doing, develop creativity, and

increase understanding of challenging concepts. This includes Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), and Extended Reality (XR) **(Suh and Prophet, 2018)** that blur the boundary between the physical and virtual world **(Lee and Lee, 2013). Miligram and Kishino (1994)** propose a model of reality-virtuality continuum that considers the physical and virtual worlds to be two different ends: the real environment and the virtual environment. Interestingly, **Pritzker (2007)** also propositions that *audience flow* can occur if a viewer finds a less immersive experience relevant.

Use of truly immersive technologies in UK higher education appears limited at present. The **Jisc AR and VR in learning and teaching Survey findings report (2019)** drew data from over 100 lecturers, researchers and technologists at universities and colleges. Findings indicated that, despite 82% of respondents being "interested" in VR or AR, credible examples of how it was being used or planned to be used in the future were absent. Moreover, how students felt about possible incorporation of this technology into their study experience was also not addressed.

Supported by the literature, we use the definition of immersive technologies as, *those that can create a sense of flow* and explore how learners from each school and institute feel about their use. Using the continuum outlined previously, we will also explore how presentation slides and audience participation methods, that sit closer to the real environment, compared to those technologies closer to the virtual space, may be developed to promote increased *audience flow.*

This short qualitative research project is aligned the Queen Mary Strategy 2030, and Active Curriculum for Excellence (ACE), which outline how the university will deliver an outstanding, inclusive, world-class education and student experience, co-creating pedagogic approaches with our diverse student body, enhanced by our world-leading research and latest technological advances.

It is hoped that finding may be of interest to educators at Queen Mary when considering how technology may be leveraged to make the learning of complex material both intellectually stimulating and clear. In this regard, The National Student Survey (NSS) is a recognised annual survey of final year undergraduates in the UK, which provides an opportunity for the student voice to make improvements for students in the future. It includes questions specifically relating to the teaching experience:

- Staff are good at explaining things
- Staff have made the subject interesting
- The course is intellectually stimulating
- My course has challenged me to achieve my best work

We intentionally incorporate this language in our data collection to tie to a key indicator of performance for the university. Additionally, we are interested to explore the specific thoughts of mature learners aged 31 and over at entry at Queen Mary, as defined by the Office for Students and in line with their B3 Conditions for ensuring successful student outcomes.

Methodology

Participant Recruitment

Participants were recruited to a focus group via email invitation and online expression of interest form disseminated through Queen Mary Faculty Education Managers (FEMs) and Student Reps. Selection for the focus group followed a non-probability, judgemental sampling method at the discretion of the research team. Whilst we acknowledge the potential for investigator bias and limitations toward

generalisation of findings, we defined our population and sampling frame to include students 31+ years old and have all three university faculties represented. Additionally, we considered free-text comments provided by applicants on the technologies they had used in studying at Queen Mary during the selection process. Chosen participants received an information sheet about the study, consent form and outline of the focus group structure prior to the session.

Focus group structure and facilitation

The focus group lasted 60 minutes. Adhering to the suggestions of **Krueger (2002)**, an introduction from the research team, which included setting of ground rules, clarification of key definitions *immersion*, *presence*, *flow*) and providing subject specific examples of what may be considered as complex concepts, was followed by four sections of questioning. Participants were asked opening, introductory, transition, and ending questions to guide the discussion, with facilitation of the discourse utilising a combination of group discussion, individual reflection, and the sharing of experiences. Questions are shown in the table 1:

Table 1: Questions used in focus group, based on categories suggested by **Krueger (2002)**

Opening questions	*Can you share your thoughts on when state of flow may have occurred and describe to us some of the characteristics you felt when in this state?*
Introductory questions	*Building on your thoughts about being in a state of deep learning, we might say that you are immersed in a topic for this to happen. So, if you were to think about technologies that have helped promote immersion in a subject or concept, can you tell us a little about this and how it might have contributed to putting you into a state of flow and helped deeper learning to take place? If it didn't this is also useful to hear about.*
	From listening to others in the group about their experiences, can anyone identify an area of complex learning from their own area that may benefit from educators using the same immersive technology to promote deep learning?
Transition questions	*Technologies are present on different levels of immersion and flow. For example, a Virtual Reality headset is present on the highest one as it fully captivates one's senses whereas PowerPoint is just one level above an educator just talking which is the lowest. When do you think these technologies can be used in your course based on the difficulty of the concepts?*
	Is there complex subject material that could benefit from a higher-level tech or if PowerPoint slides would suffice?
Ending questions	*So, we are nearly finished, but we would like to open the floor to hear about anything you feel we haven't heard about today linked to deeper learning and your experiences of using technology at Queen Mary.*

Findings

Participant Demographics

Participants within the focus group largely accounted for our desired composition of faculty representation with a third of participants over 31 years of age. Six separate schools/institutes were present in a cohort of 9 participants, as outlined in Table 2:

Table 2: The composition of the focus group by Faculty, and School/Institute with those over 31 years of age identified.

Learner	Faculty and School/Institute	Over 31
1	Faculty of Medicine and Dentistry – Institute of Dentistry (IoD)	-
2	Faculty of Humanities and Social Sciences – School of Politics and International Relations (SPIR)	-
3	Faculty of Humanities and Social Sciences – School of Law (SoL)	Yes
4	Faculty of Humanities and Social Sciences – School of Law (SoL)	Yes
5	Faculty of Humanities and Social Sciences – School of Economics and Finance (SEF)	-
6	Faculty of Humanities and Social Sciences – School of Business and Management (SBM)	Yes
7	Faculty of Humanities and Social Sciences – School of Business and Management (SBM)	-
8	Faculty of Humanities and Social Sciences – School of Business and Management (SBM)	-
9	Faculty of Science and Engineering – School of Electrical Engineering and Computer Science (EECS)	-

Thematic analysis

Using the guidelines set out by **Guest et al., (2014)**, a thematic analysis of findings from the focus group was undertaken using analysis software NVivo 12™. We followed an exploratory content-driven approach where categories or themes ("Nodes" in Nvivo 12™) were not pre-determined and emerged from the data generated by analysis of the group's discussion transcript. Overarching themes were split further into sub-categories and coded as required to provide qualitative quotes of interest that could be grouped, explored and related to the literature. An example of the coding process is shown in Image 1 and 2:

Image 1: Screenshot for the creation of themes and categories during the thematic analysis phase, using Nvivo 12.

Name	Files	References
31+	0	0
Learning complex concepts	0	0
State of Flow	1	1

Image 2: Screenshot for the creation of sub-themes and categories during the thematic analysis phase, using Nvivo 12.

Learning complex concepts	0	0
Achieving Deeper Learning	0	0
Distractions	1	1
Examples	1	3
Level of Programme	1	1
Recommendations	1	10
Tech Support for Teachers	1	4
Strategies	0	0
Large Group Lectures	0	0
Small Group Lectures	0	0
Technology to support learning	0	0
AI Tools	1	4
Audio-visual tools	1	3
Games	1	1
Mentimeter	1	1
Perceptions of adapting to tech	0	0
Podcasts	0	0
Powerpoint	1	4
Q-review	1	6
Visual Gestures	1	2
VR	1	6

Discussion

Flow can inspire peak performance and corresponds to an optimal psychophysical state of being *"in the zone"*, *"on the ball"*, *"in the groove"* **(Biasutti, 2011).** Our exploratory study aimed to ascertain if learners at Queen Mary could identify with this concept and if so, which technologies educators may be using are the most helpful in prompting this, especially when learning complex concepts.

Do learners understand flow and have they experienced it?

Firstly, it was important for us to establish if our learners could verbalise their understanding of feeling immersed in learning as this underpinned the subsequent questions relating to technology use. From our results, learners indicated that they were aware of this psychological state although not by the scientific terminology. All participants in the focus group could, when prompted, describe a learning situation where they felt at their peak performance and the characteristics that surrounded this. Some interesting interpretations from the focus group are provided:

> *"I guess everything is to 100% of your attention, all your awareness in some explanation or in a subtopic and you can remember it in the long term." [sic]* **(Learner 4, School of Law, 31+ cohort)**

> *"I feel absorbed. I feel engaged. I feel like time is going. Like I think that maybe I've spent an hour, but when I look at the time, I've actually spent 4 hours." [sic]* **(Learner 6, School of Business and Management, 31+ cohort)**

In the **Egbert (2004)** study, the phenomenon of flow in the context of acquiring foreign language skills was explored. Findings indicated that when tasks and skills align, fostering a state of flow, with learners aware, the resulting performance exhibits improvement, thereby enhancing learning. It is cited that this principle holds true for various subjects, as the specific tasks may vary but the underlying process remains consistent. With Queen Mary learners able to express how such a feeling of flow could help with their learning, they too were also able to link to how this could aid understanding complex concepts from various disciplines:

> *"In our risk and crisis management class, the professor was explaining this theory and it was really hard to understand because of lot of formulas and numbers were involved. But in the next half of the seminar, when actually saw it, it was great to understand." [sic]* **(Learner 8, School of Business and Management)**

> *"I think sometimes when we approach the lecture, because I did critical theory in my first year, I would just make lots of notes and then at the end it's like I can't even remember. You start to see links like in other things that you're looking at and where it's not really explicit. Then you see, oh, this topic could relate to here." [sic]* **(Learner 2 School of Politics and International Relations)**

Technologies experienced

The focus group provided some interesting insights into the specific technologies they had experienced at Queen Mary and were able to discuss them in relation to those that helped create a state of flow. This included:

- Audio-visual tools (PowerPoint, video, QReview – lecture recording platform with playback feature)
- Artificial Intelligence (AI)
- Virtual Reality (VR) and Augmented Reality (AR)

Audio-visual tools

The positive views of Queen Mary learners for the use of audio-visual technology corroborates the findings of **Matsiola et al., (2019)** who also found that students rated the usefulness of the technology very highly, especially if they perceive it as useful. The following comments relate to the use of Microsoft Powerpoint, video and Qreview specifically.

Powerpoint

It was clear speaking to the focus group that the use of Microsoft Powerpoint is a cornerstone of delivery across disciplines at Queen Mary. Comments were largely made on the quality of this mode and how to optimise its use:

> *"The slides which professors use, they are information heavy so sometimes what they are speaking and what is written, we get distracted easily whether to read that or whether to listen to the professor. I think generally when the PowerPoint is like bullet points, it's easy to understand with the more complex stuff." [sic]* **(Learner 8, School of Business and Management)**

> *"If you're breaking down what "Hart" has said, theorising very systematically, on the PowerPoint presentation because they say a lot of very difficult stuff that is very difficult to understand, students really struggle, Powerpoint is helpful to break it down." [sic]* **(Learner 3, School of Law, 31+ cohort)**

Two learners added that by making the content of a PowerPoint relevant and including a form of formative assessment within the sessions, it helped the learning process:

> *"Include real life examples of theory on the slides that we can then discuss in the session as it's not about the technology, it's about real life examples and how that concept relates to the current situation." [sic]* **(Learner 3, School of Law, 31+ cohort)**

> *"For me when you can do your own test where the answer is already inside the system, and at the end they tell you, okay, this is right, this is not right. I feel like I'm understanding it, when I do those assessment and I get things right, it makes me want to engage more." [sic]* **(Learner 2, School of Politics and International Relations)**

Video

Comments from specific disciplines were provided on the positive impact of using video for learning complex concepts:

> *"I think what would help make labs easier is if they could incorporate more videos in the lectures or a more comprehensive explanation of the basic concepts in programming rather than just brief overviews, because many students are new to the library that is being used to write the code and if we don't understand how exactly that function is used in the code then that makes the labs even more difficult." [sic]* **(Learner 9, School of Electrical Engineering and Computer Science)**

> *"In risk and crisis management, the professor was explaining this theory and it was really hard to understand because a lot of formulas and numbers were involved. So he made us watch a video related to that and it helped us visualise what exactly the management of that company did and how the calculation was made and what were the variables that was considered and why it was considered. It was great to understand it." [sic]* **(Learner 8, School of Business and Management)**

> *"Neural networks would be much easier to understand if we are able to visualise it. Sometimes, it feels that just reading the book is not enough because I am not able to imagine how the whole algorithm works. It's difficult to understand it from the code as well. A lot of articles on the internet create these short videos on how the algorithm works forward and backward which makes it easier to grasp. Since there are many complicated aspects involved in every step of the code, it would be simpler to see it work in a video than just a flowchart." [sic]* **(Learner 9, School of Electrical Engineering and Computer Science)**

> *"Professors use innovative techniques. They use Mentimeter and some of them use like YouTube to make us understand some of the cases studies, like what went wrong. So they*

use all those audio visual tools so it help us to retain." [sic] **(Learner 8, School of Business and Management)**

Qreview (lecture recording platform with playback feature)

Learners from our focus group spoke about how they valued Qreview at Queen Mary:

"I think what helps with Qreview is when I pause it after 15 minutes and I sit there and I just reflect on what's already been said. I start to make connections." [sic] **(Learner 6, School of Business and Management, 31+ cohort)**

"Qreview is an excellent idea, for example, when we miss some class or when we want to check a specific part of the lecture that we really didn't understand. But sometimes in person is a pretty important interaction with the professor and with your classmates." [sic] **(Learner 2, School of Politics and International Relations)**

This was corroborated by another two learners who found it especially helpful in achieving a state of flow away from taught coding and management sessions respectively. Interestingly this is expanded further on behalf of commuter students at the end of this discussion section:

"For me, I have never achieved this (flow) in class. I'm always a little bit distracted with something, so I usually achieve this when I go through Qreview and I can pause it and for me that state of oh wow. This doesn't always happen in class. It usually happens when I go through Qreview, hearing the lecture, seeing the text and maybe they give you examples of what you can do. So I usually achieve that and I feel like wow, I could do this until midnight after the lecture." [sic] **(Learner 9, School of Electrical Engineering and Computer Science)**

"Qreview helps because maybe at some later stage on the day or the next day whenever we get back, we can then take a note of like whatever is written in the slides and at that point during our lecture we can focus on what he is saying." [sic] **(Learner 7, School of Business and Management)**

Artificial Intelligence (AI)

There is emerging literature to support the adoption of AI in education both from a learner and educator perspective. **Liu et al., (2022)** explored how AI can be applied in university teaching and student learning to enhance the quality of education. Measuring students' progress in knowledge and skills, they found that AI use can benefit teachers by helping them to personalise learning. Students can benefit through AI providing tailored support. **Liu et al., (2022)** conceptualise these relationships in the term *"artificial intelligence + education."* Interesting comments were provided around the use of AI in our focus group, especially from those learners who were using it to support learning difficulties or to simplify complexly worded content:

*"For me, I use something like a speech text technology and that helps with my dyslexia because it's read out to me and I absorb it a lot easier. I do physical theory as one of my modules. It's related to algorithms and stuff like that for politics. So those topics are really not easy to digest." [sic] **(Learner 2, School of Politics and International Relations)***

"ChatGPT when you know how to say something but maybe you're not very specific. It's really helped me. We use it in lectures." [sic] **(Learner 6, School of Business and Management, 31+ cohort)**

Virtual Reality (VR) and Augmented Reality (AR)

Unfortunately, the participants of our focus group had no experience of using VR or AR in learning at Queen Mary, which is consistent with our understanding that its use is limited at present. Interestingly,

when prompted, some learners were able to visualise how these technologies may be developed for use in their respective disciplines:

> *"I think if there was like a VR headset where you look around and there's all the different kind of concepts in visual form, and then you have underneath each one, a visual representation of that concept, that would help." [sic]* **(Learner 2, School of Politics and International Relations)**

> *"So in law, I guess we can use this kind of technology instead of reading the judgments. You could see a representation of the case. For example, I heard that in some cases people use virtual reality in order to have the same experience, like in a real scenario where you can watch rather than read. So perhaps, I don't know, in the future we will have this kind of virtual reality libraries that you go in and wear the headsets." [sic]* **(Learner 4, School of Law, 31+ cohort)**

> *"I think picking up from my gaming experience, it would be much easier to imagine every step of the code and remember it for a longer time. There are multiple things going on at a time and if you can see what function is triggered when and how in a headset, it'll be much clearer. For example in big data processing we have a pipeline of how data is sourced, stored and processed, and each of the steps involves different nodes working together. If this could be 13isualized, I think it would be faster to understand it compared to PowerPoint slides which contain bullet points and pictures." [sic]* **(Learner 9, School of Electrical Engineering and Computer Science)**

Conversely, one learner was very vocal in not see the benefit of using VR in their discipline:

> *"In business management, I don't think it will work because management it's mostly like decision making and if it is a simple tool like PowerPoint, where we can use the data and interpret it if it is basic. Otherwise it will be a waste of time and will confuse the students." [sic]* **(Learner 7, School of Business and Management, 31+ cohort)**

Answers around VR were interesting as several members of the focus group were aware of the technology, often used it at their leisure for gaming and could see how it might be used in education. It would therefore be prudent to involve learners in the development of VR at Queen Mary and continue the educative strategic approach to co-creation. Moreover, the specific suggestions made by learners here may be of interest for educators in SPIR, SoL and EECS respectively. There does appear a need to effectively communicate the potential benefits of this mode to convince some learners that it is worth investing their time in engaging with it.

Mature learners

Our study was keen to provide information about Queen Mary learners who are 31+ and tend to represent those who commute to and from campus, where technology that aids flow can be of particular importance. **Maguire and Morris (2018)** state in the HEPI report *Homeward Bound: Defining, understanding and aiding 'commuter students'* that there is evidence to suggest that, compared to residential students, commuter students obtain poorer outcomes from their higher education, and will be less engaged and satisfied with their academic experiences. Additionally, a study by **Vaportzis et al., (2017)** on the use of tablets by older adults concluded that a majority of the participants displayed enthusiasm in embracing novel technology and demonstrated a willingness to learn through the utilisation of the technology. Nonetheless, they expressed concerns regarding the absence of clear instructions and support, which is similar to comments made in our focus group and is something to note. Whilst acknowledging a small representation of mature learners, two particular quotes from our focus group stood out in regard to these points and opened up some interesting points for consideration:

"I'm technology disadvantaged. Intensive use of technology will actually stress me. So I think if you have all these things and you're trying to figure out where's the button instead of actually going in a state of flow, it would be like half an hour to figure out which button, which program, which software and there's all this privacy every time you have to click okay, accept cookies."
[sic] **(Learner 3, School of Law, 31+ cohort*)***

"A technology that will really be helpful for my kind of thing is if because we spend a lot of time commuting, a lot of time going from point A to point B. I commute for like an hour. Something that is the same as QReview. Maybe like audio wise, I think that would be more use of my time when I'm just sitting in the train. So maybe make it more audio." [sic] **(Learner 6, School of Business and Management, 31+ cohort)**

Vaportzis et al., (2017) identifies barriers that may be of help to educators at Queen Mary when designing provision for commuter or mature learners that utilises technology. These include; insufficient instructions and guidance, limited student knowledge, confidence or feelings of inadequacy when comparing themselves to a younger generation, health-related issues (and associated costs). Our study also reveals some of these points.

Educator suggestions

Findings from this exploratory study inform the following suggestions for consideration when utilising technologies within programmes of study at Queen Mary. Dr Usman Naeem, Senior Lecturer, School of Electrical Engineering and Computer Science (EECS) provides this commentary for fellow educators:

The higher education landscape is constantly evolving due to the emergence of innovative technologies. When implemented correctly and without disrupting the learner's state of flow, these technologies have the potential to enhance the learning experience of learners. Hence, the findings of this study are timely, as we are currently at a juncture where educators must evolve and embrace technological innovations to facilitate a learning environment that fully engages learners. As an educator, I have highlighted some suggestions that are based on the findings of this exploratory study and my experience using some of these tools.

Use of audio-visual tools

One of the silver linings of the pandemic was that it compelled educators to think creatively about how to enhance the learning experience of learners without the use of traditional lecture rooms. One such approach was the creation of asynchronous content, which was in the form of short videos that were accessible via the institution's virtual learning environment. The purpose of these videos was to supplement the content delivered during the online synchronous sessions, and aid student-paced learning. Furthermore, short videos were also seen as a powerful medium to explain complex concepts. Educators were able to pre-record content that necessitated a detailed explanation about a concept, which would otherwise be challenging to cover within a limited lecture time slot. Therefore, it is highly recommended to use asynchronous videos, as can aid the sense of flow in the learner's learning process, making it easier for them to grasp complex concepts.

Presentation tools (not limited to Microsoft PowerPoint) have been used by educators for decades. This is a powerful tool that enables educators to present concepts to learners through the use of visual aids and text prompts. Furthermore, it also assists the educator in effectively delivering their session. However, many educators still make the mistake of adding too much content to their slides. This can prevent learners from achieving a state of flow and self-regulation, especially during live synchronous interactive large group sessions. The overload of information on the slides can cause learners to

disengage. Hence, it is vital that educators pay close attention to how much content is added to slides, otherwise, the use of this technology can be detrimental to the learner's learning experience. This view has also been endorsed by the participants during this study.

Presentation slides should also be used to illustrate real-world application examples, as this can learners understand complex concepts. As these examples can demonstrate how theoretical concepts are put into practice and provide a clearer understanding for the learners.

In our modules, we utilise Q-Review recordings extensively. The learners find this feature very beneficial as it allows them to revisit the material/content after the taught session. It also allows them to learn at their own pace by allowing them to pause and rewind the recordings. It would also be beneficial for our learners that have long commutes if these Q-Review recordings were accessible as audio podcasts. This will aid commuters in reviewing and solidifying their understanding of the material while they are commuting.

Use of Artificial Intelligence (AI)

The use of AI in education is considered by many as a disruption and a threat to the integrity of assessments. However, as an educator, I firmly believe that AI tools have the potential to enhance the critical thinking skills of our learners, but we must exercise caution. However, in order for this to be a reality, Educators must dedicate time to explore how these tools can be incorporated into their courses/modules, as there will not be a one-size-fits-all solution.

Use of Virtual Reality (VR)

Given that VR technology is still in its early stages at Queen Mary, this raises uncertainty about its usefulness in modules/courses across all disciplines. Hence, it is very important that learners are involved in the co-creation of any VR-related content/material, as they will be able to validate the effectiveness of it (i.e. does it have a positive or negative impact on their learning experience).

Limitations of the study and concluding comments

Our small scale, exploratory study provides some interesting information on the views of learners from around Queen Mary. Unfortunately, despite attempting to attract participants to the focus groups from all Queen Mary schools and institutes to establish a clear overview for the full university we were not able to achieve full representation so some insights will have been missed. Additionally, although we attempted create space for all participants to speak within our data collection process, some individuals chose not to. However, we were able to provide specific quotes from individual schools/institutes from around Queen Mary that may be of use for educators in those respective areas to reflect on when considering the use of technology within their provision. Recommendations are provided by an active Queen Mary educator in the spirt of scholarship and open up potential future avenues for exploration.

Learner research intern reflections

The final section of this report is dedicated to the reflections from Farheen Dairkee and her experience in helping to undertake this research as part of the QMA Learner Intern Programme:

"Throughout this research process as a Masters student participating in the intern program with the university, I have gained valuable insights and experiences. Firstly, I learned about the step-by-step process of conducting research, which has given me a solid foundation in research methodology. Secondly, I realised the utmost importance of thoroughness when completing the ethics form, understanding that even the smallest details can have a significant impact on the ethical aspects of the study. Thirdly, I had the opportunity to lead and conduct focus group sessions, enhancing my skills in qualitative data collection. Moreover, I acquired knowledge of new tools and techniques that proved beneficial in the research process.

One notable aspect of this internship was that I had previously primarily engaged in quantitative analysis, but this project allowed me to delve into qualitative analysis and identify themes within the data. Additionally, being part of important university initiatives gave me a sense of fulfilment, knowing that I could make a tangible impact and contribute positively to the university in a short amount of time.

This initiative, which is rare within universities, should serve as a model for others to adopt similar programs and create opportunities for students to actively participate in research and impactful projects. Furthermore, working closely with different teams, such as the ethics and academic departments, taught me the significance of effective communication and collaboration across various stakeholders. Taking on the responsibility to plan focus group activities enabled me to develop strong organisational and leadership skills. Despite the project being entirely qualitative, I endeavoured to apply my data science expertise, utilising AI tools for data pre-processing to streamline and optimise the process. During this journey, I also learned to value myself and recognised areas that require further improvement while acknowledging my strengths.

Lastly, collaborating with fellow interns in a team setting allowed me to discover the remarkable work each of them had accomplished. Overall, this experience has been incredible, providing me with invaluable knowledge, skills, and a sense of fulfilment in contributing to meaningful research initiatives." [sic] **(Farheen Dairkee, Queen Mary Academy Learner Research Intern 2023)**

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