Leveraging the Use of Learning Technologies in Higher Education to Optimise Student Learning

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Abstract

In recent years, lecturers and educational practitioners in higher education institutions (HEIs) have widely discussed and debated pedagogical innovation. This research aimed to critically analyse the lecturers' views on the use of learning technologies to optimise student learning in HEIs. This research was conducted at a private higher education institution in Pretoria, South Africa. The effective use of learning technologies lends itself to pedagogical innovation and optimisation of student learning so that they are better prepared to integrate into the world of work. A qualitative research design was used for this study. The method of data collection was individual interviews with five lecturers from different faculties. Faculties include Education, Humanities and Social Science, Finance and Accounting, Law and Information Technology. Data was analysed through the lens of the SAMR model framework using qualitative thematic analysis. The key findings indicated that lecturers believed learning technologies are used effectively when fit-for-purpose and integrated into quality planning. Furthermore, lecturers emphasised that training, development, and collaborative decision-making were essential in selecting learning technologies. Module developers and lecturers need to work in collaboration and not in isolation.

Keywords: Higher Education Institutions, learning technologies, pedagogical innovation, SAMR model

1. Introduction

In recent years, there have been seismic shifts in the educational domain. The use of educational technology has become more pervasive and prevalent in educational institutions. Educational technologies changed the face of learning and teaching by complimenting video lectures and engaging students in virtual classrooms, enabling more interactivity and hybrid models of online and face-to-face interactions (Brasca et al.,2022). These tools changed learning, teaching, and assessment in ways that persisted after the pandemic. Therefore, the imperative for HEIs post-pandemic is to explore which learning technologies, and technological pedagogies are preferred by lecturers and students, to determine the reasons why some learning technologies are considered to be more effective than others, to critically analyse the challenges associated with the higher adoption of learning technologies and investigate ways in which innovative technologies can be successfully integrated into teaching and learning.

Learning technologies are introduced and implemented across higher education institutions (HEIs) to improve and transform educational practice. However, this aim to transform teaching and learning in higher educational institutions is often not fully realised due to lecturers' or academics' ineffective use of learning technologies (Bates, 2022). Since the use of learning technologies in higher education institutions is widespread and pervasive, the leadership of HEIs must have a coherent understanding of the reasons for the ineffective use of learning technologies (Liu et al., 2020). HEIs can measure the effectiveness of learning technologies by using a combination of evaluation methods and key performance indicators. Learning technologies are rated as highly effective when they contribute to improved learning outcomes and efficiency, and align with the overall learning goals of the institution. Highly effective learning technologies enable institutions to adapt, improve, and make informed decisions in a rapidly evolving learning landscape (Lake, 2023). Determining the effective use of learning technologies is further discussed under rationale.

2. Problem statement

Although technology has significantly changed education over the past decade, educational and learning technologies have existed from the abacus in 480 BCE to the first tablet in 1989. The main problems with learning technologies have not been access to digital devices or availability but the effective use of learning technologies to optimise student learning and experience (Brasca et al., 2022). A learning technology stack, which refers to the collection of various components and tools that work together to support and enhance the learning experience, offers an infinite market of technological tools and devices (Lake, 2023). While HEIs oversee the selection of the ones that best suit their curricular objectives, the lecturers must ensure that the selection of content and devices are well aligned to produce the best outcome for the student. Thus, it is fundamental that HEIs have a lucid understanding of lecturers' views about the use of learning technologies to overcome challenges such as technology fatigue and the digital literacy gap. HEIs must comprehend and acknowledge the difference between lecturers who are comfortable with interaction-engagement-focused solutions and those who are less familiar with these tools and prefer content display and delivery-focused technologies (Brasca et al., 2022, Pajaron, 2022).

Considering the aforementioned problem statement, the following research questions (primary and secondary) delineate the aim of this study, which is to critically analyse lecturers' views on the use of learning technologies in higher education:

Primary: What are lecturers' views concerning using learning technologies in higher education to optimise student learning?

Secondary questions:

RQ1. How do teaching skills and the use of technology influence the quality of teaching?

RQ2: To what extent does the use of technology in higher education contribute to a better learning experience and the optimisation of student learning?

RQ3: What influence will collaboration between subject experts, media specialists and instructional designers have on the effective use of technology in teaching?

3. Rationale

This research aims to critically analyse lecturers' views on the use of learning technologies based on Dr Bates's "12 golden principles for effectively using learning technologies" (Bates, 2022, p.2) and the SAMR model framework. The research aims to establish to what extent

these 12 golden principles and the SAMR framework apply to a Private South African Higher Education Institution by critically analysing lecturers' views. A critical analysis of the lecturers' views will also determine to what extent lecturers use learning technologies effectively. The effective use of learning technologies lends itself to pedagogical innovation and optimisation of student learning so that they are better prepared to integrate into the world of work.

Research conducted by Ferguson (2019) for the Commonwealth of Learning, affirms that the effective use of learning technologies offers six ways to augment existing pedagogical practices. It improves connectivity by providing a wide range of tools that support networked, collaborative and conversational approaches to learning. Technology supports extended learning, connecting learning experiences across locations, times, devices and social settings. Technology develops inquiry skills and provides students with new means and structures for organising data, new reference sources, and new tools that can be used to investigate this information space. Interactions with technology generate data sets that enable learners to understand and develop their aptitudes and skills and to create personalised paths through educational content. Students may use digital tools to connect their learning with experiences outside the classroom. Education can now be delivered at scale through massive open online courses (MOOCs) (Ferguson, 2019). When used to augment pedagogical practices in these ways, learning technologies are deemed to be used effectively.

4. Literature review

In this era of the fourth industrial revolution, technology became part of everyday teaching and learning, and the use of devices and computers also changed how the curriculum was delivered (Hamidi et al., 2011). This transformation is not only teacher-orientated but also student-orientated. Technology is used to expand learning by improving information reception, deepening memory and understanding, and uniting the concepts of recognition and effective processing, and it stimulates and motivates study among groups of students (Austin et al., 2016).

Educational technology has also proven to play an essential role in achieving a sense of unity between students and lecturers in the classroom, as well as building confidence and independence within the students and has become the source of fundamental changes in the classroom (Cabaleiro-Cerviño & Vera, 2020). The use of technology in education has allowed students to access information outside of classrooms, resulting in an increase in self-motivation for learning. Research conducted by Cabaleiro-Cerviño & Vera (2020) indicates that educational technology helps students significantly improve their scores by expanding the information they can access and broadening their learning environment. The use of technology has made education more dynamic and exciting. Technology has also allowed the development of collaborative learning and greater student participation. Social networks help students create a positive contextual training space concerning pedagogical objectives and engage in collaborative learning (Cabaleiro-Cerviño & Vera, 2020).

However, research conducted by Moloi and Salawu (2020) indicates that although the deployed technologies to facilitate their teaching and learning activities by South African HEIs have been extensive and pervasive, the teaching staff was moderately competent in the use of existing technologies for teaching. This finding is corroborated by Kanyane (2023), who asserts that the South African Higher Education landscape has been partially transformed and is not ready to possess the required skills for the twenty-first century digital society. The critical skills academics require include digital transformation, cybersecurity, and cloud computing to transform the education landscape and influence learning, teaching and research applications. However, the academic staff are only moderately competent and do not respond swiftly to the

digital demands of HEIs (Kanyane, 2023). Kanyane (2023) further argues that although the education sector is eager to apply digital technologies to access education globally, the academic staff are not well prepared or do not feel confident to teach in a digital environment because of their inadequate skills capacities and competencies to interact with the digital teaching and learning platforms. Kanyane (2023) cites the following reasons for their lack of competence. Firstly, there is no dedicated programme or curriculum to advance their knowledge of online technologies. Secondly, the workplace is also not ready and old enablers of teaching and learning are still used in specific universities. Thirdly, it has been noted that not all academic staff have adequate online teaching competencies and experiences. This results from the lack of curriculum for staff development and the use of obsolete equipment at the workplace in several South African Universities (Kanyane, 2023). For lecturers, the most effective way to improve their technical skills and use of technology effectively is through training. Lecturers explained that exposure to extensive training in the use of technology in the classroom results in a higher level of self-confidence and an enhanced integration of technology in teaching and learning (Chau, 2019).

Given the above findings alluding to lecturers' lack of competencies and capacities to interact confidently with digital learning tools, 50 years of research done by Bates (2022) indicate a set of fundamental principles for effectively using learning technologies that surpass changes in technology and teaching practice.

4.1 Dr Bates' 12 principles for the effective use of learning technologies

Dr Tony Bates (2022, p.2-8) identifies 12 golden principles for effectively using learning technologies.

> *Principle 1: Good teaching may overcome a poor choice in the use of technology, but technology will never save bad teaching, usually, it makes it worse. Principle 2: Each medium has its peculiar aesthetic. Principle 3: Educational technologies are flexible. Principle 4: Every medium has specific educational benefits and limitations. Principle 5: Multiple media are usually more effective than a single medium, but this has to be balanced with efficiency. Principle 6: Interaction is essential. Principle 7: Student numbers are critical. Principle 8: New technologies are not necessarily better than old ones. Principle 9: Teaching is a skilled discipline with strong theory and research to support technology decision-making. Principle 10: To exploit fully the potential of technology, the teaching also needs to change. Principle 11: Teamwork is valuable but expensive. Principle 12: Technology is not the issue.*

While the equipoise of pedagogical knowledge and technological knowledge is fundamental in optimising the quality of teaching and learning, the choice of technology used in the classroom cannot gain mastery over poor pedagogical skills. Using the example of creating slides, Dr Bates (2022) argues that although multiple media are more effective than a single medium, each medium has advantages and disadvantages (Bates, 2022). The use of sophisticated technology will not compensate for poor language and lack of presentation skills. Since technologies are flexible, lecturers must integrate the most effective technological tools into their planning. This also includes using the best possible technology for a specific outcome (Bates, 2022).

Technology needs to be effective in the class and contribute to the quality of the lesson. When integrating digital tools into their lessons, lecturers must select digital tools to encourage interaction in teaching and learning. The selection of digital tools will also depend on the infrastructure available in the classroom and the number of students (Bates, 2022). Bates (2022) suggests that it is sometimes better to stick to an older, more convenient tool than a new one

that may not be as effective. In addition, lecturers must be subject matter experts to enable them to select the most effective digital tool to augment their lessons (Bates, 2022).

After selecting the most effective digital tool, lecturers must re-think and re-evaluate their teaching strategies to accommodate the digital tool so that the emphasis is on the subject matter rather than the digital tool being used. The selected digital tools must be made available to students at no extra cost. Tools must be functional and enhance the teaching methods (Bates, 2022). Furthermore, to enhance the use of learning technologies, lecturers must integrate innovative digital pedagogies into their teaching and learning.

4.2 Innovative Digital Pedagogy in HEIs

A key focus of 21st-century education is to prepare individuals to live and work in a globalised society. Personalised learning and provision for the diversity of students and equity are just a few examples of how education needs to be shaped to be effective. Traditional teaching methods need to change and adapt to accommodate the needs of students in current times and beyond (Smith & Jeffery, 2013). Lecturer development must include ways to innovate pedagogy through digital tools that support learning and accommodate different learning styles (Smith, 2021).

Research conducted and reported in the New McKinsey report (2022) indicates that students and faculty are eager to continue using new classroom learning technologies adopted during the pandemic, but institutions could do more to support the shift (Brasca et al., 2022). The McKinsey report (2022) further adds that the primary objectives for administration leaders, information technologists, and faculty academics must be student engagement and motivation, better academic performance, and faculty satisfaction and retention. HEIs must also factor in student access to technology before deployment. Institutions that have successfully deployed new learning technologies provided technical support and training for students and guidance for faculty on adapting their course content and delivery. Higher education institutions often do not know how to measure the impact of their investment in learning technologies, yet it is essential for maximising returns (Brasca et al., 2022).

Educational technologies are being revolutionised with a strong focus on connectivity, versatility, and student-centred learning. HEIs must be cognisant of current educational technology trends and encourage lecturers to integrate these trending digital tools into their pedagogical praxis (Bui, 2020). While E-learning educational content is delivered to learners through computers, laptops, tablets, or smartphones, the most widely used technology across faculties and universities is the learning management system (LMS) (Moloi & Salawu, 2020). The decision-making scenarios in e-learning also encourage learners to choose what they will learn next. According to Bui (2020) video-assisted learning, blockchain technology, artificial intelligence (AI), learning analytics, gamification VR (virtual reality) and AR (augmented reality) were the top educational technology trends in 2021. Video-assisted learning is highly beneficial in enriching lessons and making content understandable. It improves students' outcomes and reduces teachers' workload. Blockchain technology is used in Massive Open Online Courses (MOOCs) and ePortfolios to verify skills and knowledge. AI is a powerful assistant for in-class teaching. Learning analytics helps educators identify students who may have academic or behavioural challenges. Gamification turns learning fun-filled, engaging process. The rise in demand for experiential learning pushes learning development with VR and AR, ensuring student-centred, interactive learning. While VR provides a constructed reality, AR gives an enhanced view of an actual image (Bui, 2020). However, implementing these digital tools and applications will not result in greater academic success if these learning technologies are not used optimally with a focus on applying the SAMR model framework.

5. Theoretical framework: SAMR model

Blundell et al. (2022) argue that the integration of digital technologies in formal educational practice is an important innovation often framed in terms of its transformative potential. Integrating digital technologies in formal educational practice is conceptualised, described, and validated in research using various models and frameworks. One such model is the SAMR model framework. The SAMR model (see Figure 1: SAMR model), is depicted as having four hierarchical levels presented in order of their sophistication and transformative power (see Fig.1) and can act to enhance educational practice or allow for transformation of educational practice. Acts of enhancement involve substitution without functional change or augmentation with functional improvement. Allowances for transformation involve modification through significant task redesign or redefinition to create new, previously inconceivable tasks (Blundell et al., 2022, Terada, 2020).
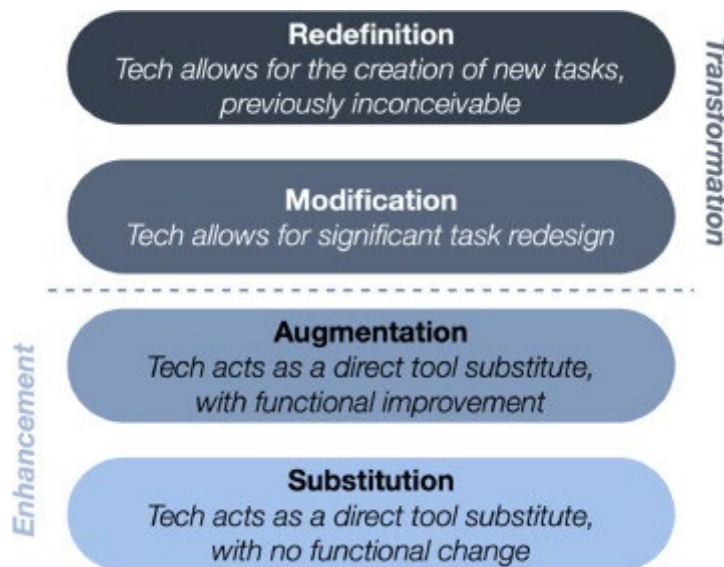

Figure 1: SAMR Module (Puentedura, 2020).

"Substitution" means technology is directly substituted for a more traditional teaching tool or method, such as in-class lectures or paper worksheets, which are substituted with digital versions. There is no substantial change to the content. Substitution might include a lecturer using Flipgrid, Keynote, PowerPoint, Prezi, Slides, or a similar program to present information about a topic or module. Substitution also helps to provide synchronous and asynchronous versions of lectures. When substituting technology for pen and paper, it is essential to reflect on what students stand to gain by replacing traditional tools and if this substitution will improve student learning (PowerSchool, 2021, Terada, 2020).

Augmentation incorporates interactive digital enhancements and elements like comments, hyperlinks, or multi-media. The content remains unchanged, but students can now use digital features to enhance the lesson. The use of technology must increase or augment students' productivity and potential in a significant manner. For example, students can create digital portfolios to create multimedia presentations for a traditional tool or method, but with significant enhancements to the student's learning experience (PowerSchool, 2021, Terada, 2020).

During the modification level, lecturers can think about using a learning management system like Google Classroom, Moodle, Schoology, or Canvas to handle the classroom's logistical aspects. At this stage, lecturers move from enhancement to transformation using the SAMR model. Significant changes are made to the lesson's design and learning outcome during this

stage. The modification must ensure that the technology significantly alters the learning experience (PowerSchool, 2021, Terada, 2020).

Redefinition is the last stage of the SAMR model and represents the pinnacle of how integrated classroom technology can transform a student's experience. Learning is fundamentally transformed at the "redefinition" level, enabling previously impossible activities in the classroom (PowerSchool, 2021, Terada, 2020). The fundamental question asked during this stage is how lecturers or teachers can redefine a traditional learning task where technology must be used to create a novel experience. For example, virtual field trips enable students to visit locations like the Amazon rainforest, the Louvre, or the Egyptian pyramids. Technology also provides an opportunity to bring authentic audiences into your virtual classroom and can make publishers out of your students, this redefines students' learning experience (PowerSchool, 2021, Terada, 2020).

Dayal (2023) argues that The SAMR model provides a robust framework for educators to integrate technology meaningfully. By progressing through the continuum, the SAMR model enables teachers to transcend essential substitution towards transformative practices that enhance and redefine student engagement, critical thinking, and creativity (Dayal, 2023). However, PowerSchool (2021) advises that layering technology into antiquated tasks will not improve students' learning experience. Teachers must purposefully alter the substance of these tasks to address the skills students need today and for the future to enhance learning.

Iris (2023) cautions that while the benefits of technology integration are undeniable, challenges are inevitable. Common concerns include ensuring equitable access to technology for all students, balancing screen time with other learning activities, minimising distractions and maintaining focused learning with technology. However, by viewing these challenges through the lens of SAMR, educators can devise effective solutions to optimise technology's positive impact (Iris,2023). Iris (2023) further adds that by staying abreast about emerging technologies and their potential educational applications, fostering a growth mindset, inspiring students to embrace technological advancements and collaborating with peers to share best practices for successful technology integration, educators can harness the transformative power of technology to create innovative and engaging learning environments. The SAMR model enables and directs technology integration in education. By utilising this framework, educators can elevate the learning experience, preparing students for a future undeniably shaped by technology (Iris, 2023).

6. Research methodology and design

This study adopted a qualitative research strategy. Qualitative research as an umbrella concept covers several forms of inquiry that help us understand and explain the meaning of social phenomena with as little disruption of the natural setting as possible. Social inquiry in qualitative research relies primarily on non-numeric data in words, including all types of textual analyses, such as content, conversation, discourse, and narrative analyses (Merriam,1998, Jackson II et al., 2007). The qualitative design suits this study since this study is less structured than a quantitative study. In this study, the specific procedures were identified during the research rather than specified beforehand.

The research paradigm for this study is located within the theoretical framework of the SAMR model. This study examines the epistemological elements of the SAMR framework. Epistemology means knowledge or what counts as knowledge within this world. It focuses on the nature of knowledge or comprehension that researchers could acquire to deepen the understanding of their research fields (Moon & Blackman, 2017). The SAMR framework

paradigm in this study leans towards intuitive and authoritative epistemology since data was collected relying on beliefs, intuitions, people in the know, leaders in their field and reputable literary works (Kivunja & Kuyini, 2017).

6.1. Sampling

Five lecturers from different faculties, who seemed knowledgeable about integrating technology into their teaching to enhance the quality of their lecturing were purposively selected. This purposive selection of participants also ensured that experts in different domains of academic studies weighed in on the use of learning technologies to optimise student learning. Participants were selected as follows:

- Participant 1 – Independent Contractor in the Faculty of Education
- Participant 2 – Independent Contractor in the Faculty of Humanities and Social Sciences
- Participant 3 - Independent Contractor in the Faculty of Law
- Participant 4 – Full-time lecturer in the faculty of Finance and Accounting
- Participant 5 – Faculty Head in the Faculty of Information Technology

Participants were emailed a consent letter detailing the purpose of the research. Participants acknowledged the ethical considerations of the study and gave consent to participate in the research by signing the consent form. For this study, the five participants are labelled P1 to P5.

6.2 Data collection method

Data for this study was collected predominantly through semi-structured one-on-one interviews. Interviews were conducted with lecturers to elicit their viewpoints on the use of learning technologies in HEIs. The interview questions were formulated based on Dr Bates' "12 principles on the effective use of learning technologies". The semi-structured questions gave us the flexibility to prompt lecturers to add information they believed relevant to the research. Interviews were conducted online using TEAMS. All interviews were recorded and transcribed.

6.3 Data analysis

Thematic analysis was used to analyse the data. The thematic analysis identifies themes or patterns in the data that are significant or interesting and uses these themes to discuss critical aspects or issues that arise from the research (Clarke & Braun, 2013). As researchers, we first familiarised ourselves with data and thereafter generated initial codes. The codes were examined for interesting and significant patterns that were formulated into seven themes, which are effective teaching vs the use of technology in the classroom, quality planning vs the use of technology, fit-for-purpose technology in the classroom, lecture development and training on multi-media teaching, the dynamic nature of technology, considering technology when developing a module and students' learning experience with technology vs students' learning experience without technology. These themes are analysed through the lens of the SAMR model and Bates's 12 principles for the effective use of learning technologies.

7. Results

7.1 Effective teaching vs the use of technology in the classroom

All participants explained the value of quality lecturing and argued that technology will never be able to replace teaching. Participants affirmed that technology was only a tool to assist

teaching and help the lecturer to enrich their lesson. P4 corroborated the views of other participants by stating the following:

> *When it comes to technology, technology is only a tool and is meant to support and will not compensate for a lack of teaching. It needs to be used in a supportive manner and not as the one all-in-the-be-all* (P4).

P3 corroborated P4's sentiment by emphatically stating, "*Teaching can still occur without any technology*". P2 further explained the benefit to students if the technology is used correctly, arguing that lecturers also need to read the "room" to see what would benefit the students. P4 mentioned the importance of teaching the basics of technology, like working with Excel spreadsheets and changing a document into a PDF format. According to P2, using technology in the classroom must go beyond enriching a lesson. It must provide students with practical experiences. P5 asserted that *"learning can continue without technology"*.

These viewpoints correlate with Bates's (2022) principle which states that good teaching may overcome a poor choice in the use of technology, but technology will never save bad teaching. Participants' beliefs also align with the tenets of the SAMR model which affirms that when substituting technology for pen and paper, it is essential to reflect on what students stand to gain by replacing traditional tools and if this substitution will improve student learning (PowerSchool, 2021, Terada, 2020).

7.2 Quality planning vs the use of technology

Participants argued that efficient and effective planning influences the quality of learning and the effective use of technology. In support of this argument, P1 mentioned that "*some lecturers think that YouTube videos can replace teaching*". P2 emphasised that "*Nothing can rescue a poor lesson. A lesson plan is definitely more critical than having slides."* P3 further supported the argument about effective planning by maintaining that "*technology plays an important role but still students come to class to get the information. As a lecturer, you can upload as many resources as you like, but if your class is not planned, and organised and information is not shared in a professional way, students will not even go and look at the uploaded material.*" These arguments support the notion that technology must be a tool used to enhance and transform the learning process as stipulated by the SAMR model. The imperative lies in effective planning aligned with the diligent selection of technology to optimise student learning, as stated by Bates (2022) to exploit fully the potential of technology, the teaching also needs to change. This teaching includes effective planning of the teaching and learning experience which integrates technological, pedagogical and content knowledge.

7.3 Fit-for-purpose technology in the classroom

Participants in this study unanimously agreed that fit-for-purpose technology must be a fundamental consideration in the classroom. The reason for the selection of specific technology must be to enrich students' experience and support the lesson. When asked the question: What do you think is the most suitable technology for face-to-face classes, most of the participants confirmed that the selection of the best technology was not as important as ensuring that the selected technology aims to optimise student engagement and interaction in the classroom. P1 and P2 shared the following sentiments:

> *For face-to-face classes, you must make your slides or your visual presentation interactive. Something that can visually represent what you are teaching them. The specific digital tool is not as important as making the lesson, whether face-to-face or online, interactive.*

> *Lecturers need to prepare a quiz or use any possible way to make sure there is constant engagement between students.*

P5 explained that the subject content and the lecturer's expectations of the students also determine the type of technology used in the classroom:

> *It depends on the subject content that you are trying to convey or that you're engaging with. In terms of the functionality, what type of engagement do you expect back from the students and how easy will it be for you to involve them in the sessions? You can even engage with lecturers on another campus and collaborate between different campuses. But whatever tool a lecturer uses, he or she needs to know the limitations of the technology."*

Bates's (2022) principles that allude to each medium having its own aesthetic, educational technologies are flexible and every medium has specific educational benefits and limitations, underscore the lecturers' views on using fit-for-purpose technology in the classroom. Furthermore, incorporating fit-for-purpose technology in conjunction with the four hierarchical levels presented in the SAMR model acts to enhance educational practice or allow for the transformation of educational practice (Blundell et al., 2022, Terada, 2020).

7.4 Lecturer development and training on multi-media teaching

Discussions revolving around themes two and three indicate that participants firmly believed that technology in the class must be fit-for-purpose and that technology cannot supersede quality planning and delivery of lectures. When asked the question: Should the possibility of using technology be exploited? P1 replied as follows:

> *It depends on person to person. I personally like to experiment and have a look at different technologies we can use, it keeps the student's interest as well. I always need to be mindful when I use a new tool that all the students can access for free. I do understand that some lecturers do not want to use it* (P1).

P2 contended that all lecturers must be comfortable with the new technologies. *"It is better to use the same tool over and over, but they must know how to use it. Technology needs to support the lesson and if a lecturer does not understand the tool and spends more time in class trying to figure it out, the whole lesson will be useless"*. However, P4 argued that *"technology is everything and lecturers need to learn how to use different types of technology in their classes to make teaching relevant"*. P2 further stressed the importance of exploiting different learning technologies by maintaining that *"technologies are there to make your life as an educator easier and for that reason, lecturers need to receive training and workshops to help those who are not used to change and use new tools*. In support of exploiting different learning technologies and fit-for-purpose technology, P5 proffered the following:

> *You always have to push your boundaries and you always need to have a plan B. You need to test it and try to fully use every tool at your disposal at some point. As long as it is fit-for-purpose, don't make it fit. Some content might rely on functionality that is only available on one specific tool and that will be beautifully supported by the use of the technology. But you can still use your pen and paper in a session and get the same results* (P5).

All participants agreed that teaching in current times must be adapted to suit and "connect" with today's generation. Many participants alluded to the assumption that today's generation

of students are visual learners, therefore, reading from a textbook is not the best teaching strategy. Most participants agreed that lecturers must be cognisant of the learning styles of the current cohort of students when planning a lesson. P1 elaborated that using PowerPoint slides is not enough. To deepen their understanding, students must engage with the concepts, skills, and subject content. An analysis of the responses concludes that participants agree that teaching is augmented by integrating technology into the lesson coupled with the implementation of the SAMR model.

An analysis of the responses that focused on lecturer development and training on multi-media technology concluded that participants agree that lecturers must be trained to use multi-media technology, however, the multi-media technologies must be diligently integrated into the planning of the lesson to ensure the optimisation of learning. These views are corroborated by Bates's (2020) argument that multiple media are usually more effective than a single medium, but this has to be balanced with efficiency. Teaching is enhanced and transformed by incorporating technology into the lesson. However, the SAMR model contends that the use of technology must increase or augment students' productivity and potential in a significant manner. For example, students can manoeuvre through the tiers of the SAMR model to create digital portfolios and multimedia presentations with significant enhancements to optimise the learning experience (PowerSchool, 2021, Terada, 2020).

7.5 The dynamic nature of technology

As early as 400 BC, Socrates stated: "*The secret of change is to focus all of your energy not on fighting the old but on building the new*" (quotesgram.com/time-for-change-quotes). This quote is still relevant in this era of technological transformation. During the interviews, participants were asked about their opinions regarding using new technologies instead of old ones. The question was as follows: Is replacing old technology with new technology necessary? P1 responded, "*A good teacher can even teach under a tree and students will still learn.*" Most participants affirmed that the quality of lecturing was more important than the technology being used, irrespective of whether it was old or new. Participants believed that it is not sufficient for lecturers to know how to use technological tools, they also must be confident that the digital tool will serve its intended purpose. In response to old technology versus new technology, P2 added:

> *I think that if you forget the fundamentals, you lose track of something that might only be useful for a few moments. For example, one of the things that I use a lot is TikTok. Because I find that there are so many interesting examples and conversations happening there. There needs to be a balance, a relationship, be aware of what's coming out, and use it if you can. But it doesn't mean you throw out the old stuff because you know. Be selective, some old tools can always be used.*

Beliefs and arguments put forward by participants alluded to the thinking that it is essential to explore new tools, but it is also important not to discard the old technology. If the old technology is still fit for purpose and able to achieve the objective, there is no reason to make this technology obsolete. P5 highlighted the importance of personal decision-making when choosing technology by stating:

> *We know that choosing the wrong methodology and choosing the wrong tools, leads to disastrous consequences. Unless you first look at the technology and make up your own opinion. Never force somebody to use a particular technology, it is like forcing a square through a round hole. Make sure of the educational purpose of a tool.*

Respondents confirmed the dynamic nature of technology and acknowledged that technology is continuously changing. However, they unanimously affirmed that discarding old technology that is still fit for purpose and yields effective results just for the sake of using new technology is unnecessary. However, many respondents also agreed that exploiting the possibilities of new technology and experimenting with new technology is equally important. Participants' views aligned with Bates's (2020) principles that stated educational technologies are flexible, new technologies are not necessarily better than old ones and teaching is a skilled discipline with strong theory and research to support technology decision-making. By progressing through the continuum of the SAMR model lecturers will be able to transcend from the critical substitution level and engage in transformative practices, redefining the dynamic nature of learning technologies (Dayal, 2023).

7.6 Considering technology when developing a module

An analysis of the responses from participants highlighted a significant finding that integrating fit-for-purpose technology into teaching and learning was imperative in ensuring an increase in module success rates. Respondents also emphasised the need for collaborative decision-making between subject experts, media specialists, and instructional designers when selecting the type and the use of technology for the different modules. The following responses were put forward concerning module development and the integration of technology when developing a module:

P2 mentioned that "*she decided not to be part of module development because it is a lot of work for very little payment*". P3 explained that "*lecturers are by default not very tech savvy and more support must be provided to lecturers*". P3 argued further that lecturers needed guidance on how to navigate and integrate technology into teaching and learning. However, contrary to the belief that technology selection must be a collaborative decision, one respondent believed that lecturers "*must not be forced to use a specific tool*". P5 reiterated the argument about collaborative decision-making by stating the following:

> *By bringing in multiple perspectives, you bring in different disciplines.*
> *You bring in more perspectives on how to make learning more effective.*
> *I would say all subject experts, media specialists and instructional designers are essential to collaborating.*

Most responses highlighted the importance and significance of selecting technology fit for purpose during the module development phase. Participants also agreed that the decision to integrate a specific digital tool or type of technology into a module must be a collaborative one that includes subject matter experts, media specialists and instructional designers. While Bates (2022) urges that lecturers must be subject matter experts to enable them to select the most effective digital tool to augment their lessons, Bouchrika (2024), advocates for the use of the SAMR model as both a planning tool and a reflection tool and a framework for assessing how technology can enhance instruction.

7.7 Students' learning experience with technology vs students' learning experience without technology

Students' learning experiences are often vital to achieving academic success. Participants agreed that although technology enriches students' learning experience, it is not always the focal point of the learning experience. Lectures must exploit the possibilities of new technology and experiment using different digital tools to gauge which digital tool or application will provide the best learning experience. Participants also agreed that lecturers require support, encouragement and training in selecting technology to optimise students' learning experiences.

However, there was unanimous agreement that integrating technology into teaching will heighten the students' learning experience.

P2 reaffirmed the need for support and training by adding the following:

> *But one of the things that I think we sometimes fail to remember is that I don't think every lecturer is originally a teacher. So, most teachers I know are also learners. We are all very keen to find new knowledge. And one of the things that happen is, a lot of our lecturers end up becoming afraid of technology or they get afraid of new teaching styles.*

P4 acknowledged that each lecturer is responsible for encouraging other lecturers to use technology effectively in their classroom. Sharing insights and ideas will ensure the effective use of technology in teaching and learning across all faculties. Collaborative discussions revolving around the effective use of technology to augment learning experiences result in overall improvements in lecturers' effective use of learning technologies. Layering technology into antiquated tasks will not improve students' learning experience. However, the implementation of the SAMR model enables teachers to purposefully alter the substance of these tasks to address the skills students need today to optimise their learning experience through the use of technology (PowerSchool, 2021, Iris, 2023).

8. Findings and discussions

The findings of this study favour Dr Bates's (2022) principles for effectively using learning technologies and the implementation of the SAMR model. Firstly, integrating technology into a lesson will not compensate for the poor quality of lecturing or teaching. Lecturers must plan diligently for their lessons to ensure they use technology that is fit for purpose. To do so, they must consider the content that needs to be delivered and the skills and conceptual knowledge that the students must grasp. To select the most effective learning technologies, lecturers must also be subject matter experts. This will ensure that the choice of technology is not forced but complements the teaching strategy and optimises student learning.

These findings reaffirm Dr Bates's 12 golden principles for the effective use of learning technologies. Bates (2022) further argues that when selecting the most effective digital tool, lecturers must re-think and re-evaluate their teaching strategies to accommodate the digital tool so that the emphasis is on the subject matter rather than the digital tool being used. The accessibility and functionality of these digital tools should be imperative (Bates, 2022). Re-thinking and re-evaluating teaching strategies must consider incorporating innovative digital pedagogies that encourage the use of technologies such as video-assisted learning, blockchain technology, artificial intelligence (AI), learning analytics, gamification VR (virtual reality) and AR (augmented reality) (Bui, 2020). These innovation pedagogies will encourage acts of enhancement underpinned by the SAMR model that involve substitution without functional change or augmentation with functional improvement or significant redesigning of tasks involving modification or redefinition to create novel experiences that transform student learning (Blundell et al., 2022, Terada, 2020).

Students' multiple intelligences and learning styles must also be factored into the selection of learning technologies since different students prefer to learn using various types of digital tools and applications. Using the transformative tiers of the SAMR model will assist lecturers in transforming their lessons and significantly altering the task to cater to students with different learning styles and multiple intelligences. Transformation and enhancement achieved through the implementation of the four levels of the SAMR model are critical components for the successful integration of multiple intelligences into learning and teaching (Terada, 2020,

Dayal, 2023). Also aligning with the SAMR model, lessons must be restructured and redefined when technology is incorporated to shift the perspective of the lesson. The design of tasks should be done in such a way that they not only transform the lesson but create something entirely new. As previously discussed, the integration of technology should not be an additional element but an enhancement of the overall learning experience. The role of technology should signify enrichment and improvement, serving as a tool to foster deeper thinking and understanding among students, rather than merely focusing on its use (Dayal, 2023).

9. Conclusion

This research aims to critically analyse lecturers' views on using learning technologies based on Dr Bates's "12 golden principles for effectively using learning technologies" (Bates, 2022:2) and the SAMR model framework. The findings of this study indicate that the lecturers' views concerning the use of learning technologies align with Dr Bates's principles for effectively using learning technologies. Based on the results and findings of this study, we recommend that HEIs consider lecturers' views when selecting and deploying learning technologies, critically evaluate Dr Bates's principles, and explore ways in which the SAMR model may be incorporated into lecturer development and training on the effective use of learning technologies.

The effectiveness of learning technologies may be measured against students' learning experiences and the module outcomes, themes, learning outcomes and selected strategies. If the learning technology improves students' learning experiences, then the use of the technology may be deemed effective. Therefore, choosing the most effective learning technologies to optimise students' learning experiences may be a heuristic approach dependent on trial and error and experience.

The delivery of the module, whether face-to-face, online or a hybrid model, will determine if the learning technologies are used to enhance or transform teaching and learning. These considerations must be factored into the module design. When developing a module that will ensure the effective use of learning technologies, collaborative decision-making between subject matter experts, module developers, information specialists, and instructional designers is fundamental. Since the integration of digital technologies in formal educational practice is an important innovation that is often framed in terms of its transformative potential, stakeholders in module design must determine firstly the point of integration of technology and, secondly, strategically leverage technology to redefine and amplify the educational experience (Iris,2023).

HEIs must provide lectures with the necessary support, development and encouragement to ensure the effective use of learning technologies in their teaching. While lecturers should be encouraged to exploit the possibilities of new technology and continue to experiment with a range of digital tools and applications, they should not be forced to abandon old technology in favour of new technology, especially if the old technology is still fit for purpose and achieves the learning outcomes. HEIs must be cognizant of the fact that there is a difference between instructors who are comfortable with interaction-engagement-focused solutions and staff who are less familiar with these tools and prefer content display and delivery-focused technologies (Brasca et al., 2022). Pedagogues who can apply the SAMR model framework will critically analyse the different tiers of the SAMR model and align these tiers to how the technological tool will be used in the classroom. Integrating technology through the lens of the SAMR framework, educators can devise effective solutions to optimise technology's positive impact (Iris,2023).

We further recommend that HEIs urge lecturers to evaluate the SAMR's applicability diligently and, depending on their confidence and familiarity with using different learning technologies to, progress through the continuum of the SAMR model. This will enable lecturers to transcend basic substitution towards transformative practices that enhance and redefine student engagement, critical thinking, and creativity (Dayal, 2023). The aim of learning technologies must be to optimise student learning and transform learning experiences that will result in academic success.

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