

Technology-Enhanced Learning Module As A Driver Of Digital Transformation In Course Design

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Abstract— This study investigates the effect of the Technology-Enhanced Learning (TeL) module on the digital transformation of course design for lecturers participating in the program. With higher education shifting towards digital transformation, professional development programmes aim to equip lecturers with the necessary skills for a digitally transformed curriculum. These skills promote student-centredness, engagement, inclusivity, and innovation. The study examines how the TeL module is utilized as an academic development intervention to foster digital pedagogy, reflective practice, and curriculum transformation. It assesses the impact of participation in the TeL module on lecturers' integration of digital technologies into their teaching practices. Using the Substitution–Augmentation–Modification–Redefinition (SAMR) model as the sole analytical framework, the research examines the extent to which lecturers progress through the model's four levels, Substitution, Augmentation, Modification, and Redefinition, during and after their engagement with the module. Studies show that TeL offers a systematic approach to integrating technology into teaching and encourages lecturers to move from using technology as a mere substitution to innovative approaches that enhance teaching and learning, promoting inclusivity and collaboration. Findings demonstrate that the TeL module provides a structured pathway for lecturers to move from adopting basic technology to transformative pedagogical practices. The study highlights key shifts in course design, including enhanced interactivity, increased learner engagement, and the creation of new learning experiences that were previously inconceivable without digital tools.,

Keywords— Course Design, Digital Transformation, Professional Development, Technology-Enhanced Learning (TeL)

I. INTRODUCTION

Digital transformation in higher education has significantly increased due to the global adoption of technologies for teaching and learning. This is significant due to evolving student needs and systemic disruptions caused by global pandemics such as COVID-19, which have led higher education institutions to undergo one or more significant changes. Universities are increasingly expected to design student-centered learning environments that are inclusive and flexible through digital initiatives. As more institutions, instructors, and students shift to virtual environments, the requirements for e-learning systems that are both flexible and inclusive have grown (Sunda et al., 2025). Lecturers and other academic practitioners are expected to translate institutional digital strategies into effective pedagogical practices; however, they have limited formal training in digital pedagogy or course design.

Professional development initiatives, such as Technology-Enhanced Learning (TeL) modules, were developed to foster formal digital pedagogy among lecturers and support their transition into it. These modules not only focus on developing technical skills but also foster reflective practice, pedagogical innovation, and curriculum transformation. TEL modules equip lecturers to design courses that are interactive, collaborative, and student-centred. Frameworks like Technological Pedagogical Content Knowledge (TPACK) have proven very useful in ensuring that technology integration in course design

is both pedagogically sound and relevant to the context or discipline. Mishra and Koehler (2006) emphasise that the effective integration of technology in teaching requires teachers to have technological, pedagogical, and content knowledge, which arises from and extends beyond the interplay of content, pedagogy, and technology.

With lecturers having integrated technology into course design, it is necessary to measure the progress of the transformation. The TeL module is an academic development intervention that supports lecturers' progression from adopting basic technology to transformative course design practices. The purpose of this study is to examine how participation in the TeL module contributes to lecturers' digital transformation of course design in higher education. Using the Substitution, Augmentation, Modification, and Redefinition (SAMR) model provides a blueprint for examining lecturers' transformation initiatives. This model functions as an analytical instrument for assessing levels of technology integration in educational tasks (Shiu, 2025).

This study positions the TeL module as an academic development intervention that supports. The purpose of this paper is to examine how participation in the TeL module offered in the Postgraduate Diploma in Higher Education and Training contributes to the digital transformation of course design. The study investigates how lecturers and academic practitioners integrate digital technologies into their teaching practices and the extent to which their course design practices have evolved from enhancement to transformation across the four levels of the SAMR model.

II. Literature review

A. Digital transformation

Digital transformation enhances innovation in teaching and learning processes. Díaz-Garcia et al. (2023) underscore that improved teaching processes are key to facilitating digital transformation in higher education, thereby enabling teaching innovation and enhancing educational quality. In course design, it can therefore be reflected in increased learner-centredness, flexible, inclusive learning pathways, and adherence to prescribed digital design principles. Varhata et al. (2025) highlight that gamification, interactive simulation, and multimedia content can enhance student engagement and motivation. These innovations require lecturers' development in both pedagogical and technological content competencies. The TeL module, therefore, offers a structured professional development intervention that lecturers enrol in to develop their knowledge and skills.

B. Digital Transformation in Higher Education

Digital transformation in higher education is an intricate process that entails the incorporation of digital technologies. This shift is driven by a global stance on digitalisation. Schwab (2016), as cited in Benavides et al. (2020), states that digital transformation is intricately linked to the fourth industrial revolution, a phenomenon wherein digital technology influences future societal and economic advancement. In higher education, digital transformation extends beyond the mere adoption of digital tools; it involves a fundamental rethinking of teaching, learning, assessment, and curriculum design. Some scholars argue that digital transformation requires shifts in pedagogical approaches, institutional cultures, and academic identities (Mexhuani, 2025; Alenezi & Akour, 2023; Anbarasan et al., 2025). It can be deduced that technology is transformative when it enables new forms of learning, interaction, and knowledge construction that were previously challenging and difficult to construct.

C. Technology-Enhanced learning as an Academic Development Intervention

Technology-Enhanced Learning (TeL) is broadly recognised as an academic development intervention that is conceptualised as a purposeful integration of digital technologies to

enhance teaching and learning experiences. TeL interventions provide personalised learning that enhances learning outcomes and improves assessment practices (Barter, 2020; Bell & Wooff, 2012). TeL provides insight into how digital technologies can be integrated into teaching and learning to promote inclusive and adaptive learning in the 21st century. TeL is seen as a method to offer learners enriched and changed educational experiences (Nicoll, 2028). TeL modules are designed to support lecturers in aligning the use of technology with pedagogy instead of adopting tools in a disjointed or technocentric manner.

D. Technology-Enhanced Learning in Course Design

The key major aspect of course design is constructive alignment, which emphasises the alignment of learning outcomes, activities, and assessments (Biggs, 2006). This ensures that the course design is student-centred and inclusive. Cochrane et al. (2017); Dunn and Kennedy (2019), as cited by Bone (2024), allude that effectively designed technology-enhanced learning environments and activities can offer real, learner-centred, adaptable, and equitable experiences. In the broader context of curriculum development and transformation, TeL modules serve as a catalyst for pedagogical change and innovation by transforming traditional teaching methods. For the effectiveness of TeL, institutions of Higher Education need to provide spaces, tools, and support to lecturers and academic practitioners.

E. The SAMR Model

The SAMR Model provides a framework for analysing the level of technology integration in course design, teaching, and learning. The model provides a four-level hierarchy that lecturers and academic professionals can use to assess the integration of technology (Puentedura, 2006). According to Romrell et al. (2014), the SAMR model was designed to promote teachers' use of digital technologies to improve the quality of education. The model categorises technology into four levels:

- Substitution: Technology is used to replace traditional methods and tools with no functional change
- Augmentation: Technology provides functional improvements by augmenting the traditional tools and methods.
- Modification: Traditional methods are modified by using technology to redesign tasks.
- Redefinition: Technology facilitates the development of novel educational experiences that were once unimaginable.

These four levels fall into two categories: enhancement and transformation. Puentedura (2013), cited by Romrell et al. (2014), stated that learning activities categorised as substitution and augmentation enhance learning, whereas those classified as modification and redefinition are regarded as transformative.



Fig 1: SAMR Model (Puentedura, 2006)

The model has been critiqued; however, it remains a useful tool for evaluating shifts in pedagogical practice, mainly in professional development. Lyddon (2019) argues that the SAMR model emphasises the integration of technology, which can overshadow pedagogical goals, and educators may prioritise technology over improving results. Blundell et al. (2022) argue that the models do not consider teachers' existing experience with digital technology, resulting in diverse interpretations and implementations of the model. Lyddon (2019) further argues that the model fails to automatically assist educators in aligning the use of technology with their fundamental professional beliefs, thereby leading to pedagogical misalignment. This study employed SAMR as the exclusive analytical framework to investigate the extent to which lecturers and academic practitioners have transformed their practice digitally during their participation in the TeL module.

III. Methodology

A. Research Design

This study adopts a qualitative-interpretive approach to evaluate lecturers' perspectives on how participation in the Technology-Enhanced Learning module affects their teaching practices and course design. The TeL module presented as part of a professional development course in higher, provided the contextual environment for the study. This approach allows for an in-depth examination of lecturers' experiences within the specific institutional context and provides rich insights into the pedagogical change process.

B. Sample

The study employed purposive sampling and selected 29 participants, comprising lecturers and academic practitioners from diverse disciplinary backgrounds enrolled in the TeL module. The module is offered as part of a professional development programme in higher education to enhance digital skills for course design. The module content focused on digital pedagogy, course design principles, and the pedagogical use of learning technologies in blended and online learning environments, ensuring constructive alignment.

C. Data collection

Data were collected through written reflective responses gathered from participants during and after engagement with the TeL module. The observations focused on participants' experiences exploring digital tools for teaching and learning, the TeL module's impact on their teaching practices, and the implications for course design and student engagement. The reflections constituted a qualitative-interpretive dataset that encapsulated the pedagogical enhancement and changes in course design.

D. Analytical Framework

The SAMR model was used as a sole analytical framework for measuring digital transformation in course design. This framework provides a structured lens for examining the extent to which lecturers and academic practitioners integrate technology. The framework allows for the distinction between enhancement-focused practices and transformative pedagogical redesign.

E. Data analysis

Data were analysed using a thematic analysis, with the SAMR model as an analytical lens to categorise and interpret the practices lecturers used to integrate technology.

Reflections from lecturers were analysed to determine whether the use of technology in their practice falls within the substitution, Augmentation, Modification, or Redefinition levels of the model.

IV. Findings

The findings revealed the impact of the TeL module on teaching practice. Although not all the lecturers are at the transformative level of the SAMR model, the analysis of the responses showed a clear trajectory of pedagogical development through the SAMR model.

I. Substitution: Digitising existing teaching methods (Theme 1)

At the Substitution level, lecturers reported using digital technologies to replace traditional teaching methods while maintaining the desired learning outcomes. Lecturers highlighted how the TeL module facilitated the understanding of “theory to practice” and “relevance in current practice”. This highlights how, for some lecturers, technology functioned as a digital tool to deliver existing content efficiently than utilising it for transformation. The reflections indicated that Substitution served as a crucial gateway, enabling lecturers to cultivate confidence and experience with digital tools before engaging with digital change.

II. Augmentation: Enhancement of Engagement and Interaction (Theme 2)

At the Augmentation level, lecturers reported improvements in their teaching methods, specifically regarding student engagement. Digital technologies were regarded as augmenting rather than simply substituting existing approaches. Lecturers characterised their teaching as becoming “innovative and interactive,” observing that technology facilitated more effective “student engagement”. Other participants remarked that the sessions in the TeL module were “eye-opening” and allowed them to “see other ways of delivering classes”. Whereas other participants highlighted the value of quizzes and feedback platforms, “using Kahoot for feedback” enhanced classroom responsiveness and engagement. These reflections suggest that lecturers started to perceive technology as a pedagogical tool capable of enhancing student engagement.

III. Modification: Redesigning Learning Activities and Course Delivery (Theme 3)

Reflections corresponding to the Modification level indicated a more deliberate redesign of pedagogy. Lecturers articulated the need to reevaluate their teaching methods, learning activities, and assessment strategies to better align with student requirements and learning outcomes. Participants expressed plans to “add online activities in class”, “incorporate technologies to make delivery interesting”. One lecturer reflected that “tools can help identify students’ challenges early”, emphasising a shift towards a responsive, learner-centred pedagogy. Other lecturers highlighted the importance of alignment with pedagogical frameworks, asserting that understanding “Bloom’s taxonomy and its implications for my course” facilitated more effective technology integration. These reflections indicated that technology at the Modification level empowered lecturers to redesign learning tasks, hence transforming the structure and alignment of teaching and learning.

IV. Redefinition: Emerging Transformative Pedagogical Thinking (Theme 4)

Although fewer in number, the reflections at the Redefinition level demonstrated emerging transformative thinking. Lecturers delineated the prospect for teaching and learning that were not meaningful without digital technologies. Participants emphasised the establishment of collaborative and supportive learning environments, acknowledging

the significance of “community of practice”, “roundtable”, and the development of “resource packs to assist students.” Others articulated a fundamental transformation in their perception of the classroom, asserting that “classrooms can be turned into a playing space” where learning can be “fun through quizzes and interaction.” A lecturer noted that the module “revealed opportunities previously unknown to me”, indicating a shift in pedagogical perspective rather than the application of a particular tool. These reflections suggest that Redefinition, in this context, was marked by evolving notions of teaching identity, student engagement, and the role of digital tools in learning.

V. Discussion

Analysed through a qualitative-interpretive lens, the findings demonstrate how lecturers understood their involvement in the TeL module across the four levels of the SAMR model. At the substitution level, lecturers’ reflections highlighted practicality and immediate application, framing digital tools as supplementary instruments for establishing teaching practices. The first engagement with tools appears to have served as a significant confidence-building phase, as it introduces the digital tools to lecturers. At the augmentation level, lecturers reported increased engagement and interaction, characterising their teaching as “innovative and interactive” and noting new teaching methods. These two levels illustrate how lecturers have located their practice in the enhancement category of the model.

Locating the practice in the transformative category, lecturers have elaborated on how they have located their practice at the modification and redefinition levels. A significant pedagogical transformation occurred at the Modification level, where lecturers reported redesigning learning activities to integrate interactive methods and to intentionally address student needs. The reflections signify a transition towards learner-centred course design and align with the focus on reflective practice in the TeL module. At the Redefinition level, reflections unveiled emerging transformative approaches and forward-thinking. References to establishing communities of practice, playful classes, and “open avenues” indicate a transformation of teaching identities and a broadening of perceptions of learning in digitally mediated environments. The progression through the SAMR levels was non-linear, underscoring the interpretative premise that digital transformation is contextually rather than uniform or standardised.

VI. Conclusion

The study illustrates that the impact of the TeL modules is better understood through lecturers’ interpretive narratives of pedagogical transformation than through assessments of tool adoption. An analysis using the SAMR framework revealed that the lecturers’ reflections demonstrated progressive and diverse engagement with digital pedagogy, spanning from substitution to transformative use of emerging practices. The findings suggest that TeL significantly enhanced digital transformation when it supports reflective sense-making, pedagogical intentionality, and transformations in teaching identity. The study underscores the significance of pedagogy-driven professional development as a strategic tool for institutional digital transformation, indicating that substantial change depends not solely on technologies employed but also on how lecturers understand, innovate, and redesign their teaching practices.

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