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LEVERAGING H5P TO DESIGN INNOVATIVE ONLINE LEARNING ENVIRONMENTS: A CASE STUDY AT A SOUTH AFRICAN UNIVERSITY

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Abstract

The rapid shift to online learning has resulted in a need for innovative approaches to enhance student engagement and interactivity in higher education. This shift has allowed universities to explore their capability to design innovative online learning environments (ILE). Achieving an ideal innovative online learning environment for a South African university has been made possible with the introduction of the H5P open-source content creation tool. This tool has allowed lecturers to create, share, and reuse interactive and engaging online learning resources within Moodle LMS. Such developments permit lecturers to create dynamic and flexible learning environments that align with 21st-century teaching methodologies. An instrumental case study approach was adopted to explore how H5P's functionalities, such as interactive videos and quizzes, can be leveraged to design innovative online learning environments. The Unified Theory of Acceptance and Use of Technology 3 (UTAUT-3) model served as the theoretical framework and helped to interpret the data and ultimately frame the study findings. Following a qualitative research design model, six lecturers and eight pre-service teachers within the faculty of education were purposefully selected to participate in the study. Firstly, the participants engaged in a series of online activities, including online quizzes and interactive videos using H5P. Semi-structured interviews and qualitative questionnaires were used to collect data. Atlas Ti was used to analyse collected data, which followed a thematic approach, allowing for the identification of common themes and patterns in lecturers' practices and pre-service teachers' experiences. The findings indicate that lectures using the H5P tool have the potential to enhance student engagement, support diverse learning needs, and foster active participation. As such, this study provided practical recommendations for effectively integrating H5P into online learning environments and suggests its broader applicability in nurturing digital transformation in education.

Keywords: *H5P, online learning, higher education, innovative approaches, engagement.*

1. Introduction and background

In the rapidly evolving landscape of higher education, integrating digital technologies into teaching and learning processes has become increasingly essential (Huang & Yanan, 2024). This transformation is marked by a shift away from traditional educational paradigms and toward more innovative, flexible, and inclusive learning models (Mohamed Hashim et al., 2022). H5P has emerged as widely adopted in many universities to allow lecturers to easily and quickly create rich interactive content within the learning management system (LMS). According to Kuzminska et al. (2023), H5P is open-source software that allows lecturers to integrate into LMS systems to increase functionality and give them more privilege to use pedagogical technologies and disseminate their learning content. This versatile technological tool supports learning experience designers and content creators in developing engaging and mobile-friendly web content. López, Ramírez and Rodríguez (2021) highlighted that H5P is increasingly amalgamated into institutions of higher learning to improve learning experiences, making education more accessible and engaging for a diverse global student population. Likewise, integrating the H5P platform results in improvements in the presentation and interaction of students with the contents and materials of their courses, in addition to facilitating the creation of interactive learning content through lectures on various areas of knowledge (Singh and Scholz, 2017).

The widespread adoption of H5P is evident, with over 200,000 websites using it by January 2020, including universities, enterprises, school districts, schools, military organisations, and other teaching and learning institutions (Lopez et al., 2021). Students benefit from this technology as it enhances engagement through interactive content that encourages active participation and provides instant feedback to aid learning and progress assessment (Mutawa et al., 2023). H5P's accessibility and mobile-friendly nature make learning available to students anytime, anywhere. Lecturers and learning designers benefit from

H5P's intuitive interface, which streamlines the creation, sharing, and reuse of content, promoting collaboration and saving valuable time (Homanová & Havlásková, 2019). This adaptable tool integrates seamlessly with various platforms and allows for the customization of learning activities to suit specific educational goals.Pre-service teachers' experiences and attitudes towards integrating H5P software are essential for adapting to different learning styles that encourage active participation and a high level of engagement. Mutawa, Al Muttawa, and Sruthi (2023) supported this and found that H5P's interactive and engaging nature can make learning more enjoyable and effective for students, keeping them motivated and engaged throughout their studies. Similarly, Homanová and Havlásková (2019) outlined that H5P inspires students, captures their attention, improves learning quality, and assists students in retaining the material. However, the success of these systems depends significantly on the effective training provided to both students and lecturers. Understanding how lecturers navigate digital technologies such as H5P is essential to improve pedagogical skills, as this can create dynamic and immersive educational experiences that cater to diverse learning styles and students' needs (Rahmi, Fajri & Azrul, 2024). Research supports the efficacy of H5P, with Ploetzner's (2022) meta-analysis demonstrating the superiority of interactive videos for retention and comprehension compared to non-interactive videos. Studies by Jacob and Centofanti (2024) and Lopez et al. (2021) highlight the positive impact of H5P on student engagement and learning outcomes. Moreover, Mutawa et al. (2023) reported that 82% of students retained their focus and motivation throughout the learning process when using H5P. These findings underscore the importance of incorporating good practices in creating effective interactive content, such as ensuring accessibility, supporting learning objectives, and maintaining diverse content types to cater to different learning preferences.

2. Theoretical framework

This study was underpinned by the Unified Theory of Acceptance and Use of Technology 3 model (UTAUT-3) by Venkatesh et al. (2003) to understand and forecast user adoption and acceptance of new technologies. UTAUT-3 is an advanced model that explains and predicts user behaviour regarding technology adoption. It expands on the original UTAUT model by incorporating new constructs to provide a more comprehensive understanding of technology acceptance (Khan et al., 2022). UTAUT-3 explains why users intend to use specific technology by considering factors like performance expectancy, effort expectancy, social influence, and facilitating conditions (Gunasinghe et al., 2020). In this study, UTAUT-3 assisted the researcher in identifying, after undergoing lectures and pre-service teachers' experiences and attitudes on the acceptance of the use of H5P software within their Moodle LMS. Employing this theory offered valuable insights for lecturers in designing effective online learning environments that leverage interactive technologies like H5P.

3. Methodology

This study employed a qualitative case study research design to investigate the perspectives and experiences of lecturers and pre-service teachers using the H5P model (Creswell & Poth, 2016). As Spencer, Pryce, and Walsh (2014) noted, qualitative research is grounded in phenomenological philosophy, emphasising the construction of social reality through individual or collective responses to specific phenomena. This approach aims to describe social dynamics through the lived experiences of individuals. The design enabled the researcher to explore the experiences of lecturers and pre-service teachers while engaging with H5P software during teaching and learning. Creswell and Creswell (2017) highlighted that qualitative research methods are well-suited for investigating, interpreting, and describing scenarios and obtaining a general understanding of the subjects. Through this research design, the researcher gained an in-depth understanding of the lecturers' experiences, insights, and challenges in incorporating H5P, providing rich, detailed insights into how this tool impacts teaching and learning and fosters engagement.

3.1. Selection of participants

This research adopted a purposive sampling method to sample six (6) lecturers and eight (8) pre-service teachers enrolling for their third year of study. Unlike random sampling, where every member of the population has an equal chance of being selected, purposive sampling involves deliberately selecting participants with specific characteristics or experiences relevant to the research objectives (Etikan, Musa & Alkassim, 2016). Criteria for selection included the following: lecturers and pre-service teachers must be from the University of Johannesburg, within the faculty of education, and have experience using the H5P model within their modules to ensure that they have a baseline understanding of this technology and can operate it during teaching and learning.

3.2. Data collection and analysis

This study utilized semi-structured interviews and qualitative questionnaires as data collection methods. Semi-structured interviews were conducted to deeply explore lecturers' and pre-service teachers' collective perceptions and attitudes regarding their experiences with H5P. Longhurst (2003) emphasized that semi-structured interviews allow participants to express their opinions, feelings, and experiences, helping to identify emerging trends. This method was particularly suitable for this study as it provided valuable insights into using H5P software as a mediating tool for teaching and learning. Interviews were audio recorded with permission from the student and then transcribed using Microsoft Teams application software. Each interview lasted approximately 20-30 minutes, and they were audio recorded with permission from the participants and then transcribed using Microsoft Teams application software. In addition, qualitative questionnaires were employed to gather detailed, open-ended participant responses. Eckerdal and Hagström (2017) noted that qualitative questionnaires are designed to investigate complex phenomena, experiences, and opinions. These questionnaires were distributed online via Google Forms and captured the experiences and perceptions of lecturers and pre-service teachers regarding using H5P software in teaching and learning. The data was analyzed using thematic analysis, as described by Braun and Clarke (2006), which involves identifying, analyzing, and reporting patterns or themes within the data. The data was coded and organized to develop various themes. Atlas Ti software was used to facilitate this process, allowing for the identification of common themes and patterns in the practices of lecturers and the experiences of pre-service teachers.

4. Findings

Lectures indicated they had excellent experience integrating H5P software into their Moodle Learning Management System (LMS) to enhance student engagement and provide immediate assessment feedback. What worked to the lecturers' advantage was that they could create engaging activities that moved beyond static content, making learning more dynamic and participatory. Through this experiment, they designed interactive learning experiences with quizzes, interactive videos, and branching scenarios that actively involved pre-service teachers. As lecturers and pre-service teachers shared their experiences using H5P, they expressed their happiness about H5P. Some lecturers mentioned that H5P allowed them to incorporate teaching approaches that enabled student engagement and interactive learning activities during their teaching. Lecturers A and B shared their thoughts regarding their experience and stated:

Lecturer A: *H5P has made my approach to online learning more interactive and student-centred. It allowed me to create engaging activities beyond static content, making learning more dynamic and participatory. Instead of relying on traditional lecture methods, I now integrate interactive quizzes, videos, and simulations that promote active learning.* Similarly, Lecture B also explained that:

Lecturer B: *Using H5P has significantly enhanced my teaching approach to designing online learning environments by providing interactive and engaging content for students. It allowed me to incorporate multimedia elements such as quizzes, interactive videos, and games, encouraging student participation and engagement.*

These responses indicate that the H5P tool supports lecturers with various content types, such as quizzes, interactive videos and course presentations, with the advantage of creating mobile-friendly content that enhances student engagement and accessibility. This was evident when some pre-service teachers pointed out how they were willing to explore and engage in various activities, demonstrating an increased interest and motivation to utilize diverse educational tools and resources.

In addition to this experiment, some pre-service teachers outlined that this technology empowered them to understand content and kept them more engaged with the material. Pre-service Teacher 1 and Pre-service Teacher 2 highlighted that:

Pre-service Teacher 1: *H5P activities were incredibly engaging because they combined interactive elements with content, making learning feel more dynamic. Instead of passively consuming information, I participated actively through quizzes, videos, and interactive games. This active involvement helped me understand the content and kept me more engaged with the material. I find that H5P's interactive nature creates a more immersive learning experience than standard lectures or readings.* In addition to how Pre-service teachers experienced the tool during their online assessment, Pre-service Teacher 2 revealed that:

Pre-service Teacher *2: The H5P activities increased my comprehension and retention of course material. These activities were more hands-on in terms of engaging with content, which could allow me to make intangible concepts more relatable to everyday life. Instead of learning about motherboards from a textbook or YouTube videos, interactive activities like drag and drop could get me involved in the processes associated with the motherboard, even to the point of how each part can be used or is used in our everyday lives.*

Due to the lecturers' experiences with the H5P tool, some viewed this technology as an effective tool for enhancing teaching and learning. They mentioned that H5P permitted them to create real-life

scenarios and apply authentic learning activities to which students could relate. They highlighted that this interactive approach made learning more engaging and helped students better understand and retain complex concepts. Furthermore, lecturers found that by incorporating multimedia elements and interactive content, they could cater to different learning styles and needs, ultimately fostering a more inclusive and dynamic educational environment. From Lecturer D's response:

Lecturer D: *I improved student engagement by using H5P in a module with lengthy definitional content. I implemented the Accordion feature to break up the text into collapsible sections, making it easier for students to navigate and explore the material. I added interactive questions for long videos, turning passive viewing into active learning. Additionally, I used activities like drag-and-drop exercises and fill-in-the-blank questions to encourage further application and recall of knowledge. These interactive elements have led to better student engagement, focus, and content retention.*

Lectures utilizing the H5P tool in their classroom allowed them to instil essential skills such as collaboration and critical thinking among pre-service teachers. They were encouraged to work in smaller groups to discuss solutions and think critically about the materials presented. This collaborative approach enhanced their understanding of the subject and prepared them for real-world teaching scenarios. Lecturers D and F explained:

Lectures D and F: *H5P has the potential to foster critical thinking by allowing students to engage in interactive decision-making scenarios, problem-solving exercises, and self-assessment tasks. While it does not directly facilitate collaboration, it can be a springboard for discussions and group work. For instance, students can complete an interactive quiz individually and then discuss their responses in a live session. However, maximizing these benefits requires time for proper content development, often limited due to other academic responsibilities.*

Lack of exposure to the H5P tool significantly negatively impacts lecturers' ability to teach with this tool. In some instances, one lecturer revealed that one of the obstacles they encountered was a lack of exposure to this tool as they were not offered sufficient training by the relevant department within the university. They highlighted that this tool was still new, and they were unfamiliar with its associated features. The following response testifies to this:

Lecturer F: *One of the biggest challenges is the lack of formal training in using H5P. Many lecturers, including myself, have had to learn through trial and error, which is time-consuming. Additionally, time constraints are a significant issue. To address this, I have relied on online tutorials offered by the learning technologies centre at the university where I work, and I am trying to integrate H5P gradually instead of overhauling my entire teaching approach at once. Even though the centre offers H5P training, due to my workload, I cannot always attend due to my busy schedule*.

5. Discussion

Lectures indicated that their H5P experience was effective as it enhanced student engagement during their teaching and allowed them to create engaging activities beyond static content, making learning more dynamic and participatory. These findings concur with Mutawa et al. (2023), who revealed that the H5P tool enhances engagement through interactive content that encourages active participation and provides instant feedback to aid learning. While incorporating this tool, pre-service teachers could collaborate in smaller groups to discuss their learning activities, allowing them to think more critically towards the task. As a result, pre-service teachers were motivated and eager to learn more about the H5P tool and its various applications towards solving problems. This finding was supported by Homanová and Havlásková (2019), who found that H5P motivates students, captures their attention, improves learning quality, and helps students retain information. As lecturers engaged in this tool during their teaching, their pedagogical approaches allowed pre-service teachers to develop essential skills such as collaboration and critical thinking while relating their content to real-world situations. This was supported by Homanová and Havlásková (2019), who highlighted that H5P proved a valuable tool in promoting an interactive, collaborative learning environment that simplifies content and creates real-life scenarios among students. Lectures incorporating the H5P tool prepare pre-service teachers for real-world challenges, equipping them with essential skills while deepening their understanding of the subject matter (Jacob & Centofanti, 2024). However, lectures and students encounter various technological challenges that need institutions' provision of training and digital assistance (Mutawa et al., 2023). The authors furter highlighted that when remote learning is used, it is difficult for lectures to maintain their students' engagement and motivation due to the lack of exposure towards the tool.

6. Conclusion

This study aimed to explore how H5P was leveraged to design innovative online learning environments at a South African university. The findings revealed that lecturers' experience with the H5P tool was effective as they could deepen the subject knowledge and encourage active participation among

pre-service teachers. They could integrate this tool to enhance student engagement and foster essential skills such as collaboration and critical thinking. These findings further showed that lecturers could integrate interactive quizzes, videos, and simulations that aroused interest among pre-service teachers and promoted active learning. Additionally, using H5P allowed lecturers to create a more inclusive and adaptable learning environment catering to diverse learning styles and needs. Lecturers can make complex topics more accessible and engaging by using multimedia. Pre-service teachers also found that the H5P tool improved their learning experienceThey were encouraged by how activities were presented, making their learning more fun and dynamic. Pre-service teachers were further motivated by this tool as it allowed them to receive immediate feedback on their performance, helping them identify areas for improvement and reinforcing their understanding of the materials. These findings have implications for professional and competency development in teaching in a digital or virtual environment where the H5P tool is utilized to enhance teaching and learning.

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