



A Case Study: An Investigation into Foundation Pathway Teachers' Beliefs of Incorporating Digital Pedagogy in Their Practice to Increase Student Engagement

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Abstract: This case study investigates the beliefs of Foundation Pathway teachers at INTO University of Exeter (IUoE) regarding the incorporation of digital pedagogy into their teaching, focusing on the Technological, Pedagogical and Content Knowledge (TPACK) framework as the theoretical foundation. By employing a qualitative research design involving semi-structured interviews with seven teachers, the study uncovers the extent to which these teachers believe that digital tools can foster an interactive and engaging learning environment for their students. The results indicate that teachers strongly believe that digital pedagogy has improved student engagement to some extent. However, they also recognise certain challenges associated with using digital tools that could potentially hinder student engagement. This case study suggests that the integration of digital pedagogy contributes to the development of a more productive classroom environment.

Keywords: digital pedagogy, TPACK, digital tools, student engagement, higher education

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1. Introduction

The COVID-19 pandemic has prompted the adoption of new digital practices in education that can encourage dynamic and purposeful learning. According to Alberola-Mulet et al. (2021), the pandemic has made the integration of digital technology into traditional classrooms increasingly noticeable. Furthermore, Rapanta et al. (2021) and Shaikh (2023) state that the way teachers view teaching and learning has changed due to digitalisation in education. Singh et al. (2021) advocate that incorporating digital pedagogy into traditional classrooms can engage students in learning. Bećirović (2023a) highlights that digital pedagogy involves new approaches to engage students in order to achieve educational objectives. These approaches can be used in virtual, blended, and in-person settings and central to this educational transformation is the use of digital technologies (Bećirovic, 2023b). Joint Information Systems Committee (JISC) (2020) defines digital pedagogy as “the study of how digital technologies can be used to best effect in teaching and learning.” Foundation teachers at INTO, a faculty at the University of Exeter (IUoE) believe that integrating digital pedagogy into teaching practices can enhance student engagement, resulting in an improved learning experience for their students. Wang et al. (2022) explain that student engagement is the outcome of individual and influences in the classroom. Shernoff et al. (2016) emphasise that supportive teachers and classmates, challenging goals, and authentic tasks are essential in enhancing student engagement in higher education.

2. Research Problem

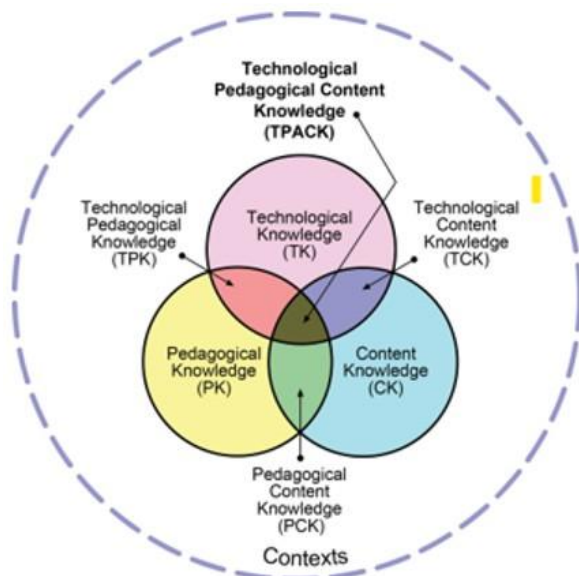
Student engagement plays a crucial role in enhancing the quality of education and achievement of students in higher education, as emphasised by Kuh (2009). The integration of digital pedagogy into face-to-face delivery can help increase student engagement. Antunes et al. (2021) report that some teachers perceive technology as a means to overcome obstacles that could hinder student engagement. In this context, students may be considered confident users of technology, and when supported by powerful tools, they can be empowered, leading to improved academic performance (Venter, 2017). Thus, this case study aimed to explore the beliefs and challenges faced by Foundation Pathway teachers at IUoE when integrating digital technologies into their practices to increase student engagement with teaching and learning activities and materials. These teachers believed that using digital tools with interactive features can enhance learning experiences and promote student engagement. This belief is supported by Shulman (2002, p38), which states that “learning begins with student engagement, which in turn leads to knowledge and understanding.” Moreover, investigating the beliefs and methods used by teachers can help understand the impact of digital transformation initiatives on education (Alhawsawi et al., 2023). This investigation was guided by the following research question:

RQ1: How do teachers’ beliefs about digital pedagogy influence their use of digital tools to enhance student engagement in their practice?

RQ2: What challenges do teachers perceive when incorporating digital tools in their practices?

3. Theoretical Framework

The Technological Pedagogical Content Knowledge (TPACK) framework is employed in this study to examine teachers’ beliefs regarding the integration of digital pedagogy into their practices. This framework was chosen due to its clear and practical approach to evaluating the use of technology in a professional setting (Sobel & Grotti, 2013).

Figure 1*TPACK framework and its components (Koehler et al., 2017)*

Koehler et al. (2017) classify teacher knowledge into three main categories in Figure 1: Content Knowledge (CK), which encompasses the teacher's subject matter expertise and is the 'WHAT' of a lesson; Pedagogical Knowledge (PK), which relates to teaching strategies and methods, and answers the 'HOW' of a lesson; and Technological Knowledge (TK), which refers to the teacher's familiarity with technologies and resources that facilitate teaching and learning, and pertains to the 'WHY' of a lesson. This framework emphasises the interplay and integration of all three types of knowledge, focusing on a teacher's ability to effectively teach with technology in their respective contexts. In this case study, the TPACK framework is employed to examine how Foundation Pathway teachers integrate digital tools in their teaching practices and the extent to which they believe that technology integration can enhance student engagement.

4. Research Design and Method

Case study

The qualitative research design in this empirical research was a small-scale case study. As a qualitative research method, a case study methodology is flexible and adaptable, and it allows researchers to explore diverse research questions across multiple disciplines and settings as outlined by Yin (2018). He further notes that case studies have the capacity to gather comprehensive and in-depth data. Stake (1995) emphasises that the holistic and naturalistic nature of case studies enable a thorough examination of the phenomena within their authentic contexts. Additionally, case studies allow for the findings generate can contribute to practical implications and directly application to real-world scenarios (Yin, 2018; Stake, 1995). Creswell (2009) note that semi-structured method of the case study enabled the researcher to explore the potential of blending digital technologies with face-to-face delivery to increase student engagement. According to Ruslin et al. (2022), the method of semi-structured interview in this small-scale case study enables researchers to collect thorough information and evidence from participants. Additionally, it offers flexibility for researchers to maintain research focus.

Semi-structured interviews

In this case study, the semi-structured interview questions were designed based on the two research questions above with specific focus on investigating the benefits and challenges of incorporating digital pedagogy in the practices of Foundation pathway teachers at IUoE. The semi-structured interview questions listed below yielded rich and comprehensive data on teachers' experiences and beliefs regarding the use of digital technologies in their practices.

Semi-structured interview questions

1. What are your beliefs about the role of digital tools in enhancing student engagement in your module?
2. How do you select and use digital tools in your teaching practice?
3. What types of digital tools do you use in your teaching?
4. What are the criteria and challenges you consider?
5. How do you measure and evaluate the impact of digital tools on student engagement in your module? What are the indicators and methods that you use?
6. How do you communicate and collaborate with other teachers and students regarding the use of digital tools in your module?
7. What are the benefits and difficulties you experience?
8. How do you learn and develop your skills and knowledge on using digital tools in your teaching practice? What are the sources and opportunities that you access?

The chosen research design and method reflect the researcher's pragmatist stance, which emphasises “problem-centred, pluralistic, and real-world practice-oriented approaches” (Creswell, 2009, p6). The researcher believes that investigating Foundation Pathway teachers’ real-world practice of using digital pedagogy is necessary to fully understand the extent of the impact of embedding digital pedagogy in enhancing student engagement.

Study population

This case study was conducted at INTO, a faculty at the University of Exeter in the United Kingdom. The student population in this faculty is very diverse and are mostly international students from various parts of the world. The Foundation Pathway in this faculty aims to prepare and equip these students with the necessary academic skills to achieve academic success in their future university courses. The participants in this case study were seven Foundation Pathway teachers teaching Economics, Academic English, Psychology, World Politics and International Relations, Social and Environmental Science, Current Global Issues and Academic Tutorials. These teachers provided their consent to participate in this case study because they are experienced in using digital pedagogy to engage their students with module contents and they are open to exploring innovative ways to enhance their teaching practices.

Data collection, coding and analysis

The 40-minute interviews were conducted, recorded and transcribed in Microsoft Teams. The transcripts were then coded and summarised using hierarchy charts and a codebook in NVivo. Hierarchy charts in NVivo facilitate the recognition of data patterns and relationships and thus, enabled the researcher to compare coding across various sources and identify key themes. To enhance the code created in NVivo, the codebook function offered detailed explanations and definitions of codes and hence, acts as a thorough record of the codes, provide valuable inspections, and evaluations of the data. The data were analysed using Braun and Clarke (2006, p87) thematic analysis's six phases, as outlined in Table 1. This approach is inductive as the themes emerged from the transcripts during the coding process.

Table 1

Six phases of thematic analysis (Braun & Clarke, 2006, p.87)

Phase	Description of the process
1. Familiarising yourself with the data.	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes.	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes.	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes.	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic ‘map’ of the analysis.

5. Defining and naming themes.	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report.	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis

5. Findings and Discussion

From the semi-structured interviews, the teachers employed various digital tools to incorporate digital pedagogy into their practices. These tools are divided into different categories, as presented in Table 2. They are embedded into the Moodle page of different modules to provide ease of access to students and to support face-to-face classroom delivery.

Table 2

Digital tools being used to integrate digital pedagogy in teachers' practices

Type of digital tools	Examples
Audio-video	BBC podcasts TED talks YouTube videos
Lecture recording software	Flashback Panopto
Microsoft 365 applications	Forms Teams OneDrive
Moodle resources	Gallery Journal Quiz
Online Whiteboards	ClassroomScreen Web whiteboard Padlet
Game element	Kahoot! Quizlet
Asynchronous workbook	Pearson MyLab
Other	Qualtrics Perplexity AI

Classroom implementations of digital tools

In Table 2, YouTube videos were specifically used to introduce new topics as the selected videos tend to be quite short and hence, can engage students with the topic and to provide a basic understanding of the topic. BBC podcasts and TED talks tend to be longer, approximately, 10 to 15 minutes in length. Their purpose was to help students to explore more about the topic and examine different opinions about the topic in Academic English.

Panopto and Flashback were used to record lectures for subjects such as Psychology and Economics. Flashback is particularly useful to highlight specific content in online videos and recording the screen while a specific lecture was being recorded. Lectures recorded in Panopto provides the teachers with a tool to measure student engagement with the lecture content as it shows the percentage of access by each student.

Microsoft 365 applications such as Forms, Teams and OneDrive are used to gather feedback from students on topics, ease of sharing documents for collaborative work and ease of communication between students and teachers and among students. These applications were used in modules such as Academic Tutorials and Academic English.

The gallery resource in Moodle was used to display students' generated images in the module, Current Global Issues. This resource also allowed students in the whole cohort to access the gallery, and this made them appreciate the work produced by their peers. The journal resource required students to input texts and teachers used this as a form of formative assessment. The quiz resource was used to check students' understanding and learning of a certain topic. This was another form of formative assessment in Economics.

The online whiteboards which included ClassroomScreen, Web whiteboard and Padlet were used to brainstorm and share ideas on a particular topic or concept and encouraged collaboration among students. These resources were used in modules including Academic English, World Politics and International Relations

Digital tools which incorporate game elements such as Kahoot! and Quizlet were utilised in Social and Environmental Science used Kahoot! in Psychology to check students' understanding of module content and as well as to make learning fun and engaging.

Pearson MyLab was used in Economics in conjunction with the textbook and as an extension of the lecture and seminar contents.

Qualtrics was used in Academic English as a survey tool for contents in PowerPoints. Perplexity AI was used in Psychology to summarise long journal articles to make them easy to understand especially for Foundation pathways students.

Moodle logs analysis

The teachers embedded these tools in their module Moodle sites. By embedding these tools in Moodle, the teachers were able to access the activity log to monitor students' engagement with these tools. The Moodle log services as an invaluable instrument to monitor students' interactions with various course resources. The teachers utilised this feature to examine the types of materials accessed, the frequency of the access and the duration of their engagement. This means that this data provides the teachers with a means to assess students' engagement with course content and identify any resources that may not be effective in facilitating learning. This data is accessed by applying filters to the logs based on individual users, course, activity, and date. Therefore, the teachers can obtain comprehensive insights into individual and class-wide engagement. The implication is these insights allows for the teachers to adjust their instructional approaches and offer targeted assistance where necessary (Moodle, 2008).

The semi-structured interview data are presented under the following themes which are guided by the two research questions above.

Teachers' beliefs about the incorporation of digital pedagogy to enhance student engagement (RQ1)

Data collected from the teachers emphasise a range of beliefs which outline the effectiveness of digital tools in increasing student engagement in their modules. In total, there are fifteen beliefs mentioned in the interview data as outlined in Table 3.

Table 3

Teachers' beliefs of incorporating digital pedagogy to increase student engagement

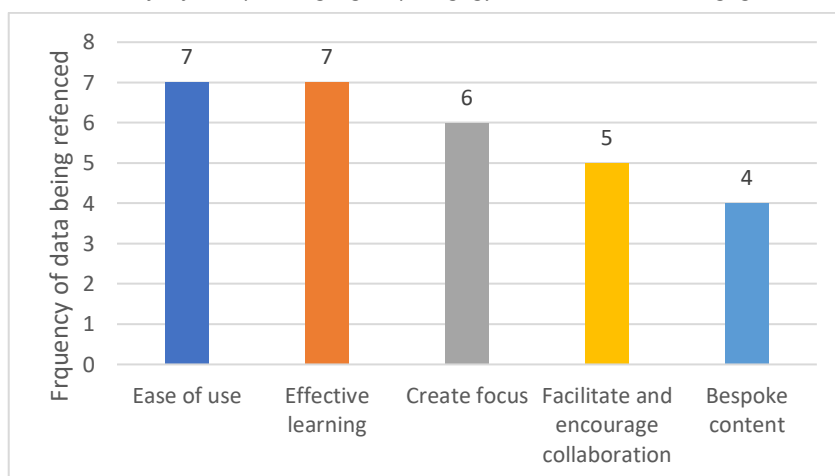
Teachers' beliefs	Frequency	T1	T2	T3	T4	T5	T6	T7
Ease of use	7							
Effective learning	7							
Create focus	6							
Facilitate and encourage collaboration	5							
Bespoke content	4							
Facilitate progress	3							

Teachers' beliefs	Frequency	T1	T2	T3	T4	T5	T6	T7
Interactive	3	■		■	■			
Instant and personalised feedback	2				■			■
Part of students' lives	2					■	■	
Prepare students for university studies	2	■	■					
Another resource	1			■				
Mitigate potential cheating in quizzes	1				■			
Prepare students for future career	1						■	
Support traditional teaching	1					■		
To be at the students' level	1						■	

However, only the most frequently referenced by the teachers are presented in Figure 2.

Figure 2

Teachers' beliefs of incorporating digital pedagogy to increase student engagement



All teachers who participated in this small-scale case study frequently cited the ease of use and effectiveness of digital tools for learning, which offer a variety of content, simplify lessons, and save time. The digital tool being referred to in this context was YouTube. Teacher 4 noted that “... because you can put the subtitles on so students have lower English ability, can follow it.” The user-friendly nature of digital teaching tools facilitates seamless incorporation into teachers' instructional practices, ultimately leading to enhanced subject comprehension for students. As YouTube is easy to use, students can focus more on their learning than struggling to use the technology. This approach also ensures that technology is being used to enhanced learning rather than as an add-on which could sometimes disrupts the flow of the lesson. Therefore, teachers can promote and encourage a more dynamic and productive learning environment that enhanced student engagement by highlighting the user-friendliness of digital resources within the Technological Knowledge (TK) component of the TPACK framework. According to Kohler et al. (2013), the Technological Knowledge (TK) component of TPACK include the teachers' technological skills and knowledge in facilitating the incorporation of digital pedagogy in their practices. This component assists teachers in selecting and implementing appropriate tools which correspond with their instructional objectives, thus enhancing students' engagement, leading to improved academic performance.

An equal number of teachers also recognise that digital resources accommodate diverse learning preferences among students and promote efficient learning. For instance, Teacher 2 mentioned “The students are able to see the information in slightly different ways, so if they perhaps prefer listening to it, they can do that. Or they prefer reading it.” Additionally, Teacher 3 indicated “even the quietest of students, ... get really interested in it as well because it's just another way of demonstrating what they know without feeling under pressure to have to say and answer.” This belief is also evident in a study conducted by Rafique (2023), in which students actively participated in activities because

they were given a 'voice' through the use of digital tools. Therefore, it is believed that digital tools improve the learning process by enhancing engagement and promoting inclusivity, leading to more effective education. This belief of inclusivity illustrates the pedagogical knowledge (PK) and technological pedagogical knowledge (TPK) components of TPACK. According to Koehler et al. (2013), when inclusivity is incorporated, the TPACK framework's effectiveness is enhanced, particularly in the aspects of Pedagogical Knowledge (PK) and Technological Pedagogical Knowledge (TPK). This approach considers and meet the diverse needs and viewpoints of students. Therefore, the relevance and efficacy of instructions are increased, and teachers also gain deeper insights into their students' unique challenges and strengths. Ultimately, this can lead to a more equitable and enhanced academic performance.

Digital resources, such as audio-videos and web-based materials, are employed to create focus among students and direct their attention to the topic being taught. This is usually carried out at the start of lessons and to review content at the end, as referenced by the six teachers. These resources are designed to be stimulating, visually interesting, and multisensory. For example, Teacher 1 stated *"a short YouTube video tends to be a bit more engaging than having students read a text, ... allows them to focus in a bit of a different way, ... it's all about that stimulation and finding different methods of getting them to do things, to keep them engaged."* Based on the study by Roodt et al. (2017), YouTube can effectively engage students in learning by increasing their participation in classes. Hence, effective digital pedagogy is crucial for capturing and maintaining students' attention, which is essential for optimal learning. This belief of catering for the diverse learning needs of students relates to the pedagogical knowledge (PK) and technological pedagogical knowledge (TPK) aspects of TPACK.

Five teachers highlighted that digital pedagogy promotes student collaboration, as it enables students to contribute, share, and explain ideas using Padlet and Web whiteboards, which enhances teamwork skills and encourages learning from peers, as highlighted by Teacher 7, *"They I like it when one group, ... can post quite a good set of ideas and because it's on the screen in front of them, the groups that maybe haven't come up with such good ideas. Oh, that's what we should be thinking about."* Learning from peers helps students comprehend the subject matter better, and also develops their teamwork skills, which are valuable in real-life situations, such as collaborating with colleagues in the workplace to accomplish goals and finish projects. In relation to TPACK, this belief aligns with the intersection between pedagogical knowledge (PK) and technological pedagogical knowledge (TPK) aspects of TPACK. Group projects and peer interaction are enhanced through tools like shared documents, online forums, and digital whiteboards. These platforms encourage students to develop essential skills such as critical analysis, effective communication, and collaboration (Koehler et al., 2013). In support of this, D'Angelo (2018) advocates that the integration of technology in the curriculum can provide students with the opportunity to enhance their academic abilities and equip them with the skills needed to face challenges in the real world.

The capacity to create custom content for their modules can also increase student engagement, as endorsed by four teachers. Digital tools such as Moodle quizzes, Kahoot!, Padlet, and Quizlet empower teachers to create personalised academic resources. Teacher 5 claimed *"personalised question I think it's important"* and Teacher 6 stated *"I can provide them with better content."* In this context, customisation enables a personalised learning experience that addresses individual student needs, leading to greater engagement and motivation. The importance of technology in customising the learning experience was emphasised by Shemshack and Spector (2020). They assert that technology can play a pivotal role in this process. The ability to create custom content using digital tools to provide a personalised learning experience that addresses individual students' needs captures the interplay between all TPACK components, which emphasise the integration of technology, pedagogy, and content knowledge.

The challenges of incorporating digital pedagogy (RQ2)

Teachers also highlighted some challenges when trying to incorporate digital pedagogy into their practices. They identified nineteen challenges as presented in Table 4.

Table 4

Teachers' beliefs of the challenges in incorporating digital pedagogy to increase student engagement

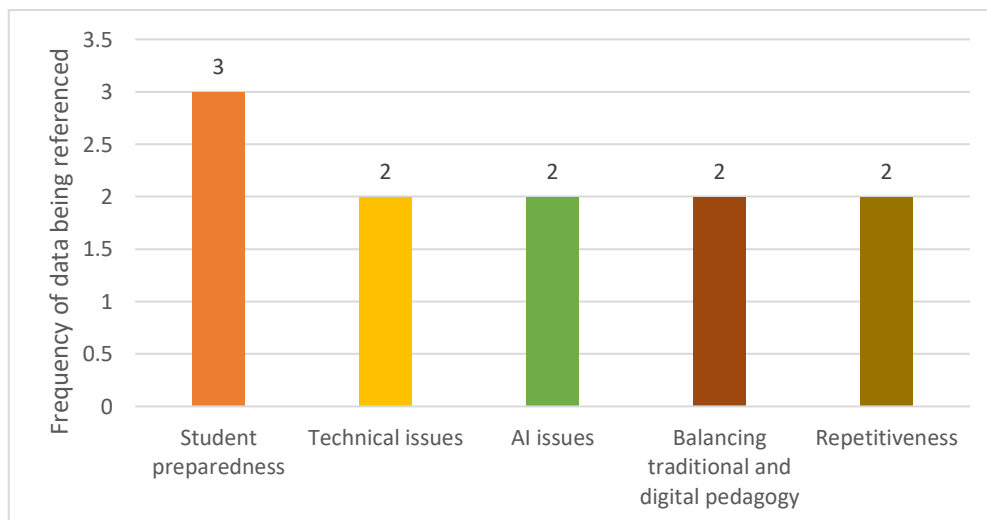
Challenges	Frequency	T1	T2	T3	T4	T5	T6	T7
Student preparedness	3							
Technical issues	2							

Challenges	Frequency	T1	T2	T3	T4	T5	T6	T7
AI issues	2							
Balancing traditional and digital pedagogy	2							
Repetitiveness	2							
Scrolling down the page	1							
Use not supported by the institution	1							
Finding engaging resources	1							
Insufficient pre lesson discussion	1							
Length of resources	1							
Too much screen time	1							
Too much information to process	1							
Time consuming	1							
Quality of content	1							
Privacy and security	1							
No download log in OneDrive	1							
Lack of use of online tools	1							
Completion rate	1							
Limited time to store data	1							

However, only the most frequently referenced are reported in this case study as seen in Figure 3.

Figure 3

Teachers' beliefs of the challenges in incorporating digital pedagogy to increase student engagement



The primary issue identified is student preparedness, as mentioned by three teachers. Some students fail to access the assigned materials outside of the classroom, either as homework or as part of a flipped learning activity. This lack of motivation to study independently appears to be a contributing factor. According to Alenezi et al. (2023), students may have trouble exercising self-discipline in higher education context. An example of this is in Teacher 6's response, "they just seem to not watch it," Students' unpreparedness leads to ineffective learning. This unpreparedness also results in limited participation and ultimately reduced academic performance due to an incomplete understanding of the subject

matter. Consequently, teachers may need to allocate more time to reteaching or reviewing content to these students, making the teaching and learning process ineffective.

Teachers also pointed out technical issues as a challenge and this is also one of the issues outlined in Alenezie et al. (2023). These include hardware malfunctions and connectivity problems, such as Wi-Fi issues that prevent students from downloading materials. For instance, Teacher 6 explained that *"Internet connectivity issue can be a problem."* Teacher 1 elaborated on this view, noting that *"Sometimes I do ask students to listen on their own devices, and if I plan for that to happen once or twice, they've been Wi-Fi issues. So, students haven't been able to download it. So, we've ended up doing it as a whole class anyway."* These issues can disrupt the learning process and cause frustration for both students and teachers. They can also be time-consuming to resolve, which can hinder student engagement and lead to ineffective learning.

The interview data also reveals some concerns about the improper use of Artificial Intelligence (AI) among students, as mentioned by two teachers. Students have been using AI to write essays and answer quizzes set by teachers. For example, Teacher 4 stated that students *"easily copy and paste the question and get the answers."* Furthermore, AI-generated information can be inaccurate and potentially lead to misinformation, as pointed out by Teacher 6 who mentioned *"the misinformation."* This issue is emphasised by Monteith et al. (2024), who reported that frequent mistakes and misinformation make generative AI models unreliable. Consequently, teachers and students require proper guidance and training to effectively utilise AI and enhance learning.

Teachers also reported that balancing traditional and digital pedagogy is a challenge. As Teacher 3 noted, *"there is still a bit of a journey in terms of finding the balance and how to manage that balance"*. The overuse of digital tools can reduce human interaction. In support of this, Meinokat and Wagner (2022) suggest that students may miss out on non-verbal communication, emotional support, and social learning opportunities.

Teachers expressed concern about repetitiveness, which could arise from overreliance on the same digital tools. As Teacher 7 pointed out, *"I don't want padlet to become just the same old, same old in the seminars."* This suggests that the students may become disengaged. Therefore, striking a balance between consistency in effective teaching and variety in maintaining student engagement is important. As regard the use of AI, Teacher 6 highlighted a concern about the repetitive nature of AI in which they mentioned *"I mean the main challenge there is obviously the repetitiveness when it comes to AI. I mean when you let it write anything at some point it starts to repeat the things in different way."* In this context, repetitive AI-generated content may lack originality and creativity. Consequently, this can lead to monotony and reduced student engagement. This situation can also negatively impact the learning experience because students are not provided with different perspectives on understanding the topics and concepts being taught. Overall, while integrating digital pedagogy into teachers' practices can increase student engagement, these challenges highlight significant barriers that need to be addressed to fully utilise digital tools for enhancing student engagement.

Implications for teacher professional development

Digital technologies such as Generative AI tools are developing at a rapid pace. Thus, teachers will need to keep pace with emerging digital technologies and instructional strategies through training sessions within the faculty. These training sessions can be conducted by learning technologists assigned to IUoE and the teachers who participated in this case study and other teachers who are confident and currently incorporating digital pedagogy in their practices. Other methods of teacher professional development involve This can be achieved through online forums such as Microsoft Teams, and peer mentoring, where teachers can share experiences and share best practice among the teachers in this faculty

Limitations

Although some documentation, such as Moodle logs and feedback forms were provided to corroborate the interview data, the case study could have been strengthened if there had been opportunities to observe lessons when digital tools were used. Additionally, it would have been beneficial to elicit the opinions of students regarding the effectiveness of digital tools in increasing their engagement with module content and materials. Addressing the identified challenges is crucial to enhancing learning and maintaining the quality of education in educational settings. Consequently, additional research could be conducted to address these challenges.

5. Conclusion

The investigation of the integration of digital pedagogy by Foundation Pathway teachers at IUoE into their practices to increase student engagement offers valuable insight into the impact of a technology-enhanced learning approach in an educational setting and the digitalisation of education. These findings suggest that effective incorporation of digital tools into teaching practices, as described by the TPACK framework, can lead to increased student engagement, improved learning outcomes, and better academic achievement. In this context, the use of digital tools that align with the TPACK framework and Foundation Pathway teachers at IUoE has provided a more interactive and engaging learning environment for students. However, there are challenges for teachers and students in using digital tools. Teachers and students face challenges, such as a lack of student preparedness, technical and AI issues, the need to balance digital and traditional teaching methods, and the repetitive nature of AI-generated content. These challenges can impede the effectiveness of digital tools in increasing students' engagement. However, potential solutions to the challenges highlighted in this case study have not yet been addressed. Addressing these issues is crucial for the successful integration of digital technology into educational settings to maximise student engagement which could result in improved academic success.

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