Digital Teaching and Learning in Higher Education: Views of University Teachers

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Abstract: Although the interest on research in digital teaching and learning in higher education is steadily increasing the last decades, the literature is still inconclusive on the views of university teachers on that topic. This paper aims to compensate for that gap by systematically analysing and presenting the views of 27 university teachers working in a research-intensive university in Scandinavia. They answered an online survey focusing on their experiences with digital teaching and learning, namely: a) opportunities/challenges (what works well for them and what does not work that well) and b) learning environments used (what are they and whether they think they are fit-for-purpose). The findings have practical implications for academic developers and researchers working with topics within faculty pedagogical development, university pedagogy, higher education, and/or digital teaching and learning.

Keywords: Digital Teaching And Learning, University Teacher Views, Higher Education

1. Introduction

Research on digital teaching and learning remains inconclusive although it is a field with long history. On the one hand, there is research arguing for a "technology first" approach suggesting that technological advancements have led to the development of innovative teaching tools and methodologies that promote active learning and engagement among students (Al-Adwan et. al, 2026). On the other hand, there is substantial research suggesting that the promises of the transformative power of technologies for learning have fallen short of expectations (Tan, Voogt & Tan, 2024) and that technology integration has varied impacts on learning quality and student engagement. Some teachers noted improvements in accessibility and in (practical and pedagogical) flexibility (Slette, Flobakk-Sitter & Mavroudi, 2026). This flexibility allowed students to learn at their own pace and revisit complex material as needed, among others. Others pointed out drawbacks, such as diminished interpersonal interactions and student disengagement (Prosen & Ličen, 2025). For instance, in the post-pandemic era, Sum & Oancea (2022) argued that student engagement was diminished in digital environments in higher education, leaving university teachers often struggling with even basic pedagogical and communication practices. On top of that, research has concluded that university teachers often use technology to replicate current teaching practices and do not employ technology in a manner that alters existing educator-centered approaches (Crompton, Burke, & Nickel, 2026).

A recent and relevant empirical study examining the adoption of digital tools among university teachers reported that 60% of university teachers regularly use digital tools in their teaching and that 2 out of 3 believe that digital technologies had some positive impact on student learning. Moreover, they report concerns about academic integrity and the digital divide (Mexhuani, 2025). The study concludes on faculty resistance and reluctance to adopt new technologies (Mexhuani, 2025), which is not surprising given the fact that 1 out of 3 faculty members is not convinced about the pedagogical value of learning technologies according to the study. Similar studies report a lack of usage among university teachers for developing their teaching practices (Mercader & Gairín, 2020) and point out academic discipline as a factor for using digital technologies in class.

Yet, the adoption of digital tools among university teachers is a multifaceted phenomenon that depends on an amalgama of interwoven factors such as technology infrastructure (Prosen & Ličen, 2025; Woldegiorgis, 2026), professional development opportunities (Drew et al., 2021), and increased teacher workload (Kaur et. al, 2026), among others. But, especially the lack of digital infrastructure coupled with lack of institutional support make a combination that threatens digital teaching and learning; something that is mentioned in articles with very broad geographical scope ranging from Latin America (Okoye et. Al, 2023), to India (Kaur et. al, 2026), and East Africa (Woldegiorgis, 2026). In this context of affairs, the European Commission wishes to promote the development of a high-performing European digital education ecosystem while seeking to enhance citizens' competences and skills for the digital transition (European Commission, n.d).

From 2023 onwards, Generative Artificial Intelligence has been perhaps the most significant concern since the COVID-19 pandemic, when traditional approaches to teaching and assessment were interrupted. However,

unlike the pandemic, the effects of GenAI are likely to be permanent and change over time as the technology develops and improves (Kennedy et. al, 2026).

The empirical study herein examines three questions from the viewpoint of university teachers:

- What opportunities do they associate with digital teaching and learning?
- What challenges do they associate with digital teaching and learning?
- What learning environments (both physical and digital) do they use and why?

2. Frameworks on how University Teachers Design Learning Environments

There exist several theoretical frameworks that help us understand how university teachers go about designing learning environments and activities. Some of them are descriptive aiming to study organically how this happens, whereas others are prescriptive in nature focusing on how it should happen with the aim of optimising the learning design process; and some of them have a twofold aim and can be used both to describe or to optimise a learning design. One of the most well-known twofold frameworks was originally proposed by Shulman (1987) arguing that effective teaching requires "the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction" (p. 8) something that he coined as Pedagogical Content Knowledge (PCK) that the teachers possesses - or should possess. For Shulman, PCK embodies "the aspects of content most germane to its teachability" (p.9). Since its inception over three decades ago, the construct of PCK has attracted a great deal of research attention through its attempts to explain the complex, nuanced and sophisticated work of teaching (Sarkar et al., 2024). While a plethora of PCK studies exists within school education contexts, limited systematic knowledge exists on PCK in higher education. Higher education differs from school education in many ways; thus, extrapolating research insights from the former to the latter may be insufficient (Sarkar et al., 2024).

While Shulman included "media" when he introduced PCK, he did not explicitly refer to technology and its relationship to content and pedagogy (Angeli, Valanides, & Christodoulou, 2016). To this end, the TPCK (Technological Pedagogical Content Knowledge) framework was conceptualised to expand PCK by including the aspect of Technology Knowledge (TK) that the teacher additionally uses when designing digital learning environments. The TPCK framework provided a new mechanism to study and understand the affordance of technologies in teaching and learning as perceived by the teachers (Angeli, Valanides, & Christodoulou, 2016).

The concept of 'affordances' refers to the perceived usefulness of technologies within a given context (Conole & Dyke, 2004). The term 'technology affordance' is increasingly used "in connection with the opportunities for action which various technologies provided" (Hammond, 2010, p. 208). Although the term often implies opportunities, it also indicates limitations (Conole & Dyke, 2004) suggesting that some technology affordances are linked to constraints. For instance, the design or functionality of the technology itself can constrain peoples' actions (Slette, Flobakk-Sitter & Mavroudi, 2026). People can also meet barriers related to factors outside the technology, which can hinder their ability to fully exploit it (Slette, Flobakk-Sitter & Mavroudi, 2026).

Another powerful framework which is more finetuned towards higher education is "Signature pedagogies" (Shulman, 2005). These are the forms of instruction that leap to mind when we first think about the preparation of members of particular professions (Shulman, 2005). For example, the quasi-Socratic interactions in Law, bedside teaching in medicine, writing equation on the blackboard in mathematics, a design studio in architecture, and so on.

3. Data Collection

Empirical data were collected via an online survey that was completed by the participants anonymously. In total, 27 participants completed the survey all of them working as university teachers at a research-intensive large university in Scandinavia. The informants were recruited via their participation in a university pedagogy course on digital teaching and learning in higher education which was conducted at the same university across two semesters (Spring 2025, Spring 2026). The demographics of the participants across genders, age, and teaching experience are shown in Figures 1, 2, and 3 accordingly. The study received permission from the national organisation for data protection services for research and it is abiding to EU GDPR (General Data Protection Regulation).

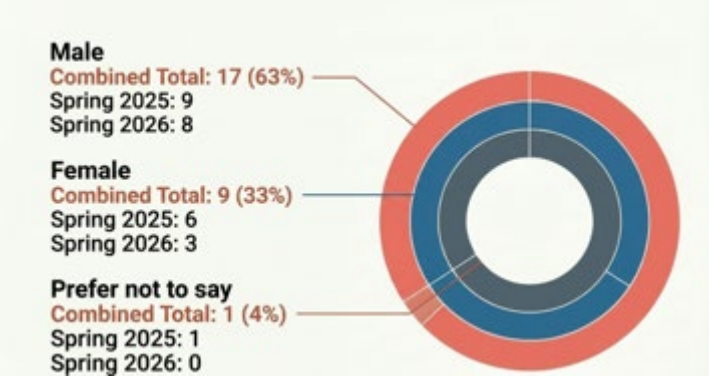


Figure 1: Sample demographics across genders

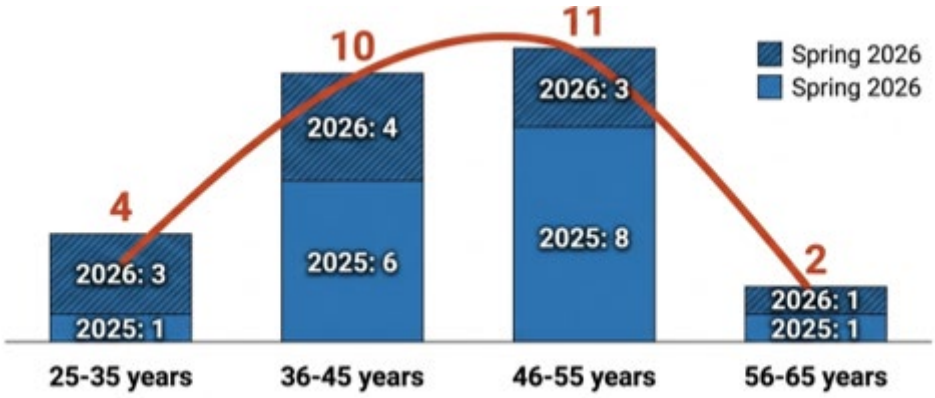


Figure 2 Sample demographics across age groups

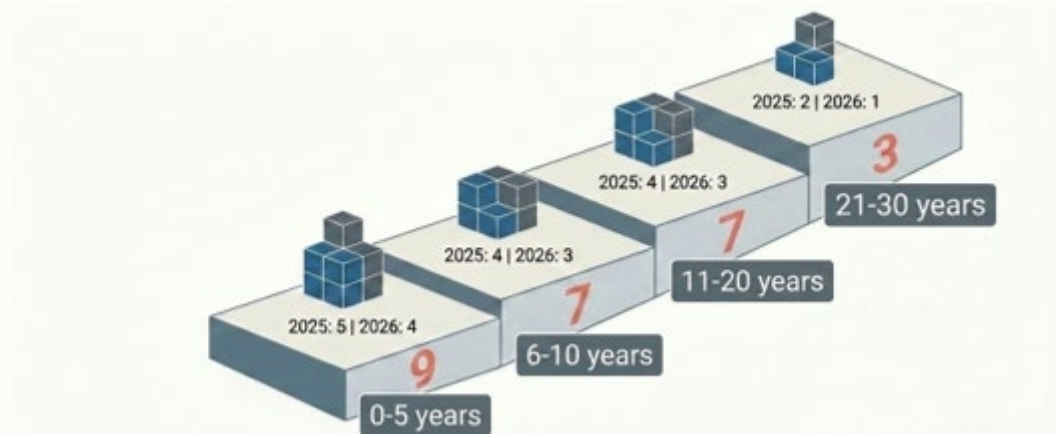


Figure 3 Sample demographics across teaching experience levels

4. Data Analysis

We applied thematic analysis in the dataset using the six- phase model originally suggested by Braun and Clark (2012). Phase 1 involves familiarisation with the data. In phase 2, the analyst generates the initial codes. In phase 3, the analysis starts shifting from code to theme generation. Phase 4 involves a process reviewing the generated themes in relation to the coded data and entire data set. Phase 5 entails defining and naming themes, and, finally phase 6 is about reporting the findings of the analysis. We selected this approach due to its suitability for an experiential and exploratory study of university teachers' expectations, challenges, and experiences, such as the study herein.

5. Findings

5.1 Perceived Opportunities or New Possibilities

In relation to opportunities or new possibilities facilitated by digital tools/services or digital pedagogies two main themes emerged.

5.1.1 Theme 1: Pedagogical Flexibility and the Flipped Classroom Model

Digital teaching provided flexibility (*"Sharing digital materials is easier and the course is also more flexible",* P10). Also, local versions of flipped classroom formats worked well. For example: employing a flipped format where slides and notes are published online, allowing live time for problem-solving (P21), using Canvas to hand out video lectures so seminars can focus on practical tasks (P1), and pre-recorded short videos on Canvas effectively to support live workshops (P13).

5.1.2 Theme 2: Finding the Pedagogical Added Value of Using a Digital Learning Environment

The justification of using digital tools stems from clear benefits coupled to the tool affordance(s): what does a digital format or tool enable the teacher to do that would have been more difficult or even impossible otherwise? For instance, using Generative Artificial Intelligence as an assistant: "*as a teacher I use AI tools as a "sparring partner" - that is, I might for example ask the AI how they would structure a class on a specific issue and then check how this correspond with my own structure. would structure a class on a specific issue and then check how this corresponds with my own structure*" (P20), and " *I have used AI for transcribing Arabic audio clips so I could give the student handouts after their listening tasks. I think that was very useful and saved me a lot of time*" (P17). Other examples include "*I teach a course on using the programming language R in the humanities. Workshop-like seminars where I show live coding on screen work really well"* (P13), " *using Zoom and it was easier to implement online survey*" (P24), or " *Sharing screen and use of digital tools is superior in digital teaching*" (P14).

5.2 Perceived Challenges or Dilemmas

When it comes to challenges or dilemmas related to digital teaching in higher education, the following themes emerged from our research participants:

5.2.1 Theme 1: The "Invisible Student" and the "Black-screen" Phenomenon

The most prevalent dilemma is the inability of the teacher to "read the room" due to lack of visual contact when teaching online. In turn, this lack hinders a teacher's ability to understand whether students "are following" and to adjust their teaching "ad hoc" accordingly. These excerpts exemplify that: "*My main concern is that I miss face to face contact*" (P11), "*I could not see the faces of the students so I never knew if they were following or not* "(P22) or "*I find the difference to the students challenging - it is easier to see reactions when one does in person teaching*" (P23). We assume that this refers to the black screen phenomenon, namely that the students when attending online choose to turn off their cameras: "*The social dynamics with listeners/students works well (dialogue, interruptions, questions) as long as people show themselves on camera"* (P1).

5.2.2 Theme 2: Decline in Student Engagement and Difficulties in Supporting Active Learning

Participants report a difficulty in sustaining student engagement and active participation in digital settings. Typical excerpts: "*Student engagement is the major challenge to me in relation to digital teaching and learning. Various concepts of pedagogy are also challenging to execute, for example 'Experiential learning' or 'Socratic Method' etc*." (P2), and "*one of the main challenges I have encountered is ensuring meaningful interaction in digital learning environments. In fully online settings, students may feel less motivated to actively participate, which affects engagement and learning outcomes."* (P9)

5.3 Learning Environments: are They Fit-for-Purpose?

5.3.1 Theme 1: The Affordances of Physical and/or Digital Learning Environments

On the positive side, the teachers demonstrated intentional use of learning environments that have the affordances needed to support the intended pedagogical approaches. Examples include:

- "I *have experience using traditional classroom settings, which are effective for fostering interaction, discussions, and hands-on activities*" (P10)
- "*I used Zoom for the presentations and used many topic specific digital things (e.g. capture the flag websites, I'm teaching ethical hacking*)" (P11)
- "*Based on my topic (life science/medical science/global health), I feel classroom, laboratory and field work are the best learning environments*." (P2)
- "*I mainly use blackboard in classrooms. The topics I teach are within mathematics. In this area, writing on the blackboard works very well because provides the right pace for the student to learn the concepts, in particular when explaining proofs."* (P22)
- "*I normally have classroom teaching mostly lectures (large student groups, around 150 students), and small group seminars (10 students). The lectures work well to provide knowledge to large student groups, and the small groups work well to reinforce learning and discuss complex topics addressed in the lectures*" (P26)
- "*I am about to participate in a project that aims to develop digital learning material with chatGPT (i.e., GPT språklab). This includes making instructions and small learning assignments, and hopefully be able to make the integration adjusted to each student's level. I think this could be exciting*» (P27)
- "*Sharing screen and use of digital tools is superior in digital teaching. Space, movement, flexibility is superior in analog teaching*" (P14)

On the negative side, there existed difficulties in supporting intended teaching practices within the given learning environment structures: "*I face dilemmas in all teaching, also in digital teaching. The challenge is to fit good practices in a rigid university environment*." (P15) or even threats to the learning process, posed by misuse of tools such as GenAI tools *" I think us as humanities teachers especially have a responsibility to teach precisely the skills GenAI is trying to make obsolete: slow and close reading, carefully crafting a text, thinking something through for ourselves instead of asking ChatGPT to explain it to us*." (P19).

5.3.2 Theme 2: The Importance of the Interplay Between Physical and Digital Learning Environments

The participants gave several examples of how their teaching practices are supported by using physical and digital learning environment(s) in ways that complement each other aiming to support the underlying learning outcomes. Two examples that illustrate that:

"*As a language teacher, it's important to activate students in a variety of ways and get them to practice what they are learning. Hence the classroom experience is crucial in providing support and real time feedback. However, we use digital tools to submit essay assignments and give feedback on canvas too."* (P10)

"*Classrom, lecture hall, Canvas. They're all fit for their various purposes. Classrooms invariably have a classroom seating plan, which is sometimes not the best (and moving tables around takes a lot of time). Canvas has tons of functionality I don't need, but I don't have any major problems with it either (except that it's proprietary software and does not like you to link to outside documents)"* (P14)

A few participants gave examples of an antagonistic relationship between digital and physical learning environments, such as: "*Digital solutions to showing up are often on the wish-list of some students, but when it is available it decimates the attendance to physical meetings and networking*" (P22).

6. Discussion and Conclusion

Examining the experiences and views of university teachers is essential to understand the challenges and opportunities associated with digital teaching and learning in higher education. This is especially timely today living in a time period in which the post-pandemic era meets the era of Generative Artificial Intelligence tools and machines that supposedly think. What the pandemic and the massive adoption of GenAI tools in different aspects of our lives, including education, have in common from the teachers' point of view is that they are both associated to digital teaching and learning. Although it is a field with long tradition, research in digital teaching and learning remains inconclusive. The empirical study herein focuses in three questions that aim to shed light from the viewpoint of university teachers into digital teaching and learning, focusing namely on 1) opportunities, 2) challenges, and 3) learning environments (physical and/or digital).

With respect to RQ1, pedagogical flexibility is the main opportunity that university teachers associate with digital teaching and learning. In relation to that, the flipped classroom model facilitated a legitimate compromise

between pedagogical flexibility and student-centered pedagogical approaches often implemented on-site in the university. This finding is not surprising as pedagogical flexibility is one of the most well-known opportunities connected to digital forms of education. Another finding suggests that identifying the pedagogical added value of using learning technologies in their teaching was a prerequisite for their adoption. The participants teachers provided several examples that demonstrated that. Rightfully, the justification of using digital tools stems from tool affordance(s) that can support the "signature pedagogies" of the subject matter taught.

With respect to RQ2, the main challenge refers to the inability of the teacher to "read the room" due to lack of visual cues when teaching online. All the non-verbal communication that would help the teacher understand if students "are following", is missing. Again, this finding is not surprising especially in the light of the pandemic literature which has highlighted that repeatedly. Yet, this could also indicate that teachers tend to replicate online the pedagogical approaches that they use on-site as mentioned in Crompton, Burke, & Nickel, (2026), something that does not work since teaching online calls for a redesign of the learning activity at stake. Still, teachers reported difficulties in supporting active learning while teaching online.

With respect to RQ3, the main conclusion is that learning environments (may it be digital or physical) are perceived as fit-for-purpose when they incorporate the affordances needed to support teachers' intended pedagogical approaches- including their "signature pedagogies". In relation to that, a theme that emerged is the importance of the interplay between physical and digital learning environments to optimally support the underlying learning outcomes. In particular, the main conclusion involves the value of creating a learning environment in which the physical component(s) and the digital component(s) have a harmonic relationship as opposed to an antagonistic one. It should be noted that this finding is in line with previous literature, but it might have been affected by the levels of the TPCK of the participant teachers (something that was not measured as part of this empirical study). In general, teachers provided several examples that demonstrated their PCK and TPCK. Yet, teachers also pointed out difficulties in supporting their intended practices or even to potential threats to the learning process posed by misuse of tools. Nonetheless, the participants gave several examples of how their teaching practices are supported by using physical and digital learning environment(s) in ways that complement each other aiming to support the underlying learning goals. This is in line with the idea of an entangled pedagogy that bypasses the "technology first" or "pedagogy first" dogma (reference).

Limitation of this study include its sample size coupled with its cross-sectional design, a combination that is limiting the generalisability of the findings. Therefore, the authors invite researchers and policy-makers to join the discussion of opportunities and challenges in digital teaching in higher education with a focus on how we can design and use fit-for-purpose learning environments.

Finally, it is worth noting that none of the participant teachers mentioned the lack of infrastructure as a problematic issue. Out-of-context this seem like a surprising finding since this parameter has been frequently mentioned in the relevant literature. But, in the Scandinavian context this finding does not comes as a surprise, since this particular geographical area scores very well worldwide when it comes to the existing infrastructure (digital services, internet access, and so on). Given the fact that our participants mentioned already well-known challenges from previous literature, it would be wrong to assume that a "technology-first" approach would suffice into promoting active learning and engagement among students in digital teaching and learning in higher education. Therefore, this paper concludes with a need for more research (and associated funding opportunities) on digital pedagogies in higher education.

Ethics Declaration

This research work involves empirical data collection with university teachers and therefore ethical clearance was obtained from the national Data Protection Services for research in Norway.

AI Declaration

Microsoft Copilot Chat service provided by the University of Oslo was used in the development of the figures included in the paper.

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