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PAPER

Unravelling Technology Acceptance: Lessons Learnt from Teachers' Experience during COVID-19 for Post-Pandemic Systemic Education

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ABSTRACT

The COVID-19 pandemic presented a unique environment to understand education technology acceptance and adoption. The pandemic acted as a catalyst, encouraging higher education (HE) institutions to rapidly transition from traditional learning environments to technology-driven learning environments. While the motivation for this transition at an institutional level was driven by the need for operational continuation and survival, this rapid transition transferred an increased responsibility to the teacher. Extant research in the context of education technology acceptance and adoption during the COVID-19 pandemic gives substantial emphasis to the learner's experience since the learner is often seen as being on the receiving end of this transformation. However, in this narrative, the teacher is often overlooked. Through a systematic literature review of technology acceptance and adoption during the COVID-19 pandemic, we examine themes surrounding the teacher's experience to address the research questions. *When the teacher or instructor is the subject of the study, how have learning technologies influenced their role?* and *What factors encourage or influence teachers' acceptance of learning technologies?* Key findings from this study reveal that the role of the teacher in this technology-driven learning environment shifts from instructor to facilitator, positioning them as an extension of technology. As a result, the teacher determines how the educational technology is perceived by the learner as useful or easy to use. The findings of this study recognise considerations for HE institutions in this age of digital transformation while also presenting new avenues for research in the domain of technology acceptance and adoption.

KEYWORDS

technology acceptance, systematic literature review, teacher, higher education (HE), COVID-19, education technology, e-learning, technology acceptance

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1 INTRODUCTION

This study examines scholarly discussions surrounding the adoption and acceptance of teaching and learning (T&L) technologies in higher education (HE), with a specific interest in emergency remote learning environments such as the COVID-19 pandemic. During the forced emergency conditions resulting from the COVID-19 pandemic, HE institutions pivoted to using educational technologies to continue their T&L activities. As we emerge from the pandemic, many HE institutions around the world have started to consider the new possibilities presented by technology-driven learning environments to expand their operations and enrich the learning environment. Guppy et al. [29] and Singh et al. [59] recognise that post-pandemic, there is a drive by HE institutions to continue the usage of technology-driven learning environments, especially those facilitating distance learning or eLearning; thus, in this landscape, there is an interest in understanding the actors who are directly affected by the transition from the traditional learning environment to the technology-driven learning environment. While there is ample research examining how the learner is affected by this transition and the motivational factors that drive the learner to accept educational technologies during the COVID-19 pandemic [10, 11, 71], our preliminary literature review found a scarcity of studies recognising the teacher's acceptance of the technology-driven learning environment. Although there is a breadth of literature on student teachers and pre-service teachers during the COVID-19 pandemic [7, 48, 17, 57], it must be highlighted that within these studies, the student teacher or pre-service teacher is still located as a learner, and our understanding of technology acceptance exists primarily from the learner's perspective. Kabir [33] further highlights the importance of stakeholders in HE working together to address the barriers affecting the adoption of technology-based education. There is value in examining each stakeholder's (learners', teachers', and managements') motivation to adopt technology-based learning. If the HE sector is to incorporate education technologies as the new normal, it is important to understand what may influence the teacher's adoption and acceptance of technologies in their teaching practice.

From a global perspective, the literature surrounding technology adoption during the COVID-19 pandemic reveals that inequalities exist in access to technology and infrastructure [60], contributing to the extension of the digital gap between the developed and developing worlds. Inequalities emerging from the shift to technology-driven learning environments during the COVID-19 pandemic have also largely been examined from the perspective of the learner, but it can be argued that such challenges are a lived reality for both the learner and the teacher. In this regard, Cabero-Almenara et al. [15] and Kabir [33] argue that providing just the technological resource to teachers is not sufficient for information and communication technology (ICT) integration in the classroom. Successful acceptance must promote professional development and training that is focused on creating awareness of the complex interaction between technology and pedagogy. It is necessary to support the teacher in rethinking how teaching approaches may be adapted to the technology-driven learning environment.

When examining scholarly works focussing on the impact of technology-driven learning environments on learning, Shelton et al. [58] argue that blindly adopting technology-driven assessments risks adopting a cookie-cutter approach to assessing learning outcomes and may dehumanise the learner in the learning environment. Similarly, Christopoulos and Sprangers [20] warn practitioners that the selection of

learning approaches, such as gamification, especially beyond the primary school level, needs to be focused on pedagogical goals rather than technological incentives. Gudmundsdottir and Hathaway [27] further share that, considering the decision to move into digital learning environments made at an institutional level, teachers often felt compelled to carry the burden of equipping themselves to adopt education technologies as a means of going the extra mile to transfer teaching online. Such findings advise practitioners to be mindful of the purposefulness and impact of technology on teaching practice.

1.1 Measuring technology acceptance

A particular way of examining this phenomenon is to examine attitudes and perceptions attached to technology itself. In this regard, Venkatesh et al. [67] recognise a value in technology acceptance theories to unpack motivations for individuals to accept or reject a technology. When considering technology acceptance models (TAMs), the general premise considers the individual reaction to using a technology and its effects on the intention to adopt the technology and actual adoption (see Figure 1). Models such as the TAM (including TAM 2 and 3) [22] and The Unified Theory of Acceptance and Use of Technology (UTAUT, including UTAUT 2 and 3) [67] are popular in technology acceptance research to understand the users' perception towards the education technology under consideration. In this systematic literature review, we were motivated to draw on technology acceptance research that examines individuals' intentions to use education technologies. While the main focus of this study is not to validate existing models, there is an interest in understanding how the variables emerging from these studies have been drawn on to interpret motivations for adopting educational technologies into teaching practice.

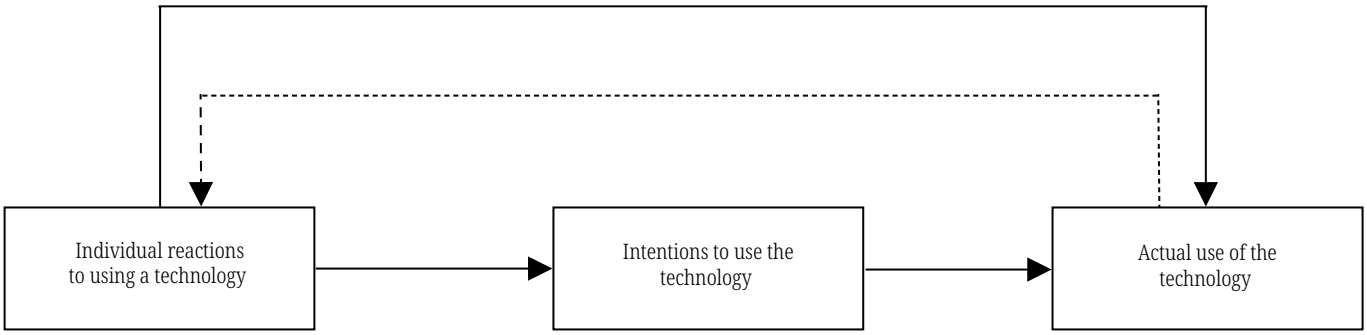

Fig. 1. Basic concepts underlying technology acceptance models Venkatesh et al. [67]

Popular predictive models such as the TAM [22, 23, 82, 83], UTAUT [67, 83], and general extended TAM for e-learning (GETAMEL) [70] have been increasingly adapted to study factors influencing the acceptance of technologies in education. As reflected in Figures 2 and 3, the original TAM and UTAUT models have been expanded by scholars to capture additional variables that influence technology acceptance.

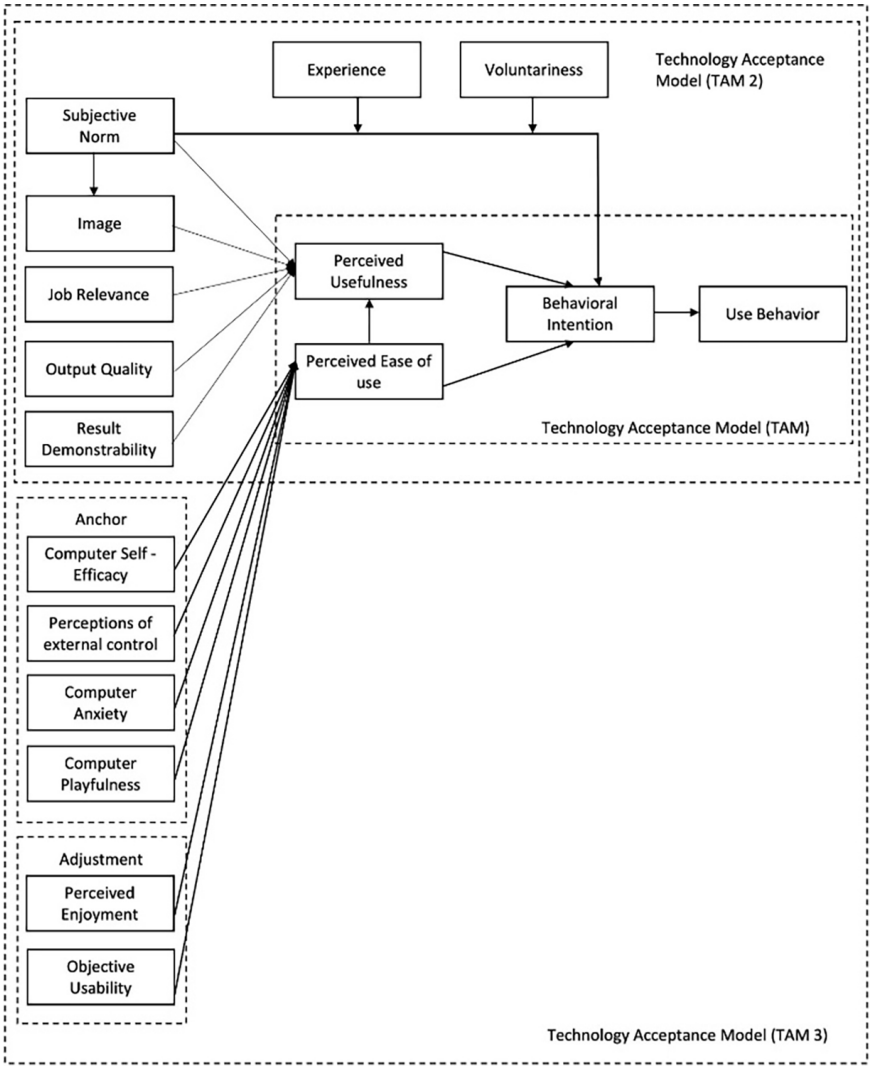

Fig. 2. Technology acceptance model (including TAM 2 and 3)

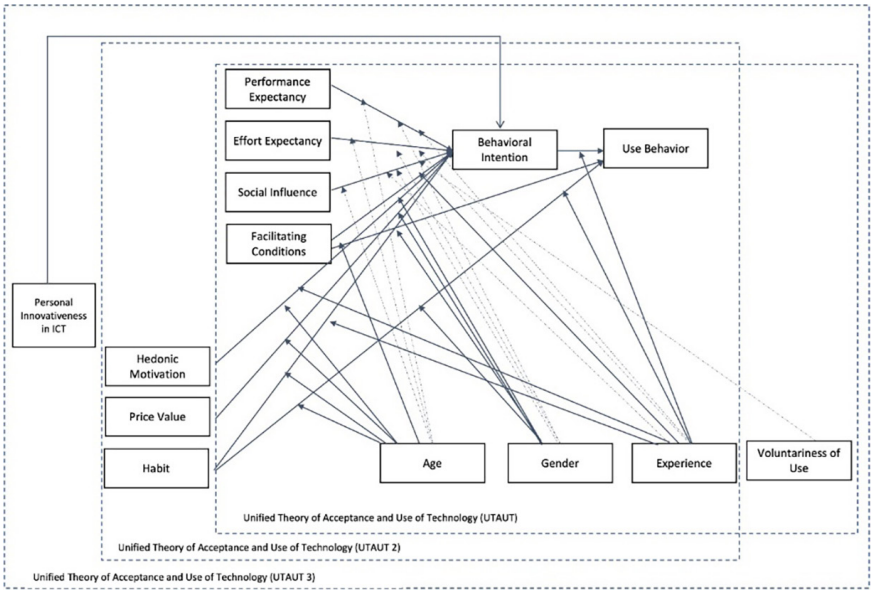

Fig. 3. The Unified Theory of Acceptance and Use of Technology (including UTAUT 2 and 3)

Though GETAMEL has been designed specially to examine the acceptance of education technologies, [72] argue that the validation of GETAMEL is still in its infancy. Hence, [72] questions the applicability of the GETAMEL model to a specific condition. [73] further conveys that the context-specific nature of technology limits GETAMEL's ability to cater to conditions beyond generic environments. As a result, though designed specifically for eLearning environments, GETAMEL continues to remain under-researched.

In an effort to examine technology acceptance, scholars have also turned to other models such as Innovation Diffusion Theory (IDT) [67, 74, 75], Social Cognitive Theory (SCT) [76], Information Systems Success Model (ISSM) [77] and Expectation Confirmation Theory (ECT) [78, 79, 80, 81] to capture what motivates usage and adoption. These theoretical models provide insight into attributes considered when measuring user adoption of education technologies. Thus, in this systematic literature review, we draw on the nature of the findings emerging from the application of such models to critically examine the teacher's experience.

Inspired by these findings, the study sets out to examine two research questions: *When the teacher or instructor is the subject of the study, how have learning technologies influenced their role?* And *what factors encourage or influence the teacher's acceptance of learning technologies?*

Within this study, the COVID-19 pandemic is recognised as the underlying landscape within which education technology acceptance is examined; thus, we consider publications from 2019 (pre-pandemic) to March 2022 (post-pandemic to endemic). Through this critical review of extant literature worldwide, we wish to present themes outlining how HE institutions can best equip themselves to facilitate the adoption of technology-driven learning environments among teachers, based on lessons learnt during the pandemic.

2 METHODOLOGY

This study draws on a sample of literature from the Web of Science database between January 2019 and March 2022. To ensure the quality of the research outcomes, three restrictive criteria were considered: (1) only include peer-reviewed journal articles, excluding books, book chapters, conference proceedings, and working papers; (2) only articles published between 2019 and 2022 were considered to reflect the COVID-19 pandemic; (3) only articles written in the English language were considered within this sample. As our interest is to unravel findings in the sector across countries, we have not used regions as a restrictive criterion.

This study emerges from a wider systematic literature review examining technology acceptance and adoption during the COVID-19 pandemic. While reviewing the sample of papers, we found that although the majority of the publications focused on the learner, a significantly smaller number of publications focused on the teacher. The focus of the present study is to examine what findings emerged from the smaller sample of publications where the teacher was the subject of interest.

Following the approach proposed by Newman and Gough [50], the preliminary investigation broadly examined themes relating to technology acceptance and adoption during the COVID-19 pandemic. The search was then narrowed down to examine more specific publications focussing on HE. The results at this stage examined literature focussing on both the learner and the teacher. As a result, this study focusses

on results reflecting the teacher's experience from a broader study investigating the user's (both teacher and learner) acceptance of educational technologies. The data set was then refined using a combination of search strings: *Distance Education* AND *TAM, Covid-19* AND *Distance Education, TAM* AND *Higher Education*, and *Technology Acceptance Model* AND *Higher Education.* It was identified that the use of *Distance Education* AND *TAM* or *Distance Education* AND *Covid-19* produced a large number of search results that were not in line with the research questions. Furthermore, the inclusion of *HE* helped to scope the search results and align them to the research questions.

Consequently, the following search strings were adopted: *TAM OR Technology Acceptance Model AND HE OR Higher Education*. The decision to adopt this search string was informed by the relevance of the preliminary results to the research questions. The initial search returned 1630 search results. Further refinements, such as the period of interest, educational research-related studies, and peer-reviewed articles, were used to bring the sample size down to 389. A closer review of the results showed us that, as expected, the results mostly comprised research into the learner's experience. The sample was then subjected to a series of inclusion and exclusion criteria through a review by the authors, as presented in Table 1, to isolate literature that considered the teacher's experience. On application of these criterion the final sample comprised 53 publications.

Table 1. Inclusion and exclusion criteria followed in the study

Inclusion Criteria	Exclusion Criteria
Publications from 2019 to March 2022	*Publications prior to 2019*
Focus on Technology Acceptance/ Adoption	*Does not focus on Technology Acceptance/ Adoption*
Focus on Higher Education	*Does not focus on Higher education (e.g., pre-university, pre-service teachers)*
Focus on empirical research	*Focus on meta-analysis (e.g., systematic literature review)*
Peer-reviewed	*Not peer-reviewed*
English language	*Not in English language*
Educational Research specific Journals	*Non-subject specific Journals*
Relevance to some or all research questions	*Non-relevance to research questions*
Access to full-text paper	*No access to full-text paper*
Focus only on the teacher/both the teacher and learner	*Focus on learner only*

Figure 4 provides an illustration of the overall screening process of this systematic literature review. While the preliminary screening identified 210 articles that did not align with the research interests of this study, the full text screening excluded 107 papers that focused only on the student, two papers that did not focus on technology acceptance and adoption, four papers that did not focus on HE, and 4 papers that did not align with the research interests of this study. As illustrated in Figure 2, the final moderation of the sample identified a paper that focused on pre-service teachers and three papers that focused on the student, along with four duplicate papers and one paper that the authors did not have access to.

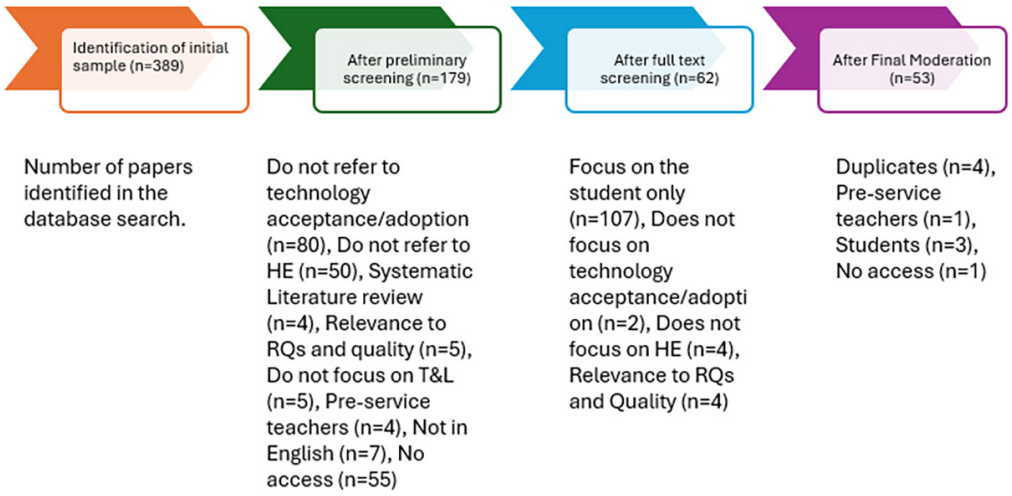

Fig. 4. Screening process

In the final sample, 12 articles focused on both the teacher and the learner, while the remaining 41 articles focused only on the teacher's experience. The final sample of 53 articles was then used to conduct a thematic analysis (refer to Table 2) of the research findings to answer the research questions using Nvivo 12.

Table 2. Thematic analysis findings

Aggregate Codes	Secondary Codes	Primary Codes
Encouraging adoption	*Self-efficacy*	*Anxiety and adoption*
		Attitude and adoption
		Confidence and adoption
		Awareness about technology encourage adoption
	Perception of the technology	*Easy to use*
		Usefulness
	Hedonic motivation	*Hedonic motivation and habit*
		Adopt if enjoyable
	Social influence	*Social Influence does not impact adoption*
		Social norms
Motivation to use	*Performance Improvement*	*Accepting due to impact on learning even if it needs more effort*
		Convenience as a motivation
	Technology-task-fit	*Fitting in with job expectations*
		Convenience as a motivation
	Demotivators	*Negative expectations of performance*
		Lack of technical competence
		Knowledge sharing is not a motivator
		Challenge in using technology

(Continued)

Table 2. Thematic analysis findings *(Continued)*

Aggregate Codes	Secondary Codes	Primary Codes
Facilitating conditions	*Training and support*	*Training*
		Impact of training on adoption
		Tech readiness of institutions
	Infrastructure	*Good infrastructure influence adoption*
	Overcoming barriers	*Organisational support to support acceptance*
		Management and user impact
		Goal alignment and continuation
Teacher concerns	*Increasing in responsibility*	*Workload*
		Increasing responsibility
	Resistance to change	*Insisting on their point of view*
		Concerns relating to teaching practice
		Technology related concerns
		Pedagogy
		Institutional concerns
	Disparity in user experience	*Reliability of the technology*
		Changes brought about by the transition
A way forward	*A way forward*	*Facilitating the transition*
		Fostering adoption
		Policy and Guidelines
		Training and skill development
		Incentives

3 FINDINGS

The thematic analysis revealed five emerging themes: *encouraging adoption*, *facilitating conditions*, *motivation to use*, *teacher concerns,* and *a way forward*. Thus, the following discussion will engage with the research findings relating to these themes while providing insights into recommendations made by scholars on how the acceptance and adoption of educational technologies can be encouraged.

3.1 Encouraging adoption

The challenges to educational technology adoption among students are well documented [38]. However, in the case of the teacher, existing research primarily focusses on teachers who are themselves positioned as learners (e.g., pre-service teachers). This study was interested in unpacking the perspectives of the teacher who, within the emergency remote learning environment, carries the responsibility of transferring the traditional learning environment to the digital learning environment.

The thematic analysis of literature from the teacher's perspective reveals that scholars have shown an interest in understanding factors that may encourage faculty to adopt technology into their regular teaching practice. In this regard, 34 studies recognise the causes of and mechanisms to encourage adoption.

Self-efficacy. Among them, scholars [36, 39, 54, 61, 43] recognise that the faculty member's confidence in using an education technology can positively encourage adoption. These findings are in line with the findings by Ajzen [1] and Venkatesh et al. [67], who recognise the relationship between an individual's confidence and adoption. Stickney et al. [61] provide further insight by elaborating that training can be a crucial factor that can boost satisfaction and confidence among teachers. While these findings resonate with Lim [41], Ayanwale et al. [8], and Hung [31], these conclusions also draw our attention to the impact of *instructor readiness* as a means of encouraging adoption. Akram et al. [2] present further insight by sharing that faculty members often faced challenges in classroom management, inadequate guidance, limited resources, and the communication gap between teachers and students, which in turn shaped their level of self-confidence in using the digital environment. Though Akram et al. [2] explain that the teacher must be competent in their use of digital technologies to adapt to the digital learning environment, it raises the question of whether the teacher's confidence in their abilities or perceived confidence must be investigated in the future to articulate the technological barrier faced by the teacher.

Perception of the technology. While many authors in the sample reaffirmed the predictive validity of TAMs by validating the influence of perceived ease of use and usefulness of the technology on adoption [55, 39, 2, 34], it is worth noting that several studies revealed some unique findings that contradicted the traditional TAM-orientated beliefs. While Aznar-Díaz et al. [9] find that the faculty members' perceived *uselessness* of the technology can negatively affect adoption, Akram et al. [2] find that, in certain instances, faculty members may prioritise ease of use over the usefulness of the technology. These findings reflect a nuanced effect of the additional workload put on the teacher, who now must actively incorporate educational technologies into their teaching practice as instructed by the HE institution. Furthermore, Stickney, et al. [61] warn of the implications of oversimplifying a technology to enhance ease of use, as it may dilute the value and usefulness of the technology and deter faculty (especially those from technical backgrounds) from adopting it. Cai et al. [16] find that, contrary to common perceptions within the sample, self-efficacy, perceived ease of use, and usefulness did not influence continuation of use. Rather, institutional support and the adequacy of the technology to pedagogy had a higher influence on their decision to continue using it.

Hedonic motivation. A merging theme in the sample was how hedonic motivation, which is often considered in the context of the learner, was recognised as influential to the teacher. For example, Şahin [54] and Gunasinghe et al. [28] recognise that hedonic motivation, such as *enjoyment* and *excitement*, can influence teachers to adopt a technology. Interestingly, Şahin et al. [54] find that within the conditions of the COVID-19 pandemic, the use of technology ceased to be optional for the teacher. Thus, the perceived ease of use and perceived usefulness were not significant in shaping the teacher's intention to use an education technology. Meanwhile, Chávez Herting [19], Jung and Lee [32], and Zwain [69] recognise that the habit of using the technology can be a significant promoter of adoption. Often, when *flow experience* is examined, especially during the pandemic, it is from the perspective of the learner [3], [21]. Within the sample of this systematic literature review, only seven studies recognised the influence of attributes relating to flow experience on the

teacher's adoption of education technologies and revealed a future research avenue for furthering of domain of study.

Social influence. The studies presented mixed results in terms of the effects of social influence on encouraging adoption. While scholars [39, 4, 34, 12, 69] recognise that a teacher's usage of educational technologies can indeed be encouraged by usage among their peers, Alshammari [4] finds that social influence had little impact on encouraging usage, but rather the decision was shaped by the teacher's own experience in using the technology. de Souza Rodrigues et al. [24] further elaborate that a teacher's reluctance to share their experiences in using educational technology with peers can slow down the adoption. It can be argued that these mixed results emerge from the complexity of the forced conditions under which teachers operated. For example, Alshammari [4] does not fully consider that in this forced situation resulting from the pandemic, the decision to move into virtual learning was an institutional decision where the instructor was forced to *follow* instructions rather than *choose* to use a medium. However, as we emerge from the pandemic, it is evident that conditions have changed. Teachers are encouraged to adopt technologies, but unlike during the pandemic, the teacher has agency in choosing technologies that best suit their needs.

The anxiety that the teacher experiences when using education technology has been recognised to negatively influence and slow down adoption [54, 12]. Thus, in the following section, the study will lay out factors that motivate the teacher to use education technologies in their teaching practice.

3.2 Motivation to use

The findings of the literature review revealed a connection between adoption and motivation, supplemented by attitudes towards education technology. 28 of the studies within the sample examined motivations driving faculty to adopt education technologies into their teaching practice.

Performance improvement. While scholars acknowledge the significant influence of the forced environment created by the COVID-19 pandemic on motivating rapid adoption [25, 40, 54, 68], scholars have also investigated motivational factors beyond the climate in which the adoption takes place. Among them, the perception of improved performance was a frequent observation made by scholars as motivating teachers to accept educational technologies (18 papers). Within this narrative, Alshammari [4] forms a connection between improved performance and usefulness, implying that the validation of performance expectancy (efficiency and effectiveness of the technology within the learning process) creates a positive impression of the usefulness of the technology and can be a key motivator encouraging the teacher to continue usage. However, it must be noted that consideration of performance in studies provides two different perspectives: improving the efficiency of teaching activities [4, 24, 53, 47, 61], the improvement of the yielding results from pedagogic practice incorporating education technology [39, 12, 56], and career performance [36].

Technology-task-fit. Among studies recognising the value of educational technologies in improving teaching efficiency, scholars [36, 46, 47] emphasise that the value of education technology is attached to the degree to which the technology fits in with job expectations or the job role. Interestingly, Karkouti [36] finds that the alignment of improved performance through technology usage and job-related rewards can be a key factor affecting the teacher's decision to adopt technology in

their teaching practice. Thus, the decision to adopt a technology is pragmatic, in the sense that teachers are selective about how their technology usage is perceived at an institutional level.

Demotivators. When considering the factors that may negatively influence the adoption of education technologies, challenges faced by the teacher when incorporating the technology into their teaching practice [65], the lack of technical competency [45, 63], and presumptions linked to how the technology may meet the teacher's pedagogical expectations [12] were recognised as demotivators. Bervell and Umar [12] further explain that concerns attached to whether the technology will achieve the goals of usage have created anxiety and reluctance to adopt an education technology.

Interestingly, the findings expose the impact of how external stakeholders, such as university administration and students, can also affect motivation. In their work, Stickney et al. [61] and Suleiman [63] recognise that university administration can motivate adoption and acceptance of education technology by monitoring the teacher's usage and providing sufficient support. Suleiman [63] further elaborates that positive student feedback can encourage and motivate the teacher to adopt and continue the usage of technology in their teaching practice.

3.3 Facilitating conditions

In order to encourage successful adoption of T&L technologies, institutions must ensure the correct facilitating conditions are put in place. As previously mentioned, during the chaotic shift to technology-driven learning environments from the traditional classroom triggered by the COVID-19 pandemic, the complexity of the transition increased due to the lack of infrastructure and support. Thus, facilitating conditions can ease the transition into technology-driven learning environments.

Training and support. Among such facilitating conditions, 17 studies recognise the value of training and technical support provided to the teacher. In their work, Bervell and Umar [12] identify that the lack of technical support, resources, and necessary knowledge can induce anxiety that may negatively affect the adoption of the technology. Chatterjee and Bhattacharjee [18] explain that facilitating conditions made available can shape the teacher's perceptions towards education technology, which can encourage adoption. In this regard, professional development interventions geared towards developing technical competencies [26] can be useful to develop self-efficacy and autonomy in using educational technologies in pedagogy.

Infrastructure. However, it cannot be ignored that the successful implementation of educational technologies rests heavily on the fluidity with which the technology can be embedded within the pedagogy. Thus, infrastructure [28, 54] plays a critical role in how the technology itself can be used and will be perceived by the user. Difficulty in using or deploying the technology can result in frustration and poor execution of the curriculum, which can negatively influence performance. Considering the current trend of blended learning and eLearning and the drive towards remote working, certain aspects of the infrastructure fall outside the remit of teachers. In such an environment, it is important for institutions to consider how technical challenges can be mitigated or overcome.

Overcoming barriers. The literature provides some insights, though not absolute, into how such challenges may be handled. For instance, user support [39, 54, 60, 12, 28]; technical skills development training [26, 55, 68, 63]; and access to resources [56] are suggested by scholars as ways to minimise the effects of

technical challenges. Within this narrative, Stickney et al. [61] find that merely providing technical support may not resolve the problem at hand. In their study, the authors find that even when faculty are satisfied with the technical support, they may continue to struggle with the technology. Stickney et al. [61] elaborate that faculty may seek technical support to develop their technological competency because the educational technology itself may be problematic or as a means to cope with the frequent technological shifts happening within the HE landscape. While they may be satisfied with the support they receive, the climate within which they adopt the technology may create resentment and frustration. This can further be linked to the aforementioned aspects of the infrastructure that fall outside the control of the teacher, which leads to a paradox of how successful adoption can be guaranteed within a system of inequalities that may create individual-level challenges to usage.

3.4 Teacher concerns

Our thematic analysis revealed that 21 studies recognised faculty concerns regarding the transition to a digital learning environment. Among them, the impact on workload (referred to by 13 studies) and concerns relating to teaching in the new landscape (18 studies) were the most significant themes.

Increasing in responsibility. Though the transition into a technology-driven learning environment presents flexibility and opportunity for HE institutions, it cannot be ignored that this shift places an added burden on the teacher, who must now prepare for and facilitate the learning environment. Akram et al. [2] and Cai et al. [16] find that inadequate guidance on how to carry out teaching in the digital learning environment shifts the burden of preparation and skill development to the teacher. As a result, the teacher is overwhelmed by the administrative, teaching, and research tasks [36, 53] attached to their role. Furthermore, Bervell and Umar [12] highlight that, though the shift to digital learning environments is promoted by institutions, the teacher was unsure of how the educational technology would fit in with their pedagogical expectations. Thus, under the direction of the overarching institutional decision to move into a technology-driven learning environment, the participants showed anxiety about carrying this responsibility without any support or training.

Resistance to change. Further delving into the teacher's concerns in teaching in the digital learning environment, Syed et al. [64] explain that faculty resistance can be a significant factor that can slow down the transition. Thus, it is important to understand what may cause resistance. The literature review reveals three key emerging themes: concerns relating to teaching practice [68, 2, 54, 56], technology-related [42, 12, 53], and institutional concerns [55, 61, 63] were prevalent among the causes of anxiety. Liu and Geertshuis [42] inform us that the teacher's resistance emerged from the change brought about by the technology rather than the technology itself. Thus, the success of the digital learning environment rests not only in the preparedness of the instructor but also in the ICT competency of the learner [26] and the degree of institutional preparedness to support the teacher [55, 61, 63].

Disparity in user experience. Interestingly, the literature review found only one study that identified the technology gap in the global south that significantly impacted the success of the shift. Vandeyar [66] recognises that, unlike in developed countries, power failures, a lack of network connectivity, and student apathy challenged the ability of developing countries to successfully transition into a digital learning environment in the wake of the pandemic. Such findings provide a deeper

look into the lived reality of HE institutions and teachers within these institutions, who now carry the responsibility of facilitating the continued operation of the HE institution.

From an institutional perspective, de Souza Rodrigues et al. [24] identify that in the sudden rush to transition into more flexible learning environments, there is a risk of losing students from traditional classrooms to eLearning due to the affordability of eLearning to students, thus reflecting an unforeseen, underlying effect of the instructional decision to move into technology-driven learning environments. This raises further concern about the potential behavioural impact on the learner as HE institutions consider the viability of blended learning as we enter a post-pandemic world.

3.5 A way forward

In light of these challenges, the literature presents possible ways forward in this new, complex reality. Among these recommendations, it must be highlighted that many rest in the hands of institutions. For instance, Akram [2] and Gunasinghe [28] argue that in order to facilitate the smooth transition into technology-driven learning environments, institutions must channel their attention to infrastructure development so that barriers to usage can be overcome. In their work, Huang et al. [30] and Bervell [12] recognise that creating an environment that fosters usage and encourages the use of educational technologies can encourage faculty to adopt educational technologies into their own teaching practices. Within this discourse, scholars [26, 40, 33, 46, 15, 61] advocate for institutions to develop policies and guidelines on usage to give practitioners clarity on the transition into technology-driven learning environments. To reduce anxiety and support usage, scholars [2, 42, 15, 56] recognise the value of training and skill development to equip teachers to bear the responsibility of instructor and facilitator in this new landscape. Meanwhile, scholars [26, 14, 53] posit that recognition, incentives, and rewards can be useful in encouraging adoption among faculty, thereby linking the effort put into the preparation for and implementation of the technology-driven learning environment to direct incentives provided for performance within their role.

4 DISCUSSION AND CONCLUSION

In this study, our interests lay in the teacher's experience in the rapidly changing HE landscape. The COVID-19 pandemic acted as a catalyst for HE institutions to shift from traditional classrooms to digital learning environments. Within this, technology played a leading role in shaping how HE institutions operated. As HE institutions around the world rapidly adapted to this controversial shift, the teacher was precariously handed the responsibility of making the technology-driven vision a reality. Thus, this research set out to examine two research questions by focussing on literature published during the pandemic: '*When the teacher/instructor is the subject of the study, how have teaching and learning technologies influenced their role?*' and '*What factors encourage/influence the teacher/instructor's acceptance of learning technologies?*'

The systematic literature review considered publications from 2019 (pre-pandemic) to March 2022 (post-pandemic to endemic) as a means of unravelling the acceptance of educational technology during the COVID-19 pandemic. We focus

our attention on the pandemic due to the unique climate it created and the rapid adoption of education technologies forced by the conditions of the pandemic at a global level.

The findings of the systematic literature review, which examined 53 studies focussing on the teacher's experience, reaffirmed observations made pre-pandemic in regard to technology acceptance, such as the effectiveness of perceived ease of use and perceived usefulness in encouraging adoption. However, we wish to highlight unique findings that we present as future avenues of research and considerations for practitioners as institutions negotiate the new normal for higher education.

First, our attention goes to factors that influence the teacher to adopt education technologies into their teaching practice. Among them, studies highlight the value of developing the individual's confidence in using a technology to develop autonomy in incorporating the technology into pedagogy [36, 39, 54, 61, 43]. To do this, recommendations are made towards developing professional development strategies [42, 15]. While these findings resonate with the large body of research surrounding self-efficacy and technology acceptance, these findings can be further explained by Straub [62], who describes technology adoption as a complex and inherently social development process through which individuals produce unique and malleable perceptions of technology that shape their decision to adopt technology. Thus, the recognition and reward of usage [26, 14, 53] and creating a culture within the institution that encourages and appreciates usage (see [30], [12]) can foster a social process through which teachers can develop positive attitudes towards adoption.

While usefulness and ease of use are broadly recognised as highly influential in developing adoption intentions, the findings by Aznar-Díaz et al. [9] highlight those technologies that are perceived as *useless* can have a negative impact on adoption. This raises interest in understanding how technology is perceived as *useful* and *useless* by teachers. Especially when the technology is enforced by the institution, the user's perception of its usefulness can be complex. Davis [22] and Davis et al. [23] describe perceived usefulness as the degree to which an individual finds that using a technology would enhance their job performance. Thus, in the context of HE, it can be argued that usefulness is twofold: how the technology may contribute to enhanced performance or productivity and how the technology usage may contribute to enhanced student performance. This provides direction to institutions as to how the usefulness of the technology can be made visible to the teacher. This again brings our focus to the value of rewards and incentives that link directly to performance improvement. However, such initiatives must be executed with care so that the teacher does not feel overwhelmed by institutional expectations.

Hedonic motivation, often prevalent in literature surrounding the learner's experience, presents an intriguing and often overlooked aspect of the teacher's experience. As reflected in extant literature [5, 37, 35], the HE learner's enjoyment when using a technology has been broadly explored in educational technology adoption and continuation. However, the teacher, who is also a user of the technology, is often not the central focus of such studies. Within the sample, we found only five studies that considered enjoyment in the case of the teacher's adoption of education technologies. While this presents an opportunity for further exploration, it also provides insight into how adoption can be encouraged through the technology itself. However, considering the context, it is necessary to strike a delicate balance between the enjoyment of the tool and how the tool fits in with the pedagogical expectations of the instructor.

The success of the implementation of educational technology is significantly affected by the availability and accessibility of the technology to users (both teachers

and learners). Therefore, as identified by Suleimen [63], the strength of the infrastructure can create positive perceptions guiding technology usage. Unlike the attention to the technological divide between developed and developing countries in learner-focused studies [6, 47, 44, 52], our review of literature revealed little insight into the teacher's experience in such an environment. Taking direction from Vandeyar [66], we encourage future research to explore the lived experience of teachers in developing regions as to how they accept and adopt education technologies as a way of contributing deeper insights into extant inequalities that may pose barriers to the transition into technology-driven learning environments. In this regard, it must also be highlighted those institutions, may it be governments, HE institutions, or third-party facilitators, have a great responsibility in undertaking infrastructure development to cater to the rising technical needs.

Emerging from the findings of this systematic literature review, it is evident that the successful adoption of education technology rests not only on the teacher or learner but needs to be facilitated by all stakeholders in HE. Therefore, as a way forward, it is recommended that, firstly, prior to the implementation and investment in education technologies, institutions carry out a needs assessment to understand the teachers' attitude towards education technologies in terms of purpose and value, alongside their concerns about embedding such technologies into their teaching practice as a way of unpacking causes of resistance. Secondly, it is integral to building institutional support and culture, such that it promotes and acknowledges initiatives taken by teachers to adopt innovative ways of T&L. This also needs to be supported by relevant guidelines and policies on how education technologies may be adopted in the HE classroom environment. Thirdly, steps must be taken to develop teacher confidence in and understanding of education technologies, such that education technologies can be purposefully embedded into pedagogy. Fourth, the work and effort put into pedagogy must be acknowledged and rewarded to motivate such initiatives. Finally, the successful implementation of strategies to adopt education technologies must also consider stakeholder involvement. As reflected in this study, the forced transition to education technologies does not necessarily guarantee the continuation of the adoption of such technologies in teaching practice. Thus, collaboration between institutional decision makers, policymakers, teachers, and learners are critical for the longevity of educational technology acceptance.

Finally, following the themes emerging from this systematic literature review, we recognise that while TAMs provides a measure of factors that may influence adoption, they often do not consider the lived experience when using the technology. In the case of the teacher, whose role is made more complex by technology, it is of interest to unravel how the teacher copes with the emotional labour and performance attached to teaching in a digital learning environment. We find value in studies such as Nyanjom and Naylor [51], Bodenheimer and Shuster [13], and Newcomb [49], who present fresh perspectives on the emotional labour attached to the role of teacher. We recognise that the consideration of the emotional labour attached to operating within the digital environment can be beneficial in understanding how attitudes and perceptions towards the technology may be shaped.

4.1 Further research directions

As mentioned previously, this study emerges from a wider investigation of technology acceptance in the HE sectors. It is evident that the literature on teachers' experiences in the context of COVID-19 is substantially limited compared to that

of learners' experiences. As a result, the understanding of the teachers experience in such forced emergency conditions is underdeveloped. Furthermore, this study finds that the shift to technology-driven learning environments has a significant impact on the teacher's role. Thus, future research can benefit from expanding on the conceptualisation of the education technology user to accommodate the lived experience of the teacher. While this study has drawn on the landscape of COVID-19 to illustrate how teachers adapt to the institutional decision of transitioning into educational technologies, future research can benefit from longitudinal studies that examine the continuation of use in post-emergency conditions. Finally, as presented in this study, there is a significant disparity in experience between users in the global north and the global south. Thus, studies that examine the social structures that shape the lived realities of both the learner and the teacher can be fruitful for policymakers.

4.2 Research limitations

Having conducted this systematic literature review, we recognise that certain limitations may affect the findings presented in this study. Firstly, this study emerges from a broader study on technology acceptance and adoption during the COVID-19 pandemic. Therefore, the sample considered in this study was a subsect within the broader sample that used the search strings TAM OR *Technology Acceptance Model* AND HE OR *Higher Education* during the period from January 2019 to March 2022, when the review was conducted. We acknowledge that a systematic literature review focused on the teacher experience using a different variation of keywords and an extended period beyond March 2022 may return a broader sample size. Secondly, the study exclusively used the Web of Science as the search database. A further development of this study would be to expand into other databases, such as EBSCO, to expand the sample results.

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