

Beyond technology use: A people-centred approach to reconceptualising the adoption of learning technologies

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Key contributions

- Multiple factors have been identified as predictive of technology adoption, but the notion of ‘technology adoption’ has been treated as equivalent to technology use, which is technology-centric.
- Following a people-centred approach, this study explores the experiences of technology adoption by academics and thereby contributes to the notion of adoption-as-process; the findings show that adoption is laden with emotional experiences, learning experiences, performance experiences, and experiences of incongruence in teaching space.
- To facilitate individual adoption, the study calls for institutions to shape emotional responses, provide authentic and safe environments for learning, scaffold performance, and coordinate change initiatives to align new technologies with existing teaching policies and practices.

Abstract

Research into learning technologies has identified predictive factors of individual adoption. However, this research largely assumes technology adoption-as-use, which, I argue, is technology-centric and disregards the role of teachers and their teaching practice. Following a people-centred approach, I sought to focus on teachers’ experiences during technology adoption and in doing so contribute to the notion of adoption-as-process. I undertook interpretive phenomenology research, conducting semi-structured interviews with a group of seven academic teachers in a New Zealand university where a new learning management system (LMS) was implemented following an institutional-wide LMS review. I analysed the interview data using a reflexive thematic analysis method. The findings indicate that technology adoption is more than technology use; it is laden with emotional experiences, learning experiences, performance experiences, and experiences of incongruence in teaching

space. To facilitate appropriate individual adoption, the study calls for future research to focus on adoption-as-process and institutional practice to address emotional responses, enable learning in safe and authentic environments, scaffold performance, and align existing policies and practices with new technologies.

Introduction

Learning technologies refer to digital technologies that are used to support teaching and learning (Oliver, 2000). Higher education institutions across the world are implementing learning technologies in an attempt to enhance the quality of education while allowing them to operate more efficiently and effectively in increasingly challenging global, social and economic contexts (Alexander et al., 2019). Despite the widespread institutional implementation, the technologies are not readily adopted by teachers (Liu et al., 2020), and many institutional-wide learning platforms are underused by teachers (Koh & Kan, 2021).

Research has been carried out to investigate why or why not teachers adopt learning technologies. Studies following versions of the technology acceptance model (Davis, 1989; Venkatesh et al., 2016) or innovation diffusion theory (Rogers, 2010) explain technology adoption as being influenced primarily by utilities of the technology, including, for instance, ease of use and usefulness of the technology (Chang et al., 2020; Scherer & Teo, 2019). Studies in education recognise the role of a teacher's knowledge, skills and attitudes, and identify conceptions of teaching, approaches to teaching, and technical competence as predictive of individual adoption (Lai et al., 2022). Other studies have expanded to considerations of institutional context and shown that individual adoption is influenced by multiple individual, institutional, strategic, and technological issues (Lai & Jin, 2021; Lavidas et al., 2022).

While insights can be gained in terms of *what* shapes technology adoption, the understanding of *adoption* itself, or in other words, what constitutes the phenomenon of technology adoption, appears limited. The existing literature portrays technology adoption as equivalent to technology use (Scherer & Teo, 2019), and constructs such as 'intention to use' (Utami et al., 2022), 'frequency of use' (Park et al., 2007), and 'period of use' (Renda dos Santos & Okazaki, 2016). These are widely accepted as indicators of adoption. These measures allow a quick assessment of technology uptake, however, as Burton-Jones and Straub (2006) pointed out, they are lean measurements that focus solely on the tool (the technology), disregarding the task (teaching and learning) and the user (the teacher). Daily access to an online platform

to upload files could be viewed as having the same or higher level of adoption than weekly access to the platform to engage students in more sophisticated pedagogies such as online discussions and collaboration. Some studies do recognise the qualitative differences in the way teachers use technologies. They report instances of using technologies for delivering, facilitating, enriching and transforming learning (Lai & Jin, 2021; Liu & Geertshuis, 2021), which resonates with the work of Kirkwood and Price (2014), showing that technologies may be used to replicate, enhance or transform educational practice. However, these studies still reduce the concept of adoption to a set of variables that reflect adoption-as-use (Table 1), which do not capture the whole human experience of technology adoption.

Table 1

Concepts of Technology Adoption-as-Use

Adoption-as-use concepts	Explanation	Example references
Intention to use	How likely is a teacher to use technology	Utami et al. (2022)
Frequency of use	How often a teacher uses technology	Park et al. (2007)
Period of use	How long has a teacher been using technology	Renda dos Santos and Okazaki (2016)
Use for enrichment	To provide authentic learning resources	Lai and Jin (2021)
Use for transformation	To enable student-centred and active learning	Drent and Meelissen (2008); Lai and Jin (2021)
Use for information delivery	To provide content, instruction, and administrative tasks	Lai and Jin (2021); Liu and Geertshuis (2021)

Measuring quantity of use and identifying different ways of use are essentially technology-centric: adoption occurs when there are instances of technology use. Instances of change in teachers and their pedagogical thinking and practice are overlooked. The reliance on a technology-centric approach may explain in part what we know and what is unclear in terms of facilitating teachers in adopting learning technologies. The literature provides descriptions of desirable technological artefacts and technical competences, which are linked to the use of learning technologies; there are limited insights into the process by which individual teachers learn about a learning technology, develop their thinking and skills and establish new ways of teaching with

the technology (Liu et al., 2020). The problem with a technology-centred approach is that, although it is limited, it has had a major influence on how institutions have chosen to support technology adoption. I argue that in addition to a technology-centric approach that focuses on use, we need to inquire into the process of adoption.

A people-centred approach (Greenhalgh et al., 2004) to adoption appears to focus on process and allow a more nuanced understanding of the teachers and their practice. A people-centred approach has been described as being able to recognise the agency of the adopters who ‘...seek innovations, experiment with them, evaluate them, find (or fail to find) meaning in them, develop feelings (positive or negative) about them, challenge them, worry about them, complain about them, “work around” them, gain experience with them, modify them to fit particular tasks, and try to improve or redesign them – often through dialogue with other users’ (Greenhalgh et al., 2004, p. 598). With a focus on people, this approach expands adoption-as-use to adoption-as-process, which encompasses a range of experiences through which an individual engages with a technology.

Studies in several disciplines have sought to better understand the adopter in the process of innovation adoption. Information systems researchers have been calling for greater focus on people, their identities and practice in explaining adoption, arguing that the relationship between an individual and a technology should be the core of research (Thompson, 2012). Similarly, marketing researchers have long established the notion of extended-self (Belk, 1988), describing adoption of new products as the process of self-extension, by which an individual exercises control over, creates ownership of, and develops intimate knowledge of their possessions. Recent developments in product innovation have further shown that innovative technologies are not readily accepted but co-created by customers in the adoption process (Mahr et al., 2014). In education, research has examined the link between identity and teachers’ reaction to change initiatives (Hoyle, 2012). Aspects of professional identity, including agency (feeling in control), sensemaking (interpreting an innovation based on existing knowledge, beliefs and experiences), and ownership (feeling being the owner of an innovation) have been reported to shape responses to curriculum innovation (Ketelaar et al., 2012). Irrespective of the discipline or field, research following the concept of adoption-as-process generally shows that innovations are not fixed artefacts delivered to adopters (e.g., users, customers, or teachers). Instead, when introduced to adopters, innovations are explored and co-constructed by adopters.

In summary, conceptualising adoption-as-use reflects a simplified technology-centric view of adoption. It does allow for the identification of factors predicting technology use, but the understanding of technology adoption needs to be extended. A people-centred approach recognises adoption-as-process by which teachers reconstruct meaning through ongoing practice and experience. With a focus on people and their practices, this approach can provide insights into how teachers engage with technology, and therefore, allow for appropriate facilitation by institutions during the adoption process. To this end, the present study explores teachers' experiences of learning technology adoption and in doing so contributes to a concept of adoption-as-process. Specifically, the research question, *what are the experiences of learning technology adoption by university teachers*, guided the investigation.

Method

Research design

Phenomenological research focuses on understanding human experiences and acknowledges the active role of researcher in the interpretive process (Tuffour, 2017). Given the study aim and the research question, I followed this research approach to identify and describe the experiences during learning technology adoption.

Study context and the researcher

The present study was a follow-up study, serving as part of a longitudinal research project that investigated the adoption of learning technologies in higher education. The research project took place in a research-intensive university in New Zealand, where a new market-leading, cloud-based learning management system (LMS) was implemented top-down to replace an existing in-house LMS that was built decades ago. The project obtained institutional approval. During the institutional implementation, I worked as a LMS facilitator in a faculty with more than 200 staff members. My work involved designing and delivering workshops, providing one-to-one support, and developing learning resources to help faculty-based staff transit to the new LMS. This work required me to collaborate regularly with staff, but I was not involved in managing staff performance or approving the quality of online courses in the LMS. Therefore, it was unlikely that there were power differentials between my role and the staff I served. With this insider and practitioner role, I undertook the investigation in mid-2017, 14 months after the initial rollout of the LMS, by which time the university had just completed the institutional implementation and academic staff in the faculty had used the LMS for teaching regularly for three semesters.

Participants

The study participants were a group of seven academic staff who were selected as champions of LMS adoption within the faculty. The group learned about and used the LMS ahead of the rest, served as departmental contacts, and had regular meetings with LMS facilitators, including me, to convey departmental needs and feedback. The group also took part in a previous study within the scope of the research project where they shared their initial experiences regarding LMS adoption. I invited this group to participate in the study because its members had substantial experience of LMS adoption, were able to provide insights into their own lived experiences and were aware of the progress of LMS adoption within their own departments.

All seven academic staff participated in the study. They represented the departments within the faculty, all had more than five years' experience at the university, and they were familiar with the previous in-house LMS. To protect participant identities, pseudonyms were used. Four participants (Alex, Bob, Fiona, and Gary) were in teaching-focused roles. Three participants (Chris, Dave, and Ethan) had both teaching and research workloads.

Data collection and analysis

I sent an email invitation to each of the participants and conducted semi-structured interviews on a voluntary basis. Given that this follow-up study was small scale and considered low risk, with the purpose of looking into staff experience in order to improve support service within the faculty, informed consent was obtained verbally before the interviews. Each interview was around 45 minutes in length and was recorded and transcribed. Interview questions revolved around the current experiences of the new LMS, changes in teaching practice, challenges encountered, and support needed (see Table 2). I analysed interview data using reflexive thematic analysis (Braun & Clarke, 2021) to leverage my experience with facilitating LMS adoption. As such, I acknowledge that the analysis was influenced by my situated understanding of LMS adoption within the faculty over a period of 14 months.

In terms of coding and theme identification, I familiarised myself with the interview data first through transcribing the audio-recordings. The transcription process focused on capturing the meaning of participants' descriptions during the interview. I then read the transcripts over an extended period of time and kept annotations and initial ideas on the transcripts. Next, I imported the transcripts to Nvivo12 and coded them one by one. This initial coding process kept the codes at the semantic level to retain the

participants' perceptions. In total, there were 41 codes. An exemplar code was 'frustration', which recorded four participants' descriptions of LMS adoption as a frustrating experience. Third, I grouped and collated the codes into potential themes, with each capturing one type of experience. Codes such as 'frustration', 'annoyance', and 'disappointment' were merged into a theme that describes adoption as emotional experience. At the end of this analysis phase, five preliminary themes were identified. Then, I reviewed my analysis to ensure that the themes represented the codes, and the codes were supported with adequate data extracts. During this phase, I decided to merge one preliminary theme, 'adoption as problem-solving experience, with the theme, 'adoption as performance experiences', because the number of codes under the former theme was small and the codes were largely about problem-solving being effortful, which influenced teaching. Finally, I checked the remaining four themes to ensure they captured the interview data as a whole and defined the themes, and I selected illustrative extracts.

Table 2

Interview Guide

Questions

1. You have used [The LMS] for several semesters, how is your experience with [The LMS] now? OR how has your experience been?
 2. How do you feel about [The LMS] now?
 3. Have there been any changes or improvements in using [The LMS] since the initial rollout?
 4. How has [The LMS] changed (or not) your teaching? How has [The LMS] changed students' learning?
 5. What are the challenges in using [The LMS] and integrating it into your teaching?
 6. How has the support been going so far? Is there anything that needs to be improved?
 7. Any other comments?
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Findings and discussion

My analysis identified four themes, each describing one cluster of experiences that participants encountered during LMS adoption.

LMS adoption as emotional experience

This theme captures LMS adoption as emotional experiences in which participants developed feelings towards the LMS based on how they engaged with it. In general, it seemed that, after 14 months of the initial adoption, staff gradually accepted the LMS. For example, Gary reported that 'people are fine with [the new LMS] especially after one year of using it.' Similarly, Alex concurred that he has not 'heard much' about issues with the LMS this year, whereas last year he 'heard a lot'. This gave Alex the impression that his colleagues 'have built up a bit of knowledge on how to do things.'

However, the overall acceptance of the LMS does not mean that individual adoption is emotion free. All participants reported specific scenarios that were emotionally charged, with 'frustration', 'annoyance', 'worry', 'disappointment', and 'pain' being mentioned. For example, when Fiona described the changes in marking process, she felt that 'previously it was quite easy to manipulate the grades... but now it's changed and caused more frustration.' Similarly, when Chris tried to 'figure out' technical problems in the LMS, 'it took (him) quite a while... and was annoying.'

Although there were variations in the words chosen to describe emotional responses, it was common that the words mostly reflected unpleasant experiences. The experiences could be a minor discontent, 'we just do it and have a little mutter' (Alex), or a major concern, 'a lot of people felt the nerve wrecking when releasing final marks' (Gary).

In contrast, descriptions of pleasant experiences were scarce and were detached from specific LMS adoption scenarios. In a way similar to how Gary and Alex described the overall acceptance of the LMS above, Ethan and Chris expressed their overall adoption of the LMS as good. For instance, 'I like [the new LMS]. Overall, it is better than [the previous LMS]' (Ethan). However, the description quickly shifted to 'pain in the neck' the moment Chris talked about how they learned to use the LMS.

My experience with [the new LMS] is pretty good because I used to be very good at [the previous LMS]. To me it's a little bit of a pain in the neck, because I had to unlearn my [the previous LMS] stuff. (Chris)

The analysis above shows that technology adoption was an emotionally charged process. From a socio-cultural perspective, emotions are triggered by contextual demands and reflective of individual adaptation and coping strategies (Lazarus, 1991). The presence of emotions in the present study is therefore an indication that

participants were agentic, rather than being indifferent, in appraising and making sense of the LMS. However, given that the most pertinent emotions expressed were negative and indicative of stress, the LMS was likely to be perceived as intrusive by participants. Such a perception may be caused by a view of the technology being a poor fit for the task (McGill & Klobas, 2009) or reflective of the workload for many university teachers (Houghton et al., 2015). Regardless of the cause, existing research shows that emotions regulate how individuals, including teachers, engage with technologies (Beaudry & Pinsonneault, 2010; Naylor & Nyanjom, 2021). This is consistent with the idea of LMS adoption as emotional experience and points to the importance of recognising emotional responses as an integral part of technology adoption.

LMS adoption as learning experience

In the last quotation above, Chris indicated that LMS adoption was painful because he had to learn about the new LMS from scratch. This experience of adoption as a learning process was shared by all participants. When asked whether there was a pedagogical improvement since the introduction of the new LMS, participants reported that ‘people are not doing anything too flash’ (Gary), because ‘people are still learning and don’t know how to use the more advanced features’ (Fiona).

Sometimes, the complexity of the LMS itself was seen as a challenge. For instance, ‘I have to spend some time to work out what the screen is telling me... the description... it is not the English as I understand’ (Bob). In other cases, infrequent use of certain LMS features, ‘only do it once a year’ (Alex), meant that learning was likely to take a while.

Despite the shared narrative of adoption as a learning process, there were differences in the motivation to learn. For instance, Ethan felt that learning to use the LMS was not incentivised by the university, which led to some people not wanting to learn to use the LMS.

There is fixed cost to learn... I told myself, this is going to be there, and I have to learn. Unfortunately for some people, they don’t. They just run away from it. (Ethan)

By contrast, Bob described student expectation as a driver of (or a reason not to continue) learning to use the LMS.

I don’t think the students are minding too much because this was raised at staff student consultation. ‘Have other people got things we should probably

be using?’ And students said, ‘well we are happy with what we got.’ So, we take some comfort from that. (Bob)

The differences in preference for learning were also widespread. For Alex, whose discipline was on information technologies, learning occurred through ‘a bit of testing... and figuring out new ways to do things.’ For Chris, who described himself as a proficient user of the previous LMS, ‘a help guide pinned on the wall... structured chronologically and by areas of setting-up a course’ would serve to allow for self-directed learning. However, for participants who might not necessarily see themselves as technical experts, a clear preference for direct guidance was expressed.

I don’t really like to read manuals. I just like someone to show me... if someone hadn’t showed me, I think I will still be struggling (Fiona); I have to have my hand-held preferably by someone... who can basically make sure that I have not screwed it up. (Bob)

In addition, the benefit of learning from colleagues was noted. Here, learning was not so much about developing technical knowledge as about recognising opportunities and learning from others’ practices.

There is a lot of things to learn from crowd wisdom... Sometimes people who have done these little things might not even think that these were worth mentioning. But for other people, they might think that's a good idea. (Alex)

Finally, the differences in preference for learning seemed to be related to tolerance for mistakes during learning. For instance, Alex regarded learning to use the LMS as ‘worth the risk’ and therefore began experimenting with ‘a back-up plan’. Bob on the other hand was reluctant, as there was ‘more scope to make mistakes.’ Interestingly, tolerance for mistakes was not described as a stable individual trait. Instead, it was framed as context-dependent. When teaching was high-stakes, namely in large classes or with junior students, participants were less likely to learn through testing and experiments.

You don’t want to experiment on 400 students in a class. If you alienate 400 people in the lecture, it's going to take you four weeks to get them back on sign (Bob); Especially in first year, we are really risk averse. Third year, I am happy to experiment... (Alex)

Learning to use technologies clearly took time and participants described different motivations and preferences for learning. Of interest here is that although the

interviews were conducted 14 months after the initial LMS implementation, participants were still learning to use the LMS. This could be an issue specific to LMSs that are designed to host different teaching and assessment activities. Technologies that focus on one type of activities may arguably take less time to learn. However, the findings clearly indicate that learning may not be accomplished in a series of workshops (Wu et al., 2015). Instead, it is an iterative process involving trial and error and ongoing problem-solving, which occurs alongside teaching practice. The findings also confirm that teachers have different motivations and preferences for learning and that such preferences may be related to prior experience with technologies (Zheng et al., 2019). Nevertheless, the findings further suggest that such preferences may be related to tolerance for mistakes and that tolerance for mistakes is dependent on the context of teaching. When teaching is high-stakes, learning to use new technologies is less likely to occur and would require a safe environment for experiment.

LMS adoption as performance experiences

Using a new LMS for teaching means that teaching is mediated by the LMS. Technology-mediated teaching means that teachers have to recognise the influence of learning technology and that of students during teaching. Participants in the study experienced teaching that was mediated by the new LMS as an initial inability to perform, where the LMS was perceived as disruptive, leading to the loss of self-efficacy, at least temporarily. For example, Chris expressed a loss of self-efficacy, where he used to be able to ‘do stuff without talking to anybody’ in the previous LMS, he now felt ‘not familiar with how everything works.’ This experience was echoed by Ethan, who complained that the LMS was ‘making us not do certain things which we used to be able to do... that is a major issue!’ The loss of self-efficacy, on the other hand, ran counter to the need for maintaining a competent image in front of students, as Alex put, ‘in our discipline, if we stuff something up with computers, we are seen incompetent with our teaching.’

The feeling of inability to perform stemmed from trying to complete a range of teaching activities with the LMS, including identifying and communicating with students, setting up assessments, marking, and providing feedback. For instance, the quotation below describes an occasion when Chris was unable to communicate with students effectively via the LMS.

I got an email reminder from [the new LMS] saying there was a comment... I could not find the comment. Maybe the student deleted it afterward. I don't know. I was like, ‘oh I don't want to not answer but I cannot find it’. I don't

know for sure if it was a LMS issue or it was the student... It is unsettling... nothing you could do about it. (Chris)

In addition, solving technical problems independently when using the LMS was often time-consuming and might not always be successful, as Ethan characterised, 'it would be so good if I can solve the problem this time for this semester because it saves me time. I wasted 2 hours fixing the problem (last semester) but (it is) not working.'

The analysis in relation to the initial inability to perform showed how introducing learning technologies created a loss of self-efficacy. This finding may indicate a gap in between how learning technologies are framed in the literature and how teaching staff adopt them. Technology adoption research seems to have a pro-technology tendency, framing technology as opportunities for improvement (Caldwell, 2018). Difficulties in engaging with technologies may be under-documented or assumed to be resolved through the provision of training and support. In organisational studies, the issue of performance dip, that is, the initial drop of performance since the introduction of organisational change, was well established decades ago (Elrod & Tippett, 2002). The finding in relation to loss of self-efficacy indicates that teachers are likely to go through a similar performance dip, not only in relation to the immediate teaching activities but also in terms of how they view themselves and their competence.

LMS adoption as experience of incongruence in teaching space

Introducing a new LMS brings changes to teaching and learning activities, and some of the changes may be incongruent with existing tools, conventions, and policies, which created confusion and dilemma that were beyond the capacity of an individual teacher to address. Participants reported incongruence between the new LMS and existing learning technologies, which hindered their adoption of the LMS. For instance, Dave initially thought that 'the new LMS would allow for integrations with Turnitin and Piazza, which were one of the big pluses.' However, when he realised that these technologies could not be fully integrated, he commented, 'I'd almost go right to Turnitin old-school and tell students to go to Turnitin directly and not even to deal with [the new LMS]. I just don't see the upside of [the new LMS].'

The incongruence between the LMS and wider teaching practice was also noted by some participants. For Bob and Gary, this was captured as the difference between what student information was recorded in the LMS and what was needed by staff. Bob recalled cases where the order of student names on the class list was inconsistent with

that in the LMS, which, in large classes with hundreds of students, ‘was really annoying, (because) it just slowed you down...it was just clunky for us.’ For Ethan, the experience of incongruence was related to the failure to reuse learning resources created in the LMS in other teaching contexts.

I cannot export the quizzes I created... if I create quizzes in [the new LMS], I could not print these quizzes out... [the LMS] does not support you (me) to link what you (I) do with other aspects of teaching practice. (Ethan)

Finally, the experience of incongruence was further identified as a lack of recognition of LMS-related issues in teaching-related policies. The absence of explanation of intellectual rights discouraged Chris and his colleagues from using the LMS. Chris said, ‘the more we engage with [the new LMS], the more we spent our wisdom into the system, and it can go into somebody’s...’ And the fact that the LMS had little presence in teaching evaluation and promotion processes signalled to participants that LMS adoption was not valued.

If I want to get promoted... I don’t need to do any of this. I just need to get my smile at my evaluations, above 80%. The only people that will take up are the people who have teaching in the heart...but, you know, a lot of people are not like that. (Chris)

Forget about the teaching evaluation by the students, because teaching evaluation does not take [the new LMS] into account... people know spending time with [the new LMS] does not get them good evaluation... (Ethan)

Interestingly, although experiences of incongruence were seen as challenges to enact teaching in the new LMS, there were differences in how participants chose to respond to the challenges. Alex chose to ‘continually to nag about that (issues related to the LMS) at the university level meeting...to keep putting pressure on.’ Dave, on the other hand, felt ‘no longer have time to deal with this to make things happen,’ as ‘there is nobody in central that is developing local tools to address some of the problems emerged in the process of adoption.’

The inconsistency between existing tools, practices and policies, and a new technology shows that learning technologies are embedded in a complex activity system, where certain ways of teaching are reinforced by policy directions, existing practices, and tools. Therefore, attempts to shift teaching practice through the introduction of new

technologies are unlikely to succeed if these policies, existing practices, and tools are unchanged. This finding would suggest that developing expertise may help teachers adopt technologies but is only likely to the extent that teaching enabled by new technologies is compatible with existing policies, practices, and tools. This is probably particularly relevant to many institutional practices, as much effort on facilitating adoption has been on developing staff (Clark & Boyer, 2016; Wilson, 2012), rather than on adjusting policy expectations, shifting existing practices, redeveloping current tools, and localising new technologies.

Reconceptualising learning technology adoption-as-process

The themes have shown that adopting a LMS that was implemented top-down was laden with emotional experiences, learning experiences, performance experiences, and experiences of incongruence in teaching space. Together, they suggest that viewing adoption-as-process is instrumental in extending the current thinking. Admittedly, the issue of technology adoption is by no means new. Studies have identified multiple factors that are influential on the adoption of learning technologies (Liu et al., 2020). However, most studies assume technology adoption as an outcome, operationalised and measured in various forms as technology use (Scherer & Teo, 2019). Considerations of adoption process are infrequent, and human experiences during adoption are reduced to a set of outcome indicators. The present study shifted the focus from adoption-as-use to adoption-as-process, describing the human experiences during adoption rather than predicting the outcome of adoption. There have been attempts to theorise the adoption process, although rather limited in scope and not necessarily focused on technologies. For example, the concerns-based adoption model (Hall, 2010) explains teachers going through seven stages of concerns including awareness, informational, personal, management, consequence, collaboration, and refocusing, in order to adopt a curriculum change. Innovation diffusion theory, on the other hand, describes five stages of adoption decision, which include knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2010). Both theories have in common the notion of adoption-as-process discussed in the present study: they all aim to unpack how individuals engage with change and innovations. However, these two theories focus on the cognitive process. The concept of adoption-as-process captures the whole human experience, including but not limited to the cognitive process. Here, human emotions, learning, changes in teaching practice, and the interpretations of and responses to the change are recognised as being integral to technology adoption. In addition, both theories imply technology adoption is a linear process. The concept of adoption-as-process does not make such

an assumption. It recognises technology adoption as a phenomenon that consists of different human experiences simultaneously. This concept provides a renewed and enriched understanding of how learning technologies are adopted, which acknowledges adoption as complex, focuses on the teacher (adopter) and their practice, and unpacks the process.

The four themes identified were not separate from each other. Descriptions of annoyance, pain, and frustration were related to descriptions of problem-solving being effortful, current performance being inadequate, and the LMS running counter to policies, existing practices, and tools. Previous research has established that emotion, learning, and self-efficacy are all part of teacher identity (Beijaard et al., 2004; Hong, 2010) and that individuals engage in behaviours that are congruent with their existing identities (Oyserman, 2009). It therefore seems that the confluence of the four themes could be explained by the notion of teacher identity. Research (Conroy & O'Leary-Kelly, 2014) has shown that transition through changes, such as the implementation of a LMS, is an identity reconstruction process where individuals separate themselves from the old self and practice, transit through ambiguity, and establish the new identity and practice. Such a description fits well with the notion of adoption-as-process: adopting the LMS could be viewed as an identity phenomenon, and participants in the present study were in the transition phase where they navigated through ambiguity and tried to make sense of the new LMS. It also seems that, at least in the context of the present study, individual adoption and institutional implementation occurred along different timelines. The completion of institutional LMS implementation by no means indicated a completion of individual adoption.

Conclusions

In this study, I sought to identify and describe university teachers' experience of learning technology adoption, and in doing so contribute to the idea of adoption-as-process. Interviews with a group of teachers who had recently championed the adoption of a new LMS showed that technology adoption was laden with different human experiences. This finding confirms that technology adoption can be understood as a process in addition to an outcome.

Overall, the study contributes to the research literature by demonstrating that adoption-as-process is a theoretically rich construct which captures the human experiences during adoption. This is in marked contrast to the dominant view of adoption-as-use, which equates adoption as the use of technical features. Acknowledging adoption-as-

process necessarily shifts the focus from technology to the adopter, and therefore, the findings from the study have practical implications for higher education institutions that seek to facilitate staff take-up of learning technologies. First, given that technology adoption is more than the use of technical features, institutions should support staff beyond the provision of training and workshops that are designed to develop technical expertise. Instead, recognising and shaping the emotional journey is likely to reduce difficulties and nurture enthusiasm towards new technologies. This could be realised through addressing staff feedback on a regular basis, designing implementation plans that take into consideration staff workload and wellbeing, and celebrating staff achievement and initiatives. Second, professional development should be informed by an understanding of how staff learn. For instance, enabling learning in a safe environment that is embedded in real teaching contexts would seem effective in facilitating adoption. Third, institutions should set realistic expectations regarding staff performance during initial adoption, anticipate disturbance, and scaffold performance within an extended period of time. Finally, coordination of change initiatives should demonstrate clearly and communicate effectively how policies, existing practices and tools are maintained, adapted, or no longer expected, in order to effectively shape new teaching practice during technology adoption.

The study also identifies several avenues for future research. The investigation took place in one faculty of a New Zealand university where a LMS was implemented top-down. Future research could investigate the process of adoption of other learning technologies, and in a voluntary rather than a top-down implementation context. In addition, the emotional experiences reported were largely negative, followed by loss of self-efficacy and sense of incongruence. Positive emotions, enhanced self-efficacy, and a sense of congruence were not captured in the study. This could be that, as discussed above, participants were still transitioning between the old and the new LMS. Future research may take a longitudinal approach to examining the experiences of adoption when new identities and practices have emerged. Third, this phenomenological study draws on researcher positioning and reflexivity as the source of interpretation rather than bias (Varpio et al., 2021). Future research may consider alternative approaches to examine the construct of adoption-as-process and compare the antecedents of adoption-as-use with those of adoption-as-process. Finally, the study took place before the COVID-19 pandemic. It could serve as the baseline for future explorations into technology adoption under emergency remote teaching situations. Given that technology adoption happened in a rather limited period of time

during the pandemic, teachers' experiences would likely be more intense than reported in this study.

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Conflict of Interest Statement

None.

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