

Re-thinking LMS change: Designing authentic learning environments to improve lecturers' digital literacy

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This paper reports on a qualitative evaluation of the first phase of an iterative, university-wide process of transitioning all units of study into a new Learning Management System (LMS). Lecturers in charge of the first group of units undergoing transition were interviewed, the goal of this being for their experiences of the process to inform its next stages, which would involve larger unit cohorts. The change process was designed with the principles of the authentic learning environment at its core and had academic professional development in digital literacy built in into its design, in hopes of enabling sustainable and scalable teaching transformation. The evaluation sought to ascertain how lecturers experienced the process of LMS change in the context of their teaching. Recommendations are offered pertaining to the change process design elements that promise to enhance lecturers' digital literacy and inspire teaching transformation.

Introduction

Timely upgrades and even complete renewals of LMS are necessary to keep these systems up to date, ensuring a consistently high-quality experience for all users. University-wide technology change, however, is a complicated endeavour. It needs to be approached with utmost care, and involve long-term planning and robust stakeholder consultation. This is especially important, considering there are reported instances of lecturers developing a problematic relationship with educational technologies and with wider technological change and innovation discourses (Blin & Munro, 2008; Liu & Pechenkina, 2017; Lokuge Dona, Gregory, & Pechenkina, 2017; Mahdizadeh, Biemans, & Mulder, 2008). These and other studies highlight how lecturers may, at best, be sceptical of various educational technologies and use them begrudgingly or be openly hostile toward them at worst. However, educational technologies and constant technological change are unavoidable aspects of academic experience today. Therefore, it is important to understand what works well and what does not work when a university engages in a large-scale change process involving such widespread technological platforms as LMS. Addressing the conference's sub-theme of "Improving Digital Literacy", this paper takes a reflective look at an institution-wide educational technology change process taking place in a mid-range Australian university.

Guided by the authentic learning environment principles (A. Herrington & Herrington, 2006), the first phase of the LMS change process described in this paper involved engaging a small group of university lecturers in a pilot, which comprised a series of training activities contextualised within the lecturers' teaching needs, and responsive to their experiences and expectations. The pilot brought together learning designers, educational technologists and technical transition officers to guide the participating lecturers in learning the functionalities and teaching affordances of the new LMS. The purpose of this pilot's evaluation was twofold. Firstly, as the process was iterative, it was tasked with identifying the effective elements, as well as drawbacks, of the change process before embarking on its next phases involving bigger unit cohorts. Secondly, it endeavoured to measure whether the process served as a catalyst for teaching transformation, and if yes, what forms did this transformation take. By placing the authentic learning principles at the core of this LMS change process, a special kind of professional development environment was created for the participating lecturers, ensuring their engagement in all stages of the process.

LMS and user experience

Used throughout universities to enable online and blended teaching and learning, LMS are also widely utilised as digital repositories of learning materials as well as interactive platforms, where self-regulated learning, assessment and collaborations can occur (Garrote & Pettersson, 2007). Despite LMS being widespread, some lecturers may not engage with these systems fully due to lack of time, insufficient training and support and other factors (Garrote & Pettersson, 2007; Lyall et al., 2017; Masterman, 2017). Moreover, lecturers may not want to engage with educational technologies as a whole, LMS included, for various reasons (Blin & Munro, 2008; Liu & Pechenkina, 2017; Lokuge Dona et al., 2017; Mahdizadeh et al., 2008). However, the use of educational



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technologies is an unavoidable part of contemporary academic experience. Because of that, there is a need to engage, train and prepare lecturers to embrace LMS capabilities fully.

Among the obstacles to lecturers' engagement with LMS is lecturers' perception of the "[required] initial amount of work compared with the expected benefits" (Garrote & Pettersson, 2007, p. 327), suggesting a pragmatic attitude lecturers may exhibit in regards to time they think is required to learn how to use LMS. This attitude persists even if lectures are overall optimistic about LMS benefits to teaching and learning. As Lyall et al. (2017, p. 304) finds, the LMS becomes "a site of tension that is not easily resolved" because a multitude of users, agendas and functions collide within an LMS, at times leading to confusions. Any inconsistencies in how lecturers use LMS may lead to dissatisfaction among students (Masterman, 2017). Developing such resources as minimum standards, best practice guidelines, and templates can be a solution, but sustainability of such approaches remains an ongoing concern (Masterman, 2017).

To help lecturers thrive during a major university-wide educational technology change, such as LMS renewal and replacement, Westberry, McNaughton, Billot, and Gaeta (2015, p. 101) argue that lecturers "need a clearly communicated plan that provides scaffolding through the transitional stages", while Zanjani, Edwards, Nykvist, and Geva (2016) urge to take into account lecturers' teaching preferences and habits when designing LMS training. The latter is especially important because even when lecturers' perceptions of LMS are positive, the lack of appropriate and ongoing training may negatively affect their acceptance and usage of the system's more advanced features (Coleman & Mtshazi, 2017).

Therefore, creating a productive learning space in which tailored and timely professional development supports lecturers through LMS change is important. Authentic learning principles emerge as a relevant framework to the change process's design and implementation of digital literacy for lecturers, as argued next.

Authentic learning and professional development for lecturers

The LMS change process described in this article was informed by the core elements of the university's new future student experience, which positions support for teaching staff as a principle underscoring all other organisational change. In practice, this entailed the change process be positioned as an opportunity for teaching enhancement, rather than simply a technical 'lift and shift' exercise. To provide an evidence-based rationale for the change process, authentic learning environment principles were drawn on when structuring the various stages of the process and designing learning activities for participating lecturers.

Defined by "real-problem contexts", authentic learning occurs in "real-life settings" and draws on "situated learning approaches" and similar pedagogies, with dynamic collaborations and experiential experiences at its core (A. Herrington & Herrington, 2006, p. 3). As proposed by J. Herrington and Oliver (2000), key characteristics of authentic learning include:

- Learning context reflects real-life knowledge
- Learners are given access to expert performances and exemplars
- Learning design allows learners to experience multiple perspectives on the same issue/problem
- Knowledge is constructed in collaboration
- Opportunities for reflection are built into the learning process
- Learners are empowered to articulate their knowledge
- There are opportunities for coaching and scaffolding
- All evaluation and assessment is seamless and aligned with learning activities

A subfield of scholarly literature focussing on the effective design of professional development for lecturers indicates that flexibility, customisation options and the relevance of the learning experience to lecturers' teaching needs have been instrumental to the successes of initiatives designed to upskill academic teaching workforce (Salmon, Gregory, Lokuge Dona, & Ross, 2015; Salmon, Pechenkina, Chase, & Ross, 2016). Given that the entire group of learners in the presented pilot were university lecturers, their unique expectations and needs had to be considered when designing an authentic environment for them.

At the same time, research into lecturers' experiences with university-wide change initiatives, specifically those involving educational technologies, showed that a change process can provoke resistance and even resentment in lecturers (Kehoe, Schofield, Branigan, & Wilmore, 2018; Liu & Pechenkina, 2017; Parker, 2014). What such studies have in common is the overarching narrative of lecturers' academic agency under threat, arguing that lecturers may feel anxious and disenfranchised when experiencing change if the process is perceived as

stripping them of control and encroaching on their agency. Specifically, if lecturers feel their teaching or other important aspects of their professional identity are threatened by the change, they are likely to react negatively.

To assuage the concerns outlined above, authentic learning principles were used to inform the LMS change initiative at our institution. As authentic learning scholars advocate (A. Herrington & Herrington, 2006; J. Herrington & Oliver, 2000), when contextualised as an all-embracing, purposeful environment, authentic learning initiatives can be motivating and empowering for learners. To achieve such positive outcomes, lecturers partaking in the pilot were invited into the process as stakeholders as well as learners, meaning their experiences and concerns were considered and used to inform the change process in a cyclical manner. In addition to expert guidance and personalised support from learning designers, participating lecturers were provided with authentic exemplars, such as online unit templates and various self-guided online training and how-to resources. Lecturers' experiences with implementing these templates and using the available resources to upskill themselves in turn informed the next iterations of these elements, shaping the final artefacts based on real-life experiences and needs.

This article argues that creating an authentic learning environment for lecturers' digital literacy development can lead to teaching transformation as it allows lecturers to use the LMS change process to reflect on their teaching and consider areas of improvement. While various challenges occurring during the pilot phase of the change process are outlined, ultimately findings show that in order to implement a large-scale institutional upskilling in staff digital literacy in a way that empowers lecturers to engage in self-directed learning and discovery and serves as a catalyst for meaningful teaching practice transformation, all aspects of the process need to be designed as authentic learning tasks for adult learners.

The Study

Nine higher education lecturers participated in the new LMS pilot in 2017. All participants were unit convenors and allocated 60 hours under the academic workload model to partake in the process, freeing up some of their time to allow them to engage. Sessional/casual lecturers who were involved in teaching these units were also allocated 10 hours each, but only convenors were interviewed for this evaluation. The primary criterion for unit selection for the LMS pilot was the expected cohort size: units attracting smaller student cohorts were deemed less likely to experience disruption to learning and student attainment during the transition process. The units were either to be transferred from the old LMS into the new one or built in the new LMS from scratch. All lecturers took part in this process as stakeholders as well as learners, where the functionalities of the new LMS were concerned. The study received ethical clearance from the university ethics committee, and followed the agreed protocols. At the conclusion of the pilot, 8/9 of participating lecturers agreed to partake in an evaluation interview. Of these 8, 7 were male and one was a woman. No other demographics about participating lecturers were collected due to the small size of this pilot cohort and the study's specialised scope. Interview schedule was semi-structured as the focus was on lecturers' in-depth experiences with the change process and the new LMS. The interviewer guided the process by engaging in a conversation with each lecturer and directing the narrative along four main topics of inquiry: lecturers' expectations of the transition experience and its desired outcomes; lecturers' instructional design philosophy concerned with the usage of LMS; challenges associated with the LMS change process; and professional development that lecturers deemed crucial to the LMS change success. Lecturers, however, were free to diverge from these topics and discuss what was of importance to them, as long as it was of relevance to the LMS change process. The resultant narratives were anonymised and referred to by a code (e.g. I1, I2, etc.). Thematic analysis performed with NVivo software allowed the researchers to dwell deep into convenor experiences, with two particular themes emerging as being of special significance, namely convenors' expectations versus actual experiences of the process, and how convenors' usage of the LMS for teaching transformed as a result of the change process. Both of these findings were directly related to the use of authentic learning environments to upskill in digital literacy.

Lecturer experiences of the LMS change

Expectations

Three aspects of the LMS change process featured prominently in interviews with lecturers, namely: the process itself; the new LMS and its features and capabilities; and, lastly, teaching and its transformation in relation to the LMS. For six out of eight of lecturers interviewed, at least two of these expectations overlapped.

Expectations concerned with the change process itself were the most commonly articulated, with all lecturers reporting at least one expectation pertaining to the process of change. Firstly, these expectations were concerned

with the time and effort lecturers were expected to put in as part of their participation; secondly, with complexity of the change process; and, thirdly, with their unit's suitability for the pilot.

Only two lecturers (I3, I5) reported having no specific expectations about the change process, entering the pilot with an open mind. I3 said, "I wasn't really sure of what to expect coming in, but... it was quite flexible", while I5 noted, "I didn't [know] what the change would be, how long it would take and what the [new LMS] platform would look like." Two other lecturers reported expectations primarily concerned with time and effort required from pilot participants, while further two admitted they expected a simpler and more streamlined process. For instance, I1 "originally... believed it would take a lot of time [and] training", imagining "learning a new LMS" would be "time-consuming".

For I7 and I8, who expected the process to be less complex, the pilot was not a positive experience. I8, who expected the transition to be a "simple task", said there was "too many emails, too many communications", leaving them overwhelmed; while I7 did not expect to have to be involved in numerous decision-making activities: "We kept being given information we really didn't need. Like the technical side of it – academics don't need to know that." Reiterating this pragmatism, I7 specified: "What we need is... to be able to know how to put our stuff in, how to link stuff, how to email students, how to make an announcement, how to use the discussion board feature... Just the basic stuff!" While I7 agreed that some lecturers may be interested in learning more about the new LMS's technical aspects, "that's something they can do in another time, in another place."

The lecturers' LMS-focused expectations of the process focused on the new system's efficiency and capabilities. For example, I1 expected the new LMS to be "more efficient", elaborating that they "have heard good things about [it and...] believed there'd be more things [they could] do with the site and... student assessment and topics and so on." After trialling the new LMS, however, I1 concluded: "I like it. It looks nicer... neater, and, to be honest, it didn't take that long to learn." Others also pointed out how their LMS-related expectations were eventually met, often with help from their learning designer. For instance, while I7 expressed their initial disappointment due to having "not that much space for video", citing disciplinary expectations for video-enabled teaching in a "media and communications unit", the issue was resolved by using an embedding technique. Another concern I7 had with the new LMS had to do with the system's 'look and feel'. Because I7 "worked really hard to make [old LMS] site really pretty", they worried whether the new LMS would replicate the aesthetics. While this was eventually made possible, the process was not stress-free, and involved a significant learning curve.

Lecturers whose expectations of the process were primarily teaching-focused had the most positive experience with the transition. For instance, I2, whose main concern was to improve student learning experience, noticed how the new LMS shared many design and engagement similarities with Facebook, acknowledging how because of that, it would appeal to young people, and the learning curve for them would be minimal: "the young people are pretty good— [the new LMS is like social media], it's not much different." I6 was another lecturer whose expectations were mainly teaching-focused and who embraced the change process because its goals aligned well with their aspiration to transform their unit. In this regard, I6 emphasised the "fortunate timing" of the LMS pilot:

I've had the unit for three years and... I didn't have enough time really [go] over it—so we just carried on, ticking by... The effort of... re-designing the unit was always too much, but because [of the LMS change] I thought, well you're going to have to do changes anyway, you may as well do it all at once... So... it just accelerated the implementation, which has been good, it's been an impetus to make some changes so that's cool.

Lecturer's expectations of the process were instrumental in influencing their actual experiences of upskilling in digital literacy as part of the change process. Having the LMS change environment designed according to the principles of the authentic learning helped mitigate potential challenges emerging when expectations and realities clashed.

Realities of LMS change

Key pillars of an authentic learning environment state that knowledge is constructed in collaboration; opportunities for reflection are built into the learning process; and learners are empowered to articulate their knowledge (J. Herrington & Oliver, 2000). Taking this approach identified some interesting juxtapositions between lecturers' expectations, and their actual experiences of, change. The comparative analysis of the two sets of perceptions showed that while some lecturers thrived, finding the process flexible and enriching, others felt their agency was diminished and, as a result, they exercised their resistance to the change. The latter

behaviours attested to the anxieties lecturers experienced over how much creativity or control they felt they could retain in the change process, and how much of their unit design/structure was to be mandated externally. As I3 stated, “[the biggest concern was] that someone would say, ‘it has to be this way, it has to be that way’”, worrying that this would diminish the effects of the flexibility and customisation options the new LMS promised. Some lecturers managed to resolve such conflicts by working with learning designers.

For those like I4 and I5 who ultimately had a positive experience with the process, “the transition’s been good”, leaving them feeling “over-serviced” and “very happy” (I5), also noting how the fact that the new LMS performed well also factored into this positive experience. Further, I4 pointed out the importance of the continuity of support (e.g. working with the same learning designer throughout the entire process) and of streamlined communications: “[You need to] have the same person doing it from start to finish and... you work in conjunction with that person.” Speaking of the process continuity as a whole, I4 emphasised the importance of having the multiple check-in points built into its structure, allowing lecturers to touch base with their learning designers: “I would suggest... weekly meetings... even if it’s just a notion of saying ‘hello, how are you...’” Thus, the opportunities for coaching and scaffolding that were built in as core elements of the authentic learning environment proved both valuable and successful.

For those lecturers whose primary expectations of the process were focused on teaching transformation, an aspiration to improve their teaching persisted throughout the process. For instance, I3, who saw the LMS change as a catalyst for the long-overdue changes to their teaching, said: “[when re-creating the unit in the new LMS]... all of the changes I’ve made are just around trying to make it easier for students to find things”, mirroring the dominant narrative of their fellow participant, I6 who also drew on the change process to transform their teaching.

When comparing lecturer expectations of the process with their actual experiences, several aspects of the process were highlighted as factors of successful transition which did not diminish their agency. These aspects were fundamentally located in the authentic learning environment that was created to support their upskilling, namely personalised support, encouraging learning by doing, designing effective professional development that aligned with the change processes, and allowing for self-regulated learning to occur throughout the duration of the change process. Pertaining to the personalised support aspect, lecturers were keen to not only receive it but also to deliver it to the next participant cohorts by acting as ‘champions’ of change and fostering peer learning. However, it was also understood that such a scalability of personalised support was not always feasible, especially with larger numbers of units scheduled to undergo transition in the next stages of the process (120 in the next stage, and 3,500 in the final one). Further, not all lecturers wanted to be involved as ‘champions’, cautious of their time and finite resources. As I7 said, “there is a real danger that people like me could become the... helpdesk for our colleagues... I could start getting people lining up outside the door asking how you use this or how you use that. [University] needs to have a really good think about the kind of support they can offer.” These considerations were built into the next cycle of the project.

Learning-by-doing is an important aspect of any authentic learning environment. Thus, opportunities for self-regulated learning were an important factor shaping lecturer experiences of the change process. Those lecturers who referred to their existing digital literacy capability and overall educational technology usage level as comfortable or advanced were overall keen to try out the new LMS and experiment with it. For example, I6 recollected, “when I get new software or when I’m trying new things... I just start building and figure it out as I go along”. Giving lecturers online ‘sandpits’ where they could experiment factored into their positive perception of the change process. This was especially critical to the pilot’s success as lecturers have limited time to perform any tasks which do not directly relate to their teaching or research: “I prefer to self-learn. It’s quicker... My days turn into piles of paper and meetings, so anything I do has to happen really, really [late in the day], and there’s no-one to talk to then” (I5).

Inclusivity at the core of the process was also important. Lecturers were positive about the university decision to involve relevant sessional staff in the change process as well as account for this participation in the academic workload model or sessional hours pay. As I2 says, “sessionals are essential to this process because while convenors are involved in decisions dealing with the unit’s design etc., sessionals are actually teaching and assessing student work...” While some (e.g., I7) felt that what was allocated was “quite generous”, partaking in this process still meant “lo[sing] time from... research”, which was perceived as a drawback, as research outputs are those most likely to lead to an academic promotion.

Lecturers who already felt anxious about the process were likely to find it overwhelming. For example, for I8 the process should have been simplified (“just talk us through key points, don’t make it so complicated”),

training and communications involving lecturers only “if it has direct relevance to teaching matters”. While I8 admitted that the process improved as the time passed, the “lack of stability in change management was a problem” and while “students don’t know the difference between LMS”, it is lecturers who were affected by what was perceived as a “too complicated” process. I7 who had similar experiences to I8, also at times felt overwhelmed and anxious. As the authentic learning environment allowed these concerns to surface, they were able to be taken into consideration when designing the next phase of the project.

Using LMS to enhance lecturers’ digital literacy

A. Herrington and Herrington (2006) have argued that authentic learning environments have their foundations in situated approaches to learning, which advocate that learning is best achieved in circumstances that resemble the real-life application of knowledge. With this as a framing concept, this evaluation explored the question of how lecturers used the LMS for teaching and whether, and how, their usage patterns changed with the introduction of the new system. Key findings that emerged through engaging these lecturers in an authentic learning environment that reflected the realities of their teaching experiences were that changes in their digital literacy was influenced by the: usage patterns; functionality; interactivity; customisation; and accessibility of the new LMS.

Many existing LMS usage patterns were determined by a discipline and/or subject matter; however, the reverse was also true, as some lecturers believed the LMS affordances shaped their teaching. For example, for I4 the LMS usage was curriculum dependent: “engagement in part [is] shaped by... certain aspects of the LMS”. This attitude illuminated the way lecturers saw the role of LMS in their teaching: some recognised the transformational potential the LMS held for teaching, while others (e.g., I2) felt that “it’s... academic content that’s important, not the learning system.” Another lecturer (I8) who shared the belief that the LMS usage was shaped by the course/unit of study, said “student requirements are different, so the teaching is different. For example in [a] Law [unit], the way LMS is used is minimalistic because the material is hard and dry, so it needs to be made easier for students to study this subject,” while a subject involving ethnographic type work “doesn’t need much LMS presence”.

In terms of an LMS’s functionalities, lecturers valued its digital storage capacity, interactivity, accessibility and customisation. Alluding to the digital storage aspect, I5 termed LMS “data warehouse”: “I put up all my notes... a lot of readings... interactive activities [and] podcasts.” Others (I3, I7) echo these usage patterns: “it all comes back to storage. If we’ve got plenty of storage, we can do pretty much what we need to do, but as soon as you take away data storage from us, it really does restrict what we can do” (I7). Interactivity is another aspect of LMS that lecturers identified as important. I6 and I2 found the new LMS superior in that regard, appreciating its “really intuitive interface” which made all interaction easy, giving it “a social media feel” (I6). For those like I2 who used collaborative digital documents to engage students, the new LMS presented further new opportunities: “it’s easy to embed working documents, [e.g.] Google sheets... allow[ing] to talk to each other and share and collaborate at the same time.” I2 acknowledged that perhaps the old LMS also allowed for this type of collaboration, but they did not know how to do it; the LMS change process allowing for them to learn new digital skills, facilitating teaching transformation in the process.

Accessibility for students was third most valued aspect of the LMS. For example, I3 found that the new LMS “ma[de] it easy for students to find stuff” which matched their unit design goal to make it “blatantly obvious to [students] where [to find things]”. I3 noted, “in the [old LMS], sometimes... I’d be saying to students, “Go here, then into this folder, and then in there...” whereas now, I feel relatively confident saying to them, “Go [to the LMS and] follow the buttons”—it’s easy to find.”

The customisation the new LMS allowed was seen as another important way to build on lecturers’ digital literacy. For example, I3 highlighted customisation as important, specifically “the ability to do what works for your unit.” I4 who modernised their unit in the new LMS reported that “it’s very easy to assemble pages [and]... to compartmentalise knowledge”, which was especially important for the unit this lecturer was teaching. However, I4 warned that such a modularisation may not be appropriate for all types of units, but only for those better suited for the “linear progression” type learning.

Thus, it can be seen that the authentic learning environment that was established to facilitate this change saw the participants fully engaging in a professional development learning context that reflected their real-life knowledge of teaching on digital platforms. In being empowered to articulate their knowledge of the existing system as a building block to engage with the learning designers’ coaching and scaffolding their own expertise of the new system, knowledge was collaboratively constructed, which led to both increases in individuals’ digital literacy and the positive adoption of this broader organisational change.

An authentic LMS change process and teaching transformation

For roughly half of lecturers in this pilot, the LMS change enabled teaching transformation, ranging from self-directed, targeted upskilling to adopting a completely new approach to teaching with LMS that embraced enhancing their digital literacy. For example, inspired by the new LMS's advanced HTML editor tool, I4 and I6 learnt more about HTML coding and used their new skills to customise their units and streamline their learning design. Others (I2, I6, etc.) progressed from using the LMS as a digital repository to exhibiting a more interactive approach to their teaching, by embedding working documents and spreadsheets into the LMS rather than heavily relying on static files.

Further, I6 took advantage of the new LMS capabilities to introduce “in-class data gathering”, “voting”, and other elements enabling student collaboration and real-time feedback cycle where student feedback was immediately “inject[ed]... back into the teaching.” While I6 was using the elements of these tasks before, the new LMS presented an opportunity to “go a little bit further”, ending up transforming their unit into “a standalone walkthrough guide to the course,” rather than a digital repository with limited interactive elements. The overarching goal of I6's new LMS usage pattern was to better “support the student” by organising their learning in a more engaging and logical way. This pivoted on the growth in their digital literacy to engage in teaching transformation: “each week's got an intro to it and it's got the materials... to [keep students' attention] on what they should be learning that week before they come to the classroom and to reiterate some points through videos”. As far as these changes went, I6 noted how “[the new LMS was] ... like a catalyst.”

Another convenor (I2) who used the change process to transform their teaching quickly learnt how to use the new system's interactive/responsive learning features and included those into their unit's transformed design. Specifically, I2 used the new LMS learning analytics function to gather timely feedback from students and use it as an indicator of students' learning progress:

In each of our weekly modules we have two areas where students can give us feedback and then support each other. So, every week we have a [non-graded] quiz where we ... list the array of topics we have covered and they simply tick the one they found most difficult, about which they want more clarification. And then, at the end of the week or the class, you can hit analytics and see immediately that 17% had trouble understanding the lecture or 35% want more clarity around the brief. Then we give them that next week.

I2's usage of analytics within the new LMS showed how this feature could be adapted to enable an embedded student feedback tool cycle. The effective use of this feature could be instrumental in boosting student retention, which is especially critical in the first few weeks of study. Targeted feedback collected in a timely manner is also an important, and well established, factor of student success.

As the authentic learning environment entailed, lecturers were experiencing the new LMS by engaging in real-life examples, first as learners, then as teachers, they felt empowered to transform their teaching. By using their enhanced digital literacy to make their units more interactive, and by engaging their students in feedback cycles, lecturers capitalised on the LMS change process by improving their teaching.

Conclusions

A university-wide LMS change process can be challenging for lecturers, at times causing resistance and stress (Blin & Munro, 2008; Liu & Pechenkina, 2017; Lokuge Dona et al., 2017; Mahdizadeh et al., 2008). Because of that and other reasons, many lecturers only use some aspects of LMS and generally do not engage with it fully, these inconsistencies in turn affecting student experience (Garrote & Pettersson, 2007; Lyall et al., 2017; Masterman, 2017). However, if LMS change is accomplished in a way that positively builds digital capability, does not diminish academic agency and allows lecturers to retain control over their teaching, such a process has the potential to be well received, and even inspire lecturers to personal upskilling efforts and teaching transformation.

This evaluation showed that for at least half of the lecturers in the pilot the change process served as a catalyst to rethink their teaching, mainly thanks to the enhanced digital literacy skills they gained while learning how to use the new LMS. While another half of the lecturers in the pilot did not feel particularly inspired to transform their teaching, recommendations based on their experiences helped shape the next iteration of the change process in a way that affects a higher percentage of participants.

Using authentic learning environment as a central frame of this change approach meant that training and upskilling of academic staff in using the new LMS occurred simultaneously with enhancing their digital literacy

skills. This combination proved to be crucial to inspiring many lecturers in the pilot to consider transforming their teaching in a mindful and sustainable way.

Specifically, the following recommendations have emerged as a result of this evaluation:

- Authentic learning environment principles need to inform the change process, with all its aspects and activities designed for its specific cohort of learners
- Such process's overall complexity needs to be reduced, only engaging lecturers on a need-to-know basis, while creating enough outlets to hear and act iteratively on their feedback
- All support needs to be personalised and flexible in response to the real life knowledge of lecturers as learners
- The change initiative needs to be aligned with the existing organisational needs, e.g. academic professional development can be built into the change process, so that lecturers are trained, coached and enabled through expert performances and exemplars, in how to use the new LMS more effectively for teaching
- Time allocation is to be carefully considered and managed so as not to encroach on lecturers' research allocations and other multiple responsibilities
- Digital literacy development for lecturers must ideally be aligned with the authentic requirements of their teaching environments.

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