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Addressing inconsistency in use of the LMS: A collaborative approach

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Inconsistency in the use of the learning management system (LMS) by academic staff is a source of dissatisfaction among university students in the UK. One solution is to establish a set of minimum standards (or baseline) for LMS use within an individual institution. Another is to supply templates – frameworks for LMS course sites – with a view to providing students with a seamless experience in their interactions with the LMS. This paper describes how the issue of inconsistency was addressed at a leading research university in the UK through an exploratory project, WebLearn Improved Student Experience (WISE). The widespread devolution of responsibility for site management to administrative staff, together with the 'maverick' creation of course sites by those academics who chose to engage with the WebLearn LMS, had resulted in unevenness in students' access to learning materials. The project team engaged in close collaboration with 19 departments in order to achieve the immediate purpose of improving uptake of, and consistency in, their LMS presence. The ultimate aim was to develop a support package comprising LMS templates and 'best practice' guidelines that would enable departments in the future to achieve the same objective, either unsupported or with minimal assistance from the central team of learning technologists. The project was evaluated using a modification of the Innovation Histories method, which included interviews with 13 participants. The evaluation findings additionally threw into relief the complex social and cultural factors at play that can inhibit a consistent student experience in an institutional LMS.

Introduction

For over two decades the learning management system (LMS)[1] has been the cornerstone of digital education for both campus-based and online courses. Yet, in a substantial proportion of higher education institutions in the UK, the LMS is still not used to its full potential, whether 'full potential' is measured (for example) in terms of uptake by academic staff or by the broadening of their pedagogic repertoire to capitalise on the variety of tools available.

This paper is concerned with the first of these measures: uptake. Increasingly, uptake is couched in terms of consistency in use of the LMS by academics. It has been suggested that students' appreciation of 'a reliable and seamless experience' (Cook & Obexer, 2014, p. 71) in technology-enhanced learning (TEL) generally (i.e. not just the LMS) is second only to their appreciation of TEL *per se* (Walker et al., 2016). However, as Reed and Watmough (2015) observe, an inconsistent LMS experience – in which 'some module spaces are empty whilst others overflow with administrative information, lecture content and support materials' (p. 69) – is now a source of substantial dissatisfaction among university students, as captured in surveys of the student experience.

The paper describes the approach taken to tackle inconsistent use of the LMS in one of the UK's leading research universities, the University of Oxford, through the provision of templates: 'frameworks for, or initial states of, course VLE sites' (Fresen, Hill & Geng, 2014). More specifically, it focuses on an exploratory, practice-based project in which the LMS support team worked collaboratively with departments[2] across the University to develop a set of LMS templates and accompanying 'best practice' guidelines. The ultimate goal was to enable departments to design, or redesign, their LMS sites in a more consistent manner, with minimal support from the central team.

A brief survey of the research literature relating to consistency and support for academics to engage with the LMS opens the paper; particular reference is paid to two solutions: minimum standards and templates. Next, the motivation for the project and the team's *modus operandi* with the participating departments are described. An account of the project evaluation then follows, providing

input into a discussion of the findings and their implications.

Literature survey

In gathering students' input into a review of their institutional LMS, Cook and Obexer (2014) identified three aspects to consistency:

- structure and navigation of LMS sites between departments;
- use of the LMS by academics, 'so that students know what to expect from [the LMS], across all units' (p. 73);
- the use of tools within the LMS.

A fourth aspect can be added to this list, derived from the quotation from Reed and Watmough (2015) in the Introduction above:

- content and activities between modules (or courses) within the same department.

Quantitative evidence of the patchiness in LMS provision between courses and departments can be found in the 2016 TEL survey of higher education institutions in the UK conducted by the Universities and Colleges Information Systems Association (UCISA) (Walker et al., 2016). Even though all respondents to the survey had at least one LMS in their institution (and 28% had additional, departmental, LMSs), in only 42% of cases were all courses supported by the LMS. Among respondents from the Russell Group of 24 leading UK research universities (http://www.russellgroup.ac.uk), the proportion was even lower: 35%.

One explanation for this state of affairs is proposed by Bothma and Cant (2011), who found that, although the academics whom they interviewed overwhelmingly supported the idea of an LMS, only a few actually used it. In other words academics may recognise its value in supporting students' learning, but do not engage with it themselves: 'a "disconnect" exists between what lecturers believe is an important learning technology and their day-to-day practices' (p. 382). Furthermore, McGill and Hobbs (2008) suggest that, since the LMS is a learning environment, students may feel it has a greater impact on their learning than teachers feel it has on their teaching. They also suggest that staff have a more complex relationship with the LMS than students do, since they have to develop the learning materials and facilitate the learning activities undertaken by the students in the LMS.

Another reason for the patchiness in academics' use of the LMS in some institutions is in part a function of the principle of academic autonomy and an opt-in model of engagement (Dutton, Cheong & Park, 2004). This may be exacerbated in research-intensive universities, where research is privileged over teaching (Masterman, 2016).

However, the principal barriers to academics' engagement with the LMS remain those of time, acceptance of technology and lack of support (Bothma & Cant, 2011; Walker et al., 2016; Rienties, Giesbers, Lygo-Baker, Ma & Rees, 2016). Indeed, for Cook and Obexer (2014), 'investment in staff capability building is the most important cornerstone of the successful use of digital technologies in learning and teaching' (p. 73), with Dutton et al. (2004) reminding us that training needs to go beyond the mere features of the LMS. Bothma and Cant (2011) suggest additional ways to motivate academics' use of the LMS, including helping them to see the benefits, adopting a more managed approach to its use at the department level, establishing departmental mentoring programmes and including LMS use as a criterion in academics' performance appraisals.

Yet, none of the approaches listed above addresses the specific problem of consistency in academics' use of the LMS. This is tackled by Reed and Watmough (2015) and Varga-Atkins (2016) in their studies relating to minimum standards, or baselines, for LMS use. Many of these standards currently 'focus on administrative tasks and supportive information, rather than factors that necessarily enhance learning and teaching' (Reed & Watmough, 2015, p. 72) and/or 'stipulate to staff the required or recommended course information and content to be provided for students' (Varga-Atkins, 2016); however, others additionally contain guidelines on the visual presentation of material (e.g. UCL, 2016). Currently, though, the use of baselines is less widespread in Russell Group institutions than in universities as a whole (Walker et al., 2016).

The second approach to consistency, and the one addressed in the current paper, is the use of LMS templates, intended as 'partially built online space[s] to enable lecturers or tutors to "get started" quickly' and to provide students with a more structured and consistent learning experience (Fresen, Hill & Geng, 2014). Fresen and colleagues envisage a set of templates for different pedagogic purposes, such as tutorials, lecture series and assessment. In principle, all the teacher should need to do is to populate the template with 'the teaching and learning content – the body of knowledge that constitutes the core materials and activities in the course.' Importantly, a template should be 'practical, easy to understand and useful to academic staff before, or even without, support from learning technologists.' That said, Fresen et al. emphasise that a template must be accompanied with guidance on how to modify and implement it, since the 'organic interplay between pedagogical dimensions and course site properties' gives an academic choice over the way the content is presented within the template. Thus, a template is seen to act as a starting-point, not as a constraint. This is the perspective adopted by the project team in the work described in the present paper.

Genesis of the WISE project

A member of the prestigious Russell Group, the University of Oxford is characterised by a distinctive model of individual and small-group teaching, and by a devolved model of management and decision-making. In relation to TEL in general and to the LMS in particular, this means that:

- teaching competes with research for an individual academic's priorities, and so administrative staff are often responsible for maintaining the resources on LMS sites;
- small-group teaching makes the role of the LMS less apparent in the view of some academics;
- the principle of academic autonomy is perceived to militate against setting a LMS baseline.

The institutional LMS, WebLearn, is based on the open source Sakai platform, which is maintained by a community of developers based in institutions around the world (https://www.sakaiproject.org), including the development team responsible for WebLearn at Oxford. The developers in each institution can customise the tools within Sakai according to their local requirements; customisations that are considered to be of benefit to the community as a whole may subsequently be incorporated into the core Sakai platform.

Sakai was selected for Oxford's LMS both for its customisability and because its functionality supports the University's ethos and accepted practices. For example, the user management features have been modified to support devolved system administration and to allow students to access courses other than their own (reflecting the principle of openness within the University) (Lee, 2008). WebLearn users are supported by two learning technologists; a substantial online collection of guidance is provided; and a user group (comprising primarily administrative staff) meets termly. Because TEL support falls within the central IT services department, WebLearn has been less fully integrated into professional development programmes for academics than it might otherwise have been.

Internal research conducted during 2012 and 2013 (Geng, Fresen & Wild, 2013) indicated that student satisfaction was high where individual departments had paid attention to the design and maintenance of their WebLearn sites. However, in many departments the devolution of responsibility for site maintenance to administrative staff – often with little technical knowledge – together with the 'maverick' creation of sub-sites by those academics who chose to engage with WebLearn, had resulted in inconsistencies of all four types listed in the literature survey above. For example, the data showed that students taking courses in two departments found variations between them in WebLearn use; some lecturers uploaded all their lecture notes to WebLearn and others not at all; individual lecturers were inconsistent in uploading their materials; and timetables were made available sometimes through the WebLearn Calendar tool and sometimes as PDF files. Students also highlighted the importance of clarity and consistency, not only in site structure but also in the layout of materials. They expressed a preference to access their learning materials week by week, instead of having to access them through a menu of tools.

The inconsistent use of WebLearn, coupled with issues relating to its usability in general and with a desire to encourage academics to treat it as more than just a repository of learning materials, provided the motivation for the WebLearn Improved Student Experience (WISE) project in 2015–16. The overall goals were 1) to increase the uptake and optimise the use of WebLearn across the University to support teaching and learning, and 2) to increase student and staff satisfaction with WebLearn. These goals were to be achieved through improving the usability of WebLearn tools, and the structure and visual design of WebLearn sites.

Given the tiny number of learning technologists supporting WebLearn, departments wishing to restructure and redesign their sites in the future would need to be able to do much of the work either on their own, or with minimal individual support from the central team. Therefore, a core activity of the project was to develop a self-help support package encapsulating templates and accompanying guidance on best practice, as recommended by Fresen et al. (2014).

This paper reports work on developing the support package; work relating to usability is described in Laurent, Fresen and Burholt (in press).

The 'WISE' approach

Developing the desired support package entailed working intensively with a number of academic departments in order to broaden our understanding of their educational needs and the context in which they operated *vis-à-vis* WebLearn in terms of key stakeholders, their capabilities, and the enabling factors and constraints at play. From experience, we knew that we would be working largely with administrative staff; nevertheless, we aimed to engage directly with academics too.

For the purposes of the project, the central team of WebLearn learning technologists was augmented to four; in addition, a project manager was appointed who also served as the project evaluator. Over the period May 2015–October 2016 we collaborated with 19 departments across the University to redesign their existing WebLearn sites or to design new ones.

Most of the departments were recruited through an email to the WebLearn user group. They represented a wide range of disciplines and all course types: undergraduate, campus-based taught postgraduate, blended taught postgraduate and doctoral training. The size and complexity of the WebLearn sites in different units varied. The extent of work ranged from a simple revamp of a department's top-level page(s) to a complete restructuring of the site hierarchy and extensive use of WebLearn's Lessons tool. A few departments created brand new WebLearn sites from scratch.

Departments joined the project and finished at different times, which allowed us to refine our *modus operandi* and outputs progressively through 19 iterations. Work with each department started with an initial meeting, and then proceeded through a five-stage cycle: requirements gathering for the new site structure, prototyping (customising the templates), building and populating the site, launching it, and evaluating its usability with students. Ideally, the usability evaluations would have preceded launch; however, the building phase tended to take place during the vacation (when students were away from the University), ready for launch at the start of the next term. Even so, conducting evaluations on live sites did not preclude minor adjustments in response to students' feedback.

The WebLearn Lessons tool was central to the technical aspects of the work, in order to address head-on students' complaints about the difficulty of finding their learning materials. It was used to underpin the site templates and to encourage departments to provide students with the structured pathway that students desired (Geng et al., 2013), including content such as lecture slides, readings, links to web pages and audio/video clips, and activities such as discussion forums and tests.

Developing the 'WISE' support package

The iterative way of working enabled us progressively to refine the artefacts that were intended to comprise the support package: four templates for sites, and the 'best practice' guidelines. The templates were intended to provide a starting-point for the development (or redevelopment) of WebLearn sites, to encourage consistency of site structure and layout across the University, and to reduce planning time and the learning curve for academics using them. In contrast to Fresen et al. (2014), the templates were designed with a focus on navigability rather than pedagogy and offered a hierarchical structure:

- departmental site: 'landing page' for department-wide materials and information;
- programme site: for an undergraduate or postgraduate programme of study;
- course site: for a single course or module;
- tutor site: to present teaching materials and activities under the control of an individual academic.

It was not possible to remove the tool-oriented navigation menu on the left side of the WebLearn window, which is a standard feature of the platform. Early in the project, one department requested a layout using 'boxes' in the main window to provide a more user-friendly way to access resources and learning activities. The 'box' design was taken up by subsequent participating departments and became integral to the templates (Figure 1).

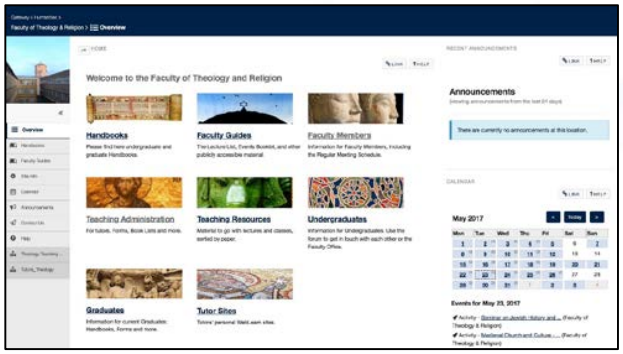

Figure 9: A WebLearn site redesigned from a template, showing the standard tool-oriented menu (on the left) and the 'box' design introduced in the WISE project to improve usability

We developed the 'best practice' guidelines from our evolving experience with the departments, but finalised them only after the end of the project. The guidelines included advice on creating sites from the templates, using the Lessons tool, and good practice in web page layout and presentation of content, together with pre-existing advice on copyright and the use of images. They were made available on a WebLearn site developed using the Lessons tool.

Developing the templates entailed software changes to the WebLearn Lessons tool over the course of the project, which were made by the WebLearn development team. This resulted in a temporary slight disadvantage to the earlier participants, who missed the benefits of later enhancements. However, the changes were subsequently incorporated into the core Sakai platform. An upgrade of the Sakai platform and, hence, of WebLearn in September 2016 thus harmonised the Lessons tool functionality for all participants.

Evaluating the WISE project: compilation of an innovation history

To evaluate the WISE project as a whole, we formulated three questions:

1. To what extent have the new templates and the use of the Lessons tool contributed to greater consistency in students' experience of WebLearn?
2. Which are the key stakeholder groups involved in the redesign of departmental WebLearn sites, and what are the relationships between them?
3. What is needed to ensure the sustainability of the project for a) the participating departments and b) departments wishing to make use of the support package in future?

To address these questions, we sought a method that would allow us to identify the common factors across the experience of the participating departments that are conducive to the successful redesign of WebLearn sites and, conversely, the factors that can impede it. The approach adopted was a modification of Innovation Histories: 'a method for recording and reflecting on an innovation process' (Douthwaite & Ashby, 2005, p.1). Participants in an innovation draw on their recollections and on project documents in order to build a collective narrative of events: the innovation history. This activity 'stimulates discussion, reflection and learning amongst stakeholders' (p. 1), and the lessons thereby extracted are incorporated into future planning.

The innovation history is compiled from two intermediate artefacts: a timeline of events and an actor network matrix (which can be converted into a network map to aid visualisation). Normally, an actor network matrix consists of individual actors. Because of the iterative format of our work (i.e. a series of 19 cycles within an overarching chronology), it was appropriate to include stakeholder groups as well. As a result, the actor network matrix comprised the WISE team, the WebLearn development team, administrative staff, academic staff, head of department, departmental teaching and learning committee, students, IT support staff and the departmental WebLearn coordinator. Participants were asked to describe their relationships with the other stakeholder groups in their department and to score each one on a scale from 0 ('not relevant') to 4 ('crucial'). An additional score, 4X, was available to denote relationships that were 'crucial, but missing' (Douthwaite & Ashby, 2015).

As an artefact, the innovation history is split into three columns: a narrative of events, direct quotations or paraphrases of participants' comments on individual events, and reflections on individual events by the project team. For clarity, the printed page is laid out so that these three categories are clearly distinguishable from each other (Figure 2).

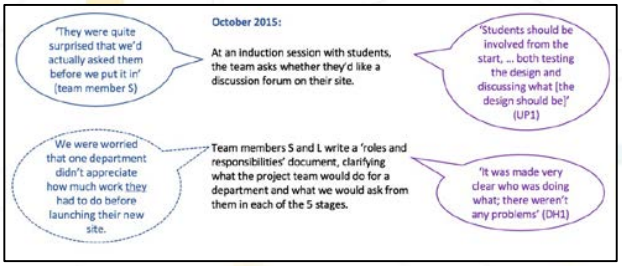

Figure 10: Extract from the innovation history. Comments (solid outlines) and reflections (dotted outlines) by the project team are on the left of the narrative; quotations from participants are on the right. Participant codes are explained in the main text of this section

Ideally, the innovation history is created through direct collaboration between the project team and the participants; however, the difficulty in bringing busy staff together meant that we gathered their contributions through interviews with 13 participants instead. Since the participants had experience of their part of the project only, they were interviewed in relation to their own individual timelines. The overarching timeline was created by the project team; contributions from the interviewees were slotted in as appropriate. Table 1 summarises the evaluation process.

Table 1: Evaluating the WISE project: activities and outputs

Date	Activity	Outputs
17/0616	Team workshop 1	Draft timeline
19/07/16	Team workshop 2	Stakeholder group matrix: team perspective
26/07/16	Team meeting	Interview questions
21/09/16–03/11/16	Interviews	Individual stakeholder group analyses; contributions to innovation history
Oct 2016	Preliminary analysis	Provisional key findings from data; collated stakeholder group matrix and network map
24/10/16	Team workshop 3	Finalised timeline; agreement on emergent findings
Nov–Dec 2016	Detailed analysis	Finalised innovation history; evaluation report

The project evaluator conducted five interviews with individuals and four with pairs. Interviewees were nominated by the other members of the project team and came from a range of disciplines. Two interviewees had academic posts, nine had administrative posts, one worked in IT support and one was a student. The interviews lasted 35–60 minutes and primarily addressed these topics:

- the interviewee's experience of collaboration with the WISE team;

- construction of the stakeholder group matrix from the interviewee's perspective;
- the major changes made to the site, including the use of the Lessons tool;
- feedback from colleagues about the new site;
- the knowledge and skills that the interviewee would consider necessary for others to design, or redesign, their WebLearn sites without the benefit of such intensive support.

Approval for the interviews was received from the University's Central Ethics Committee.

In the sections that follow, interviewees are identified by three-character codes denoting their role (**A**cademic, a**D**ministrator, I**T** support, st**U**dent), the division of the University in which they work (**H**umanities; **S**ocial Sciences; Maths, **P**hysical & Life Sciences, **C**ontinuing Education) and a sequential number.

Evaluation findings

The project evaluator conducted a provisional analysis of the interview data and presented the preliminary findings for discussion in the third team workshop (Table 1). Once these findings had been agreed, a more in-depth analysis took place. This section reports the outcome of the in-depth analysis and is organised according to the three evaluation questions.

1. Contribution of the templates and Lessons tool to promoting consistency

Qualitative data from the interviews indicate a positive transformation of existing WebLearn sites as a result of engaging with the WISE team. For example, AH1 described her department's previous site as 'like opening up a cupboard and finding out that everything's just been jammed in everywhere. You don't want to go back and look again.' After the redesign, her cupboard '[has] nice ordered shelves, and everything makes sense.' Another academic, who did not take part in the evaluation but permitted her feedback to be shared publicly, commented that her department's new design would ensure consistency across courses. A student, who likewise allowed their informal feedback to be reported, expressed the desire for all module sites to be structured in the same way as the redesigned site.

The usability evaluations reported by Laurent et al. (in press) confirmed that students find navigation more efficient where the design uses a clear and attractive layout with boxes and images on the main page, and minimises the use of tools on the left-hand navigation menu (as shown in Figure 1). However, the team also discovered limitations in the usability of some areas of the underlying Sakai platform – particularly navigation – that could not be modified locally by the WebLearn developers within the scope of the WISE project.

Although the Lessons tool appears to have been central in implementing consistency in the visual design and structure of WebLearn sites, it is not easy for site maintainers to set up. The interviewees did not comment on this, since in many cases the WebLearn team created the basic Lessons pages for them and they only had to add the content. It was only in the team evaluation workshops that the usability issues in the Lessons tool came to the fore, including the need to edit HTML code in order to change the number of boxes. One team member commented: 'It's a shame, because the power of the Lessons tool and the power of Sakai sometimes get pushed aside amid the challenge of doing the site layouts and the structure.'

2. Key stakeholder groups

The quantitative data obtained from the stakeholder network analysis were somewhat fragmented. We were unable to recruit interviewees from all nine stakeholder groups identified, and those whom we did interview had not necessarily interacted with representatives of all the other eight groups in their departments. Data reported in this section are, therefore, largely qualitative and concentrate on the stakeholder groups that featured the most prominently in interviewees' oral responses.

The interviews confirmed what we already knew: that the key users of Oxford's LMS are administrative staff. Reasons for academics' lack of involvement include time (DS1), dislike or fear of technology (DH1, DP1) and a sense that uploading resources is 'an admin job' (DS2). The downsides of the reliance on administrative staff to maintain WebLearn sites include low technical skills ('We're all just administrators, aren't we? … we have no real … understanding of the technology': DS2), a high turnover of staff (DP1), and lack of influence over the academics to engage with WebLearn themselves ('if people don't take it up there's not much you can do': DS1).

Although academics' lack of involvement in WISE was 'the one big disappointment' (DS1) for some interviewees, not all administrators deemed this relationship 'crucial but missing' in the actor network matrix. Indeed, some departmental administrators (e.g. DH1) reported that they purposely prevent academics from accessing WebLearn. This is to minimise the creation of individual sub-sites and pages that had contributed the chaotic site structures which, in turn, triggered the department's decision to participate in WISE.

In spite of the constraints, we were able to collaborate with a small number of enthusiastic academics. For example, AH1 had not used an LMS before, but was familiar with many websites and found the Lessons tool 'the most sensible way to divide things up'. She was able to benefit from the WISE team's redesign of the

WebLearn site for a similar discipline; even so, she had to devote a lot of personal time to the work.

Although the student experience was the *raison d'être* of the WISE project, for reasons of timing the project was carried out with students largely on the periphery until the fourth stage in the cycle (usability evaluation). Exceptions were DH1, AH1 and DP2, who consulted students in earlier stages. Overall, however, the situation was not ideal: 'Students should be involved from the start, … both testing the design and discussing … "Is this a good idea? Or is it just a good idea in theory, but in practice nobody's going to use it?"' (UP1). DH2 commented: 'if the students are really pushing it … it's going to have a lot more weight than just us admin team saying "Well, we think you should do this."'

The final relationship about which interviewees spoke in detail was the one between themselves and the WISE project team. The extent and nature of this collaboration varied. One department was largely self-reliant, involving the WISE team only to ensure that what they were doing already constituted 'best practice' (DC1). At the other end of the spectrum, smaller departments, where administrative staff had no local technical support, needed extensive hand-holding (e.g. DS2). In terms of communication, interviewees generally spoke appreciatively. For example, DS3 'felt we had a lot of opportunity to get across what we needed,' and DP2 appreciated the team's sharing of insights into students' needs and preferences: 'we were … able to … go "Ah, OK, so we can exploit this knowledge,"… and I thought that was really good.' We also relied on the goodwill of departments when software bugs were discovered, especially early in the project (e.g. DH1, DP1). In a few cases, relationships became temporarily strained during technical problems after launch (DS2, DP1); we took prompt action to resolve matters.

3. Sustainability

As interviewee DS1 commented, the challenge facing participants was to 'move from having a good job done in WISE to having WebLearn really well used across the department.' However, he reported interest in the redesigned sites among only a minority of academics in his department. In contrast, DH1, TH1 and AH1 reported that academics in their departments had reacted with enthusiasm. Initially, some academics continued to hand over their materials for uploading to WebLearn; TH1 and AH1 responded by writing 'how to' guides and providing one-to-one training respectively, which resulted in more academics uploading content themselves. DH1 observed that academics who were previously reluctant to engage with WebLearn themselves remained reluctant, but she felt that the natural turnover of academics would lead to greater interest in use of the LMS over time.

Maintaining consistency in the use of the redesigned sites would also depend on adherence to new ways of working. We became aware, through the interviews and through communications with other participants, of staff disregarding new editorial guidelines on visual design (DH1), disrupting the new site structure (AH1) and reverting to a tool-based access to learning materials. Commenting on the third example, a project team member said: 'It's the path of least resistance … setting up a folder in Resources takes one minute. Figuring out how to set up a new Lessons tool might take longer.'

The long-term sustainability of the work done by the WISE project would depend on the uptake and successful implementation of the support package in the wider University. In this respect, interviewees felt that staff responsible would need to be 'tech-savvy' (DP1) to some extent, with an understanding of file organisation (AH1), hyperlinks (AH1) and the WYSIWIG editor (DH1). Even so, DP1 felt 'you would need some support even to adapt the templates … and just basic stuff of knowing where to plug in different bits and pieces, and how it actually functions behind the scenes.' On the 'people' side, DS1 commented: 'you'd have to find a champion, an evangelist … who was enthusiastic about it and prepared to take on as much of the work as needed to be done, and to make it visible then and try to enthuse people.' The people who most need to be enthused, in TH1's view, are the academics: 'sell the idea … that it's going to be easier for them to use, it's going to save them so much more time … and that it will help the students in that they'll be able to find all the material.'

Discussion

WISE was an exploratory, developmental project in a real-life setting, which delivered evolving outputs to a relatively small number of participating departments over a limited period. As such, it could not be expected to achieve outcomes measured using tests of significance, all the more so in an institution which permits individual academics considerable latitude in the decisions they make about their teaching.

The primary goal of increased uptake of WebLearn across the University proved unattainable within the timescale of the WISE project. Nevertheless, the project achieved modest results in terms of more consistent, and usable, WebLearn sites through the templates and 'best practice' guidelines – the second of the two project goals. In addition, contributing the software modifications in the Lessons tool to the core Sakai code has automatically extended the reach of some of the technical benefits, not only to other departments in Oxford, but also to the world-wide Sakai community.

Although the support package brought improved consistency in terms of visual presentation and

navigation, the usability of the underlying Sakai platform reported by Laurent et al. (in press) is of concern. Usability is important because it can determine whether or not an individual academic is willing to persist with a tool after first use – and sustained, regular use by teaching staff is a key aspect of a consistent student experience in the LMS (Cook & Obexer, 2014). Unfortunately, in the case of an open source platform such as Sakai, where tools are developed by different parties, the user interface may be inconsistent between tools. This can make it difficult for users who do not understand – and should not need to understand – how the overall LMS has been put together. Consistency in the user interface also applies between the LMS and the other tools and websites with which users are familiar. In the words of one WISE team member, the LMS should 'look like the thing they were using last night … like Google Docs', which for participants such as DS1 and DH1 had not previously been the case.

In relation to the human dimension of innovation, Douthwaite and Ashby (2005) characterise an innovation as 'an interactive and experiential learning process mitigated by social networks' (p. 4). This characterisation is borne out in the analysis of the role of different stakeholder groups in the WISE project. It also resonates with analytical frameworks that have been employed in other research into LMS use, such as the social shaping of technology (by Dutton et al., 2004), communities of practice (by Ellaway, Dewhurst & Macleod, 2004) and Activity Theory (by Varga-Atkins, 2016). In the words of Ellaway et al., 'all VLE functions exist in a "blended" relationship with human activities' (2004, p. 127).

The devolution of management of WebLearn sites to individual departments, coupled with the freedom of individual academics to decide whether or not to engage with WebLearn directly, has resulted in frequent mismatches between the designated (job) role of an individual member of staff and their actual role in relation to the LMS. It is true that we worked with non-academic staff who had a genuine interest in encouraging academics to use WebLearn as more than just a document repository (e.g. DS1, TH1). Even so, our experience indicates that, in a devolved institution such as Oxford, the central LMS support team needs to be supplemented by learning technologists working locally in the University's academic departments. This view is now shared at a strategic level (University of Oxford, 2016).

Inconsistencies in the use of WebLearn within and between departments invite a further human solution in addition to the support package already developed: namely, a consensus on a baseline for educational provision in the LMS (as per Reed & Watmough, 2015). Indeed, the potential for such a baseline was discussed with academics in a separate study that ran concurrently with WISE (Masterman, 2015); the data indicated that a baseline could be implemented in a manner compatible with the institutional principles of academic autonomy and devolved decision-making.

Reference to institutional principles prompts consideration of a further factor: institutional culture. Digital education tools such as the LMS should both support an institution's model of teaching and learning and reflect (or embody) its core values and cultural practices (Lee, 2008). While the selection of Sakai as the platform underlying WebLearn made possible the enactment of Oxford's ethos and accepted practices through the LMS, the work of the WISE project suggests that this may have come at some cost: namely, sub-optimal usability and an inconsistent experience for students. The challenge for the future is to achieve a balance between, on the one hand, the flexibility needed to support a devolved model of administration and the needs and preferences of different departments and academics, and on the other hand, the constraints that may be desirable for the sake of usability and consistency.

Conclusion

Consistency – or the lack of it – in use of the LMS in university teaching is a topic of concern in the UK (Reed & Watmough, 2015), if not elsewhere. However, as yet it is under-represented in the peer-reviewed literature. This paper has offered a contribution to a solution in the form of a self-help package of templates (with supporting explanatory documentation) and best-practice guidelines that was developed iteratively in close conjunction with stakeholders from 19 academic departments.

The outcome of any innovation hinges not only on the artefacts that it delivers, but on the sociocultural context in which the work is carried out: the ethos and practices of the community which it is intended to benefit, the optimal alignment of roles and capabilities within that community, and the properties (or attributes) of the tools and technologies at the community's disposal. An appreciation of this context, and of the tensions between its elements that need to be balanced in order for the innovation to take permanent hold, may benefit from analysis through the lens of theory and evaluation frameworks such as Innovation Histories.

Notes

1. In the UK, the LMS is generally referred to as the virtual learning environment (VLE).
2. The term 'department' is used in this paper as an umbrella term for all academic units within a university: e.g. faculties, schools and institutes, as well as departments.

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