

## **SMART Teaching in New and Old Classrooms**

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### Abstract

The University of Westminster is undertaking a major classroom refurbishment program that is linked to a new approach to staff development in mobile learning. Feedback obtained from academic staff and students previously highlighted how classrooms should be changed so as to promote more active forms of curriculum delivery. Both technology and classroom furniture were considered significant enablers for effective in-class delivery, with the simplicity of the former and flexibility of the latter identified as key. To date nearly 70 classrooms have been re-designed and the impact of the changes on both staff and students has been assessed. Generally, the feedback has been positive with high praise for the easy to use technology solutions provided and the adaptability of the furniture. In addition, the significance of ‘getting right’ basic features in new classrooms (lighting, acoustics for example) was frequently cited by staff and students. This paper will highlight the features of new classrooms that students and staff have indicated they feel are most significant for their learning and teaching experiences. The paper will also assess the extent to which the new classrooms have been successful through analyzing the impact of both new technology and furniture arrangements on approaches to curriculum delivery. In addition, staff views on the utility of the new staff development approach will be discussed.

**Keywords:** learning and teaching; technology enhanced learning; mobile learning; new classrooms; staff development.

## Introduction

Students in the United Kingdom are expecting more from Higher Education as the personal costs for degrees in many countries progressively rise (Douglas, Douglas, McClelland & Davies, 2015; Temple, Callender, Grove & Kersh, 2014). Linked to this are changing expectations in relation to the ways in which universities prepare students for their future life in the workplace (Higher education: success as a knowledge economy, 2016) and the recognition that technology must play a key role in that preparation. Digital technology is central not only to the personal development of students but also to curriculum delivery in modern education. School leavers tend to come to university having experienced the use of technologies as an integral part of their earlier learning years, and they expect to see technology being used effectively by their lecturers to support and underpin their learning (Lai, 2011; Sharpe, Beetham, & De Freitas, 2010).

The current situation, however, is that the use of technologies in learning and teaching, and especially online and web-based tools and systems, has still generally not led to a fundamental transformation of teaching and learning from largely lecture based to more student centered and active approaches (O'Flaherty & Phillips, 2015).

The experience described and analyzed in this paper is of a university seeking to redress the balance of activity in taught classes from lecturer to student centered. The University of Westminster is seeking to change the nature of curriculum delivery through a fundamental shift in the nature of its learning spaces and in the way it provides staff development in new approaches to learning and teaching.

## Literature Review

Web-based tools and systems have considerable potential to change learning and teaching dynamics and processes (Gilkas & Grant, 2013; NMC Horizon Report, 2014; Saunders & Oradini, 2008) and the literature is full of numerous case studies of its successful use (Sharpe, Benfield, Roberts & Francis, 2006). However unlike in the commercial world, technology has still not fundamentally transformed the way in which universities conduct their core business of curriculum delivery (Huer, 2015). Most UK universities are still trying to make sense of the place of technology-enhanced learning within overall learning and teaching strategies (Kirkwood & Price, 2014). This is currently a major area of debate specifically in relation to the concepts of mobile learning and the flipped classroom (Bishop & Verleger, 2013; Saunders & Klemming 2003). We know that students use their mobile devices frequently whilst at university and would like to exploit them in learning (Beetham & White, 2013). Equally, we know that the majority of academic staff are suspicious of these devices and often see them as distractions or only useful for surface learning (Garrison & Vaughan, 2012; Greener, 2010; Hanson, 2009; Outram, 2004). It is quite common in UK classrooms for students to be told to switch off mobile devices rather than for them to be exploited as part of a curriculum delivery and engagement strategy.

There are a number of other possible reasons why mobile devices are not used that much by lecturers as part of the learning and teaching approach. The age profile of academic staff can have an impact, with many not familiar with the features of smartphones beyond telephone calling, texting, and browsing. Certainly, many academic staffs lack the confidence to engage with tools or services that can be accessed on mobile devices often for fear of the approach failing on the day. Thus the technical infrastructure and support for staff are frequently raised

as an impediment to progressing attempts to integrate mobile learning approaches into classroom teaching (Puentedura, 2006; Sharples, Arnedillo Sánchez, Milrad & Vavoula, 2009). Allied to this are concerns about the physical nature of the classrooms, for example, poor WiFi and furniture that makes it difficult to do anything other than seat students in rows facing one way.

Today's students enter Higher Education with an increasingly diverse range of prior knowledge, capabilities, study habits, digital literacies, and expectations than those of previous generations (Valenti, 2015). "Students need a flexible environment that lets them experiment, learn from each other, and create their own blend." (Beetham, 2014, p. 1).

Today's fast-paced business environment demands nearly instant productivity from every hire. The nature of work today is inherently team-based and collaborative, often virtual and geographically distant. Employers seek creative, collaborative and dynamic employees, therefore the student of the future needs to graduate with instantly productive skills and abilities and educational institutions are being asked to fill in the gap (Valenti, 2015). The blend of technology-specific, individual, and team-based skills is a realistic portrayal of the needs of the modern student (Brown, 2012). Pedagogies that encourage a participatory culture need to be the new focus of educational change (Abeysekera & Dawson, 2015).

The physical classroom remains key to curriculum delivery in most traditional campus-based universities (Fisher, 2016; Graham, 2012; Hakkinen & Hamalainen, 2012; Oradini & Saunders, 2016; Temple, 2007). Curriculum shifts include focusing on various forms of active learning such as flipped classrooms, scale up, team-based learning (Michaelsen, Davidson & Major, 2014) and problem-based learning environments (Tritz, 2015). Such active learning classrooms have the potential to enable students to acquire exactly the kind of skills that employers are demanding of today's graduates.

The general trend towards constructivist approaches in learning and teaching is driving the need to have more adaptable physical spaces that are suited to a range of teaching and learning approaches (Mukerjee, 2014; Valenti, 2015). At the University of Westminster, an extensive review of infrastructure for learning and teaching in 2014 showed clearly that academic staff felt inhibited by the physical spaces they taught in. They collectively highlighted a range of issues that made it difficult for them to contemplate more flexible forms of in-class curriculum delivery, as also observed by Oblinger (Oblinger, 2006). Many problems cited were quite basic such as lighting, availability of sufficient whiteboard space and room blackout capability. Classroom furniture was also frequently raised as requiring attention. Audio-visual (AV) and Information Technology (IT) facilities were also identified as key to the set of lecturer's tools within a modern classroom. The ease of use of the AV and IT was critical in determining the extent to which they were used. Current AV/IT configurations were not seen to encourage nor enable student engagement, again tending to lead to a lecturer-centric model of operating within the classroom environment.

## **Methodology**

### **Purpose of the Work**

The work described and discussed in this paper was undertaken in order to support a desired shift by the university to more student-centered, active learning approaches in curriculum delivery. The changes made to physical classrooms were one major aspect of the university-

wide project concerned whilst the promotion of mobile learning was the other. Allied to both of these was an examination of existing staff development in new methods for learning and teaching and a consideration of how best to provide such development support.

### **Classrooms – The Views of Staff and Students**

A range of approaches to obtaining views and opinions from students and staff about existing classrooms were exploited including surveys, crowd sourcing, as well as individual interviews and focus group meetings. The discussions and data obtained from over 150 staff and around 1000 students were categorized into various themes (see results below).

Having gathered a number of consensus points about new classrooms from across all subject areas, the next step was to work out how to reflect the views collected in any new classroom designs. Working through the University's estates department, a project manager (PM) was engaged for the work and a single person internal to the University, with teaching experience, acted as the principal client for the work. The client's main role was to engage with the customers (the academic staff who would use the rooms) to take the themes that had emerged from the review and start to develop outline plans for a number of rooms.

The university is structured into five faculties and working within the available budget it was calculated, using sector and internal norms for room refurbishment costs, that potentially 5-6 rooms per faculty might be refurbished. Each faculty was asked to identify a minimum of two lead stakeholders to work with the client on identifying the target rooms and to go on from there to specify requirements for each room. The specification/design process was broadly split into two; the audio visual and IT in each room was one part and the other was what would be described as the "building works." To help to ensure that the overall look of the new classrooms would feel engaging, an external design company (Rock Townsend) was contracted to ensure this and to provide overarching co-ordination of the entire works. The AV and IT delivery aspects were managed by a separate external company that had already been engaged to start a program of AV/IT refresh across the whole of the university that would progressively ensure uniformity in AV/IT equipment, as well as effective control and monitoring of that equipment.

Through a series of face-to-face meetings, sometimes with single faculties and sometimes with representatives from all faculties, the rooms to be targeted were identified and details of any specific requirements for each room were developed. Specific requirements were either related to the precise mix of the technology in the room or the furniture.

### **Approach to the Development of Mobile Learning**

In order to move the University of Westminster forward in relation to mobile learning, a project-based approach, based on best practice methods developed by sector-wide agencies was used. Initially, members of the core project team concentrated on exploiting a number of resources that were specifically focused on mobile learning to gather ideas for moving forward with the project in its early stage. These resources were provided through JISC, a not-for-profit organization for digital services for further and higher education. JISC resources helped in deciding certain paths (e.g. formation of a practitioner group) and gave ideas for quick wins. In addition, the resources were used as sources for a report prepared by the project team to provide a basis for engagement with the wider university staff and student community. This included the gathering of baseline data from stakeholders on their view of mobile technologies and learning approaches. The JISC resources exploited were:

**Mobile Learning infoKit** (<https://www.jisc.ac.uk/guides/mobile-learning>) – this was the core resource and helped us to consider where quick wins might be made. For example, this resource prompted the generation of the Virtual Learning Environment (VLE) newsletter for staff and students and also began to make us think of implementing a secure texting service for use by staff.

**Effective Practice in a Digital Age** ([www.jisc.ac.uk/publications/programmerelated/2009/effectivepracticedigitalage.aspx](http://www.jisc.ac.uk/publications/programmerelated/2009/effectivepracticedigitalage.aspx)) – this provided some useful information on the theoretical aspects of the report referred to above and also suggested the use of YouTube for storage of videos that would then display on mobile devices.

**JISCTechDis’ Go Mobile!** (<http://rscstaffdev.blogspot.co.uk/2009/02/jisc-techdis-go-mobile.html>) – again this provided useful background for the report and also was an important resource to cite in highlighting the advantages of mobile learning to students with accessibility issues.

**Sustainability Toolkit** (<https://sustainembed.pbworks.com/w/page/31632855/Welcome>) – the project director was very familiar with this resources having worked with a major contributor to the resource for some time. We were able to draw therefore on the individual concerned to guide us quickly through key points to ensure sustainability, which in part has led the project to work ever more closely and become a small part of wider institutional initiatives. An early eye on sustainability also led us from the outset to ensure the work was connected to key institutional committees (in this case Information Strategy Committee and Learning, Teaching and Student Support Committee).

## Results

### Audio-visual and IT Equipment

A standard audio-visual arrangement for each room was used, which had been previously agreed for the entire university. This included a new kind of lectern, touch-screen all in one networked PC, data projector and a range of wired connectors to which devices brought to the classroom by the lecturer could be attached to display screens. In addition, as standard, each room was also equipped with a microphone and necessary software to allow for capture (as minimum) of audio/audio over slides. The external design company (Rock Townsend) had the primary responsibility for working with the faculties on room layout and furniture options.

Though not part of the established standard for AV/IT across the estate, all of the rooms were provided with a Kramer unit ([www.kramerelectronics.co.uk/products/#filters?&grouppli=57](http://www.kramerelectronics.co.uk/products/#filters?&grouppli=57)). This was provided as a solution to an emerging requirement to enable screen-casting in classrooms from mobile devices belonging either to the lecturers or the students. The Kramer unit is a wireless presentation and collaboration system that enables more than simple screen-casting. So for example with Kramer units, it is possible to have multiple independent wall displays within one room. In addition, with a Kramer unit up to 6 user screens can be shown simultaneously on one class display. The AV/IT installed the rooms can be grouped broadly into 3 types as shown in Table 1.

Table 1. Summary of types of AV/IT configurations beyond the basics across the classrooms

Type	AV/IT features	No. of rooms
1	One data projector displaying to a designated main wall	11
2	One data projector displaying to a designated main wall but with additional independent displays on other wall(s)	7
3	Smart display board to main wall	1
4	Smart display board to main wall with additional independent smart board displays on other wall(s)	3

Although the University of Westminster had a standard lectern shown in Figure 1, 6 of the 22 rooms refurbished in this project were equipped with an innovative non-standard lectern (Figure 2). This wall attached lectern was designed to be side on to the audience thus removing the potential physical barrier between lecturer and student audience of the standard lectern.



Figure 1: The standard lectern at the University of Westminster



Figure 2: Non-standard side-on wall mounted lectern known as ‘the box’

The variation in the precise mix of AV and IT and furniture allowed the collective group of faculties to make available a variety of room types at the end of the project but still enabled certain aspects of AV/IT (such as the control panel on the lectern) to be standardized. Similarly, although furniture could be different, the general décor and basic features such as lighting, window blinds, and flooring and electric power options was also standardized across the rooms. In addition, feasible walls became ‘writable’ surfaces to add a further option for group working. Typically, this included the designated ‘front’ wall and one side wall.

## The Furniture

There was variation across the classrooms with respect to furniture. Essentially three types of furniture or furniture arrangements were agreed upon. The first was a standard table and chair (see example room in Figure 3) though the specification from faculty academic staff was that these should be much lighter than current tables and chairs typically supplied. The second type of furniture was an ‘all in one’ unit i.e. a chair on wheels with a small writing tablet built in that could be pulled across in front of an individual once seated in the chair (see example room in Figure 4). In the end, the project experimented with 2 types of such chair. Finally, there was a circular, sofa-based seating arrangement proposed for one of the 22 rooms (see Figure 5) and one room was planned to have fixed revolving seats (see Figure 6).

The balance of furniture types across the rooms was:

- Standard tables and chairs – 8 rooms
- All in one chairs on wheels – 12 rooms
- Sofa/lounge type circular seating – 1 room
- Fixed revolving seats – 1 room

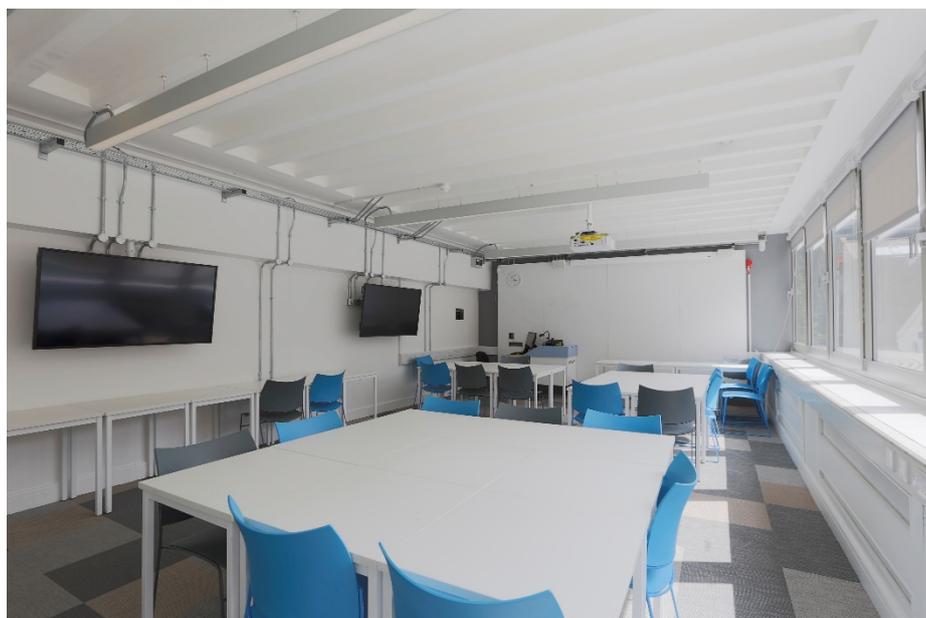


Figure 3: Classroom with standard tables and chairs



Figure 4: Classroom with chairs on wheels with integral writing tablet

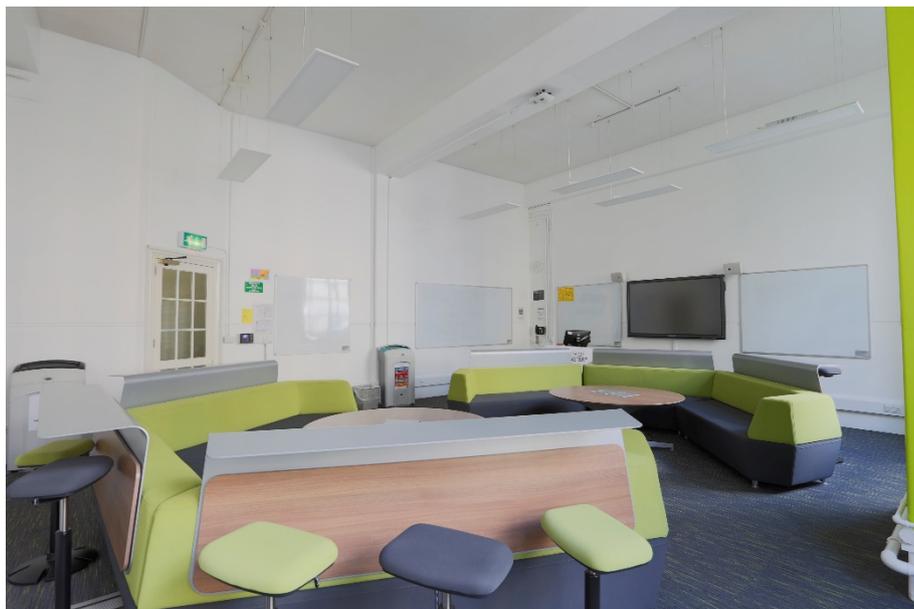


Figure 5: Classroom with sofas and additional informal seating

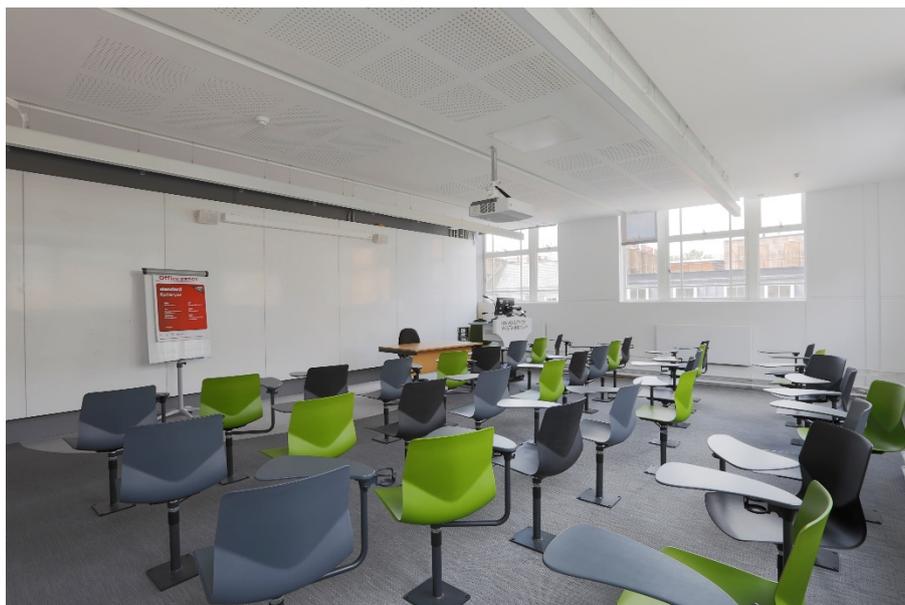


Figure 6: Classroom with fixed, rotating chairs with integral writing tablet

## **Developing the use of Mobile Learning at the University**

### **Surveying students on their views and use of mobile devices and systems**

An online survey (see Appendix 1) was distributed across a range of subject areas at the University with the help of academic staff with a teaching responsibility in those areas. These subject areas were Construction, Biosciences, Media Art and Design, Psychology and Complementary Medicine. They were chosen because of the active involvement and interest of specific academic staff which made it more likely that the project team would be able to get reasonable numbers of responses from students. The goals of the survey were to gather information on students' use of online technology and tools as well as to get a feel for variation in student views across a range of subject areas. In the end, the survey collected some 413 responses across the 5 subject areas involved.

A summary of the data collected is shown in Tables 2, 3 and 4 below. The tables respectively report on access to specific hardware or ownership of specific social networking accounts (table 1); use of/preference for different communication and social networking systems (table 2) and perceived training/development needs (table 3). The 5 columns represent the 5 subject areas that took part. The total number of responses for each subject area were respectively: Construction 129; Psychology 28; Biosciences 180; Media Art and Design (MAD) 47; Complementary Medicine (Comp Med) 29.

Table 2: Access to specific hardware and use of social networking tools and features

	<b>Construction</b>	<b>Psychology</b>	<b>Biosciences</b>	<b>MAD</b>	<b>Comp Med</b>	<b>Mean</b>
Access to laptop	87%	90%	81%	91%	97%	<b>89%</b>
Access to tablet	16%	15%	19%	11%	17%	<b>16%</b>
Smart phone	78%	79%	53%	68%	66%	<b>69%</b>
No mobile internet	12%	18%	30%	28%	24%	<b>22%</b>
Have a Social network account (e.g. Facebook)	77%	86%	77%	91%	76%	<b>81%</b>
Have a Twitter account	20%	36%	23%	49%	13%	<b>28%</b>
Don't know what an RSS feed is	64%	54%	67%	55%	66%	<b>61%</b>

Table 3. Use of communication and social networking systems

	<b>Construction</b>	<b>Psychology</b>	<b>Biosciences</b>	<b>Art</b>	<b>Comp Med</b>	<b>Mean</b>
Never read blogs	38%	21%	31%	9%	28%	<b>25%</b>
Never created blogs	86%	61%	78%	26%	90%	<b>68%</b>
Never used wiki	72%	29%	42%	40%	34%	<b>43%</b>
Never used discussion boards	54%	29%	41%	45%	52%	<b>44%</b>
Rarely use email as communication	4%	4%	2%	6%	0%	<b>3%</b>
Never used web-based image hosting	53%	61%	57%	26%	72%	<b>54%</b>

Table 4. Stated training/development needs

	<b>Construction</b>	<b>Psychology</b>	<b>Biosciences</b>	<b>MAD</b>	<b>Comp Med</b>	<b>Mean</b>
Need to develop internet searching skills	9%	7%	14%	4%	7%	<b>8%</b>
Need to develop word processing skills	5%	4%	9%	6%	14%	<b>8%</b>
Need to develop spreadsheet skills	29%	18%	27%	45%	31%	<b>30%</b>

Key findings from the student survey included a relatively high percentage of smartphone ownership but low tablet ownership. In addition, students seemed generally to use social networks but were often ignorant of terms such as RSS feed. Significant percentages of students had not previously maintained, created or used blogs, wikis and discussion boards. Most students rated their internet searching skills very highly. More recent data gathered from staff and students at Westminster indicates these findings were still mostly valid in 2015.

Student focus group discussions were carried out to explore the results of the survey which generally reinforced and confirmed the impressions gained from the survey data collected. The focus groups also explored in more detail the student views of the Blackboard Mobile Learn app used at the university. All of the students found the mobile app was valuable to them as an aid for keeping up with their studies with the mobile alerts constantly mentioned as a key feature. None of the students who contributed to these face-to-face discussions had experience using their mobile device in any formal, directed learning activity. The groups were evenly split over whether using mobile devices more proactively in learning activities were desirable.

### **Surveying Staff about Mobile Learning**

At the start of the project a short questionnaire designed to obtain baseline information about current exploitation/interest in mobile learning approaches was distributed to all staff who are instructors in the University's VLE, Blackboard. There was a total of 58 completed questionnaires received with representation from each faculty in the university.

The questionnaire included one closed question asking if staff provided material/content that they expected or required students to access on a mobile device. By far the majority of staff who responded (88%) did not currently do this. Two open questions then explored what learning activities staff currently provide for mobile devices and how desirable and/or feasible they thought it was to integrate mobile technologies into learning and teaching either inside or outside the classroom.

Of the 14% (n = 8) that identified a current use of mobile learning, only 2 could be classified as being mobile specific. These were, using a mobile to take video footage (Media, Art and Design), and sharing and pooling group work tasks during seminars on mobile devices (Social Sciences). The other practices put forward were focused on information retrieval from Blackboard and were not necessarily mobile dependent i.e., could also be done via a desktop, or in one case (Computing) the use of puzzles which could be accessed on iOS and Android mobile platforms but also on a computer desktop. Although 88% (n = 50) of respondents

indicated they do not currently provide information, online materials or activities that they expect or require students to access/use with a mobile device, it was apparent from the responses to the question about desirability of utilizing mobile approaches for learning that a large number of the staff who responded were using learning and teaching activities which could support a mobile learning strategy. Examples of this were:

- posting additional [course] information on Facebook accounts
- asking students to photograph relevant public scenes [linked to theory learned in class]
- providing a comprehensive range of learning resources on Blackboard
- annotating lecture slides directly onto netbook (small, lightweight, legacy-free, and inexpensive laptop computers) or tablet devices
- downloading e-books of key texts to refer to in practical classes on laptop or tablet
- encouraging data gathering directly onto smartphones via survey monkey
- ensuring multimedia materials are accessible to mobile devices
- using Twitter, Flickr, etc. for project work
- audio recording of lectures
- viewing YouTube videos in class

When asked how desirable or feasible it is to integrate learning and teaching activities utilizing mobile technology/devices beyond just the provision of information, 77% (n = 45) respondents gave a positive response. Only a very small number of respondents were unsure of this, with the common reason being the lack of knowledge of what might be possible (either from not being aware of the technology available or the support for this within the University). Some 16% (n = 9) stated that a greater integration of mobile learning approaches was neither feasible nor desirable. A common theme amongst the negative responses was a concern over the impact on physical attendance and the subsequent loss of “personal interaction,” “sensorial experience,” the perception that mobile learning “does not enhance learning” and furthermore is a more superficial “surface approach to learning’.” Across all respondents, there were concerns about equality of access given that not all students have access to smartphones or tablets. Finally, a substantial proportion of respondents 81% (n = 47) expressed a desire to find out more about mobile learning approaches either through workshops, seminars or newsletters.

### **Developing a Community of Practice**

The work described above led to the formation of a mobile learning practitioner group. This group had 70 members at the first meeting to discuss how best the University could support mobile/flexible learning. The group went on to organize an internal webinar series to disseminate more widely some of the examples of practice that bringing the group together had revealed. The group managed to engage with the Deputy Vice-Chancellor of the institution with responsibility for learning and teaching, who personally took part in the webinar series, and undoubtedly raised awareness at a senior level the need for support development. This led to specific changes to the technology enhanced learning strategy for the institution. The project also funded a number of pilot projects, including one designed to measure the impact of providing a tablet device to students in small classes to facilitate student co-creation.

### **Leveraging Additional Institutional Investment in Mobile Learning**

As a consequence of the practitioner group as well as the university-wide events the group organized to raise the profile of flexible/mobile learning, the university’s central support

services added two services to the online learning toolset that could underpin mobile learning approaches. These were a texting solution that integrated with the VLE and web-based polling that could be used both in and outside of the classrooms. In addition, a plan for the progressive enhancement of the university's WiFi network was also put in place.

### **Academic Staff Development**

We received clear feedback from staff that what they wanted was simple uncomplicated suggestions of how to integrate mobile learning into their teaching and classroom delivery. Time was cited as a real issue for academic staff. There was little spare time to spend on complicated systems or excessive pedagogic theory. Experienced staff wanted ideas with which they could rapidly engage and consider within the context of their subject area. We therefore started with a workshop that was around two hours in length when delivered face-to-face.

The workshop was discursive and centered around four short video case studies that briefly highlighted situated learning, the use of video recording, student co-creation and use of online collaborative spaces including writing walls and blogs. The student co-creation case study was internal to Westminster and was based on pilot work supported by the project. Presentation of the case studies was followed by group work where participants brainstormed “how what they had seen and heard in the case study video could apply to their teaching.” Initial feedback from the first two workshops (15 participants in total) was generally positive. However several participants did remark that they would like access to additional “how-to guides and videos.”

As a consequence, the workshop team developed an online version of the workshop within the VLE. The site contained the short case study videos plus a recording of the introduction to the workshop given face-to-face. Wholly online participants were encouraged to keep personal blogs and to reflect at predefined points with those reflections guided by questions focused on “how what they had heard could help in their context or not.” In addition, there was a course blog to which all participants at the end of the online course were asked to post an outline plan for taking mobile learning forward in their teaching. The online site also contained a number of short videos supplementing the core materials and activities used in the face-to-face version of the workshop. These videos showed how specific tools worked and it also included an area called the “app store” where all participants could share their experience of apps or web services they found valuable. Associated with the completion of the online course was the award of a digital badge that could be passed by the participant from the VLE site to their Mozilla Badge Backpack. The badge was triggered by completion of personal blog posts at set points in the course workflow and through completion of the outline plan referred to. The workshop continued to be offered face-to-face and these participants, as well as those who had taken the face-to-face course previously, could gain the badge by writing an outline plan posted to the workshop in the VLE blog.

Between January and July 2015, around 150 staff attended the workshop either face-to-face or online and nearly 300 blog posts were made. The views from participants at various points in the workshop (face-to-face and online) were also collected on Padlet walls.

### **Academic Staff Reflections on the Workshop and Mobile Learning Approaches**

Many unsolicited comments written in the blogs suggest that the workshop was highly regarded and pitched at the right level. The scope for participants was: to hear about simple approaches

that have worked, think with others about how the approach could be adapted to their context and then find out how to use the technology tools required. In the latter respect, the online site was considered most helpful not just for the how-to aspects but also because it was a place they could revisit and benefit from the reflections and views of others. While there were many blog posts praising the course and highlighting the community aspect of the online site, there was one part of one post that we reproduce below and which we believe reasonably represents the collective view of the utility of the course and the community aspect:

Thank you for a really useful introduction to mobile learning. I feel much more confident about starting to implement mobile learning techniques into my teaching sessions and the tools that are available to me now, as well as where to get help and advice from. It's also been really useful to read some of the blogs from other participants on this course who, having tried and tested some of these tools and activities, have offered valuable tips and ideas, and others who like me are relatively new to mobile learning and had similar concerns and ideas also. I am now thinking of ways in which I can use some of these tools in my upcoming sessions.

Generally, participants who wrote in the online course blog about their plans for going forward tended to focus on what they had experienced in the workshop/online course. So, situated authentic learning was regularly raised, as was reflection, sharing and role-playing. Of the technology tools used in the face-to-face workshop, Padlet (online writing wall), Poll Everywhere (in and out of class web-based polling) and the video/audio capture capability of smart devices seemed to exercise individual and group thoughts most frequently. A number of examples of simple mobile learning approaches already practiced by participants or planned for the future, across a range of subjects, are summarized in Table 5.

Table 5: Simple mobile learning approaches done or planned by participants

<b>Subject Area</b>	<b>What I do or plan to do</b>	<b>Technology</b>
Politics	Students reflect on visits to political, government or non-government institutions. Communication and sharing of data to prepare for simulated negotiations,	Twitter, blogs, Padlet, Poll Everywhere
Psychology	Students are encouraged to experience a musical genre culturally different to their own. Reflections can be enhanced through recordings and shared with peers. Students visit a museum to research aspects of the topic (e.g., history, conceptual issues, professional issues). Students use mobile devices to gather data.	recorder app, discussion board, smartphone or tablet
Languages	Students share what they have observed on a visit. Class responses to translation questions and strategies. Brainstorming vocabulary or opinions on different topics. Recording of role play scenarios.	Padlet
Business	Sharing reflection and commentary on daily news. Gathering feedback on curriculum delivery. Students work in groups and produce podcasts. The group chose the best podcast to represent their group. Students work in groups to identify characteristics of projects and post comments on these.	Padlet, iMovie, Educreations app, Adobe Voice

Computer Science	Students attend exhibition and create a group video of their experience. Recorded video lectures coupled to student completing set questions to bring to face-to-face lectures.	iMovie app, Padlet, Panopto, Google Sheets
Cultural Studies	Providing groups of students with the opportunity to formulate answers to in-class questions.	Padlet, Poll Everywhere
Biomedical Science	Laboratory class recording of observations, and measurements made during experiments.	iMovie app
Property and Construction	Pre-class sharing of individual and team work.	blogs
Health Sciences	Student teams co-create learning materials.	Group blogs
International Relations	Students visit a cultural organization, record aspects of the event and then share reflections in relation to learning outcomes.	Smartphone, blogs
Molecular Biosciences	Students work on placement record and share their experiences.	blogs
History	Creation and sharing of recordings/short films while on field trips/walks.	Smartphone, blogs
Law	Gathering information from students on topics that they find difficult to support revision	Padlet

### Discussion

It is clear that quite basic aspects of a classroom were of importance in helping lecturers to make classes more flexible or adaptable. While most of the academic staff saw the potential of some modern technology approaches in learning, their main concern was to be able to do the basics with technology easily and reliably. When questioned about this, academic staff cited two issues consistently. One was a lack of confidence in using new technology in a live classroom and the other, tightly associated with the first, was time needed to become confident in dealing with situations where the technology does not operate as expected. A quote from one member of staff summed it up thus:

When I go into a classroom I am performing and to perform I need to know how my props work inside out. When my props are harder to operate than a light switch or are not tools I can use in my own office or at home I struggle. Teaching is a performance and I don't have the time to rehearse as much as I would like. To be honest most classroom technology beyond the PC and PowerPoint is simply not mature enough for me to engage with confidently.

In addition to the technology, classroom furniture has generated a great deal of debate. While it is generally accepted that chairs on wheels with integral writing tablet support adaptability, such chairs do not suit all types of classroom activity across subject areas. Without effective timetabling, it can be very difficult to ensure that particular classes get the facilities that most suit their type and pattern of in-class work.

The university has plans to undertake further research to determine the impact of the changed nature of these classrooms on the curriculum delivery approaches taken by lecturers and on the student experience. In part, this is due to acknowledged limitations associated with the

evaluations carried out to date. The surveys conducted have a relatively low response rate and the conclusions drawn may not be entirely representative, despite best efforts to check conclusions through focus group meetings with representative student and staff groups. The low level of engagement with feedback mechanisms is particularly an issue with staff where some lecturers seem reluctant to engage at all. This lack of engagement from non-enthusiasts makes it harder to fully satisfy the needs of different subject areas while also addressing the financial and design constraints that are often faced.

As this research goes on, what has been learned to date is being used to inform the second phase of classroom refurbishment, this time to encompass 40 classrooms across the estate. In the second phase, the nature of the AV and IT introduced, beyond the basics, will be examined carefully to ensure that what is provided generates scope for innovation but is practical for busy staff. In addition, adaptability may be addressed better through providing classrooms that have a mix of furniture within them and also by improved agility of timetabling.

The work done on developing mobile learning alongside the classroom redesign has clearly raised awareness as well as exposed real interest in mobile learning approaches. The desire to engage with mobile learning by academic staff is evidenced through the surveys and focus groups. The pleasing engagement with the staff development workshop, “Flipping Mobile Learning” is another strong sign of the topical nature of mobile learning, especially when linked to classroom activities. For students, the surveys generally show their interest in all things mobile, though this is by no means true for all students and in addition, there is a significant view that mobile learning for students is more about receiving information and watching videos than for engaging in classroom-based or out-of-classroom group activities. This may, of course, reflect their experience of the use of mobile learning to date, which would in turn reflect the relatively low level of maturity for this form of learning at the University. It may also be a sign that significant numbers of students are more comfortable with passive roles within classrooms and may see some mobile learning approaches as potentially a way to make them do more work.

The student survey carried out as part of this study revealed that though many students like using mobile devices, they may not be too keen on in-class activities that exploit mobiles. On the other hand, academic staff surveys and focus groups suggest they struggle to be less reliant on lecture and want to engage students, but too often find it difficult to do so. Whilst many staff seemed able to see the opportunities that mobile approaches present for changing the passive student role, they are wary of using less familiar technology in the classroom environment. How does one address this difficult and complex problem?

At the University of Westminster, as at most universities in the UK, new staff has to undertake at least one module on the Postgraduate Certificate in Higher Education. One of these, Technology to Enhance Learning, covers mobile learning and flipping the classroom as part of its timetable. It has undoubtedly led to an increase in interest and practice amongst new staff in these key areas of teaching development. However, the bulk of the staff at Westminster who are experienced do not, by and large, have time to take a full module and want brief, immediately applicable support. This is what the authors feel the workshop described in this paper is delivering. The feedback to date, on both the design of the course and the readiness to state concrete plans for action post-completion of the workshop, supports these feelings. The combination of face-to-face and online delivery for the workshop has worked well to support diverse learning styles and to develop connections across a community with some common interest.

It is to be hoped that the wider sector can learn from the experiences of this case study from the University of Westminster. These are exciting and interesting times for university within a rapidly changing higher education environment. The introduction of a new curriculum structure, with an enhanced focus on employability, and new learning and teaching strategies with a focus on blended learning, signal significant changes ahead. Whilst not by any means the panacea for success, technology will be central to building the future learning environment and student experience. To be successful, any university will need to bring academic staff closer to simple technology solutions and help students to get more engaged in an active learning partnership with academic staff.

Future work at Westminster will focus on how to achieve even wider engagement across the student and staff base in determining the impact of the new classrooms on what actually happens in taught sessions and how this impacts the student experience and their learning and achievement. Part of this will include a longer term assessment of the wider adoption and impact of mobile learning technologies and approaches.

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## Appendix 1 – Survey of Technology Access and Usage

This is a simple survey of students on University Programs to establish how familiar students already are with some of the technologies used in connection with your course, and the level of access you have to technology.

Your responses are anonymous and will not be used to assess you in any way. Please answer honestly. The results of the survey are only useful to us if we can get a clear picture of students' current level of access and usage. We aim to use the results of this survey to inform the design of our course content and staff development to best meet your needs.

When you have answered all the questions, simply click on 'Submit'.

Thank you.

### Questions

\* Required

#### Your course \*

1. Please indicate which course you are on
2. Please indicate your year/level of study \*
  - Foundation year (Level 3)
  - Undergraduate year 1 (Level 4)
  - Undergraduate year 2 (Level 5)
  - Undergraduate year 3 (Level 6)
  - Postgraduate (level 7)
3. Please indicate whether you are a full time or a part time student
  - Full time
  - Part time
4. Please indicate whether you are male or female
  - Male
  - Female
5. For all of your modules it is essential to have access to a computer with an internet connection. Which of the following options best describes the type of computer access which you use most frequently in connection with your studies?
  - I use my own personal laptop or netbook with a wireless internet connection
  - I use a desktop PC at home with a high speed internet connection
  - I use the open access computers provided by the university
  - Use of a laptop or netbook computer

6. Please indicate the option which best describes your access to a laptop or netbook, and how you generally use it.
  - I don't have access to a laptop or netbook
  - I have a laptop or netbook and I generally bring it with me to University
  - I have a laptop or netbook but I do not bring it with me to University
  - Tablet computers (e.g. iPad or similar)
7. Please indicate the option which best describes your access to a tablet computer, and how you generally use it.
  - I don't have access to a tablet device
  - I have a tablet device and I generally bring it with me to University
  - I have a tablet device but I do not bring it with me to University
8. Please indicate the option which best describes your access to a smartphone or other mobile device
  - My mobile phone is a smartphone (e.g. iPhone, Android, Blackberry etc) which can access the internet
  - I don't have a smartphone but I do have a mobile device which can access the internet (e.g. an iPod Touch)
  - I don't have any mobile devices capable of accessing the internet
9. Please indicate your level of usage of social networking sites such as Facebook
  - I have a social networking (e.g. Facebook) account and I update my status daily
  - I have a social networking (e.g. Facebook) account and I update my status occasionally e.g. once a week
  - I have a social networking (e.g. Facebook) account but I rarely post anything on it and only use it to view other people's posts
  - I don't have a social networking (e.g. Facebook) account
10. Please indicate your level of usage of Twitter
  - I have a Twitter account and I post 'tweets' daily
  - I have a Twitter account and I post 'tweets' occasionally e.g. once a week
  - I have a Twitter account but I rarely post anything on it and only use it to view other people's 'tweets'
  - I don't have a Twitter account
11. Please indicate the extent to which you read blogs on the internet
  - I read a lot of blogs on the internet and I read them regularly
  - I occasionally read blogs on the internet
  - I rarely read blogs on the internet
  - I never read blogs on the internet
12. Please indicate the extent to which you use RSS feeds

- I use an RSS feed to bring all the blogs I follow together in one place
  - I have used an RSS feed in the past but I never kept up to date with it
  - I know what an RSS feed is but I have never used one.
  - I don't know what an RSS feed is
13. Please indicate whether you maintain your own personal blog, or have done so in the past (please only consider personal blogging - not any course related blogs you have been asked to contribute to)
- I maintain my own personal blog and post to it regularly
  - I maintain my own personal blog but only post to it occasionally
  - I have maintained a personal blog in the past but currently do not
  - I have never maintained a personal blog
14. Please indicate your prior level of experience in using wikis
- I have contributed to wikis regularly in the past
  - I have limited prior experience of wikis
  - Prior to starting to this course I had never used a wiki
15. Please indicate your level of prior experience in using online discussion boards (Note: this can include experience in using discussion boards for non-academic purposes, e.g. a football fans' message board or similar. This does not relate to any current course related discussion boards you may contribute to)
- I have contributed to discussion boards regularly in the past
  - I have limited prior experience of discussion boards
  - Prior to starting to this course I had never used a discussion board
16. Please indicate the extent to which you use email
- I send and receive emails every day (including, work, social and university)
  - I send and receive emails occasionally (e.g. a few times a week)
  - I hardly ever use email as a means of communication
17. Please indicate your level of experience in using web-based image hosting services (e.g. Flickr or Picasa)
- I have used web-based image hosting services regularly
  - I have limited experience of web-based image hosting services
  - I have never used web-based image hosting services
18. Please indicate your level of experience in using web-based social bookmarking services (e.g. Delicious or Diigo)
- I have used web-based social bookmarking services regularly
  - I have limited experience of web-based social bookmarking services
  - I have never used web-based social bookmarking services

19. Please indicate what level you consider your internet searching skills to be

- I consider myself to be highly proficient at internet searching
- I consider myself to be competent at internet searching
- I think I need to develop my internet searching skills

20. Please indicate what level you consider your word processing skills to be at (e.g. in Microsoft Word)

- I consider myself to be highly proficient at word processing
- I consider myself to be competent at word processing
- I think I need to develop my word processing skills

21. Please indicate what level you consider your spreadsheet skills to be at (e.g. in Microsoft Excel)

- I consider myself to be highly proficient in the use of spreadsheets
- I consider myself to be competent in the use of spreadsheets
- I think I need to develop my spreadsheet skills