# Developing confidence in the use of digital tools in teaching

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**Abstract:** In this study Higher Education teachers were offered new mobile devices with very few conditions attached. The aim was to introduce staff to mobile technology and how it could be used to support teaching and learning within a small, interdisciplinary campus. The study hypothesized that by offering staff the simple incentive of new mobile devices for professional and private use, they will be keener to adopt new practices. The only conditions required were the adoption of two items of software – SharePoint as a file repository, and the VLE provider's mobile learning application which provides access to the VLE for both learners and staff. There were three stages to the project; Stage 1 involved presenting staff the results of student feedback from their own courses, where the students set out their preferences for using learning technologies. Stage 2 involved surveying staff opinions on the impact of the mobile devices once they were issued. Stage 3 followed up with a selection of interviews, focussing on concepts of interest gained from the questionnaires. Overall results from this study suggested there was an undeniable enthusiasm amongst teaching staff for using mobile technology, however there were still issues surrounding digital confidence and the pedagogical reasoning for integrating such technologies. There is still a divide on the role of mobile technologies within the classroom, most likely stemmed from the lack of knowledge surrounding their potential purpose. In conclusion, staff enthusiasm alone is not enough to result in adoption and integration of mobile technology within teaching and learning, there must be a focus on pedagogy and relevance for teaching staff to engage fully.

**Keywords:** learning agility, Higher Education, institutional change, digital scholarship

## 1. Introduction

The pervasive presence of technology in everyday life has driven higher expectations among learners for digital approaches to learning and teaching; teachers fail to recognise and respond to this drive at their peril. Conole *et al* (2008) highlight i) students' specific expectations for the internet as a first access point for information, and for all involved in the learning process to ii) access up-to-date information and iii) be able to communicate on demand. Their study shows that students are becoming what Weller (2011) calls 'digital scholars' using technology for all forms of research and retrieval of information, communication, data processing and manipulation, storage and analysis. This argues that the pace of learning for teachers and developers must increase. Institutional strategies for fostering "learning agility" must be found (De Meuse *et al* 2010, Greener, 2012a), enabling academics to explore and develop the willingness and ability to learn new competencies in digital education and scholarship (Lombardo and Eichinger, 2000, p. 323, Vincent 2008). Previous research has shown that academic teaching staff are motivated to engage with Technology Enhanced Learning (TEL) by a desire to deliver high quality learning for students (Bennett, 2014). By building on this enthusiasm with a practical project, the aim will be to reduce any confidence issues with technology, often identified as a major barrier for teaching staff (Kregor et al, 2012). Engaging with mobile learning may result in a 'trojan horse' effect, where, based on engagement with mobile learning, staff reflect on wider uses of technology, such as esubmission and assessment (JISC, 2011).

This study project took place at a small interdisciplinary university campus in which the prime mission is widening participation and working to develop the educational aspirations of the local community. As a result, all faculties have outposts at this campus, and staff have a teaching focus, though some will be engaged in research activity within their home faculties. To interpret a strategic university objective of digital transformation involves potential constraints, not least of which is the limited time and energy of academic staff to retain a focus on discipline scholarship alongside their teaching and pastoral commitments locally, yet also embrace a wider vision of digital learning, when this is not necessarily part of their professional background or personal appetite.

**Why did we undertake this project?**



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A paper presented to the European Conference on E-Learning in 2012 outlined the view from the literature concerning the preparation and development of university teachers in the application of Web 2.0 (Greener, 2012b). It was suggested that a pedagogy, which explored and applied those affordances of Web 2.0 most suited to learning, could promote an active role for the learner in their Higher Education: enabled effectively by digital technology, which in turn could foster sharing and collaboration in social learning networks and contexts (p2). It was also evident from this literature review that the advantages of learning technologies were mediated in their impact on teachers by "the local environment, the macro environment of learning and teaching and the teacher's own personal response to learning technologies based on teaching beliefs and self-efficacy" (p5). This paper focusses on an attempt to trigger change in the local environment. It is only one piece of the jigsaw for fostering learning agility (De Meuse *et al* 2010, Greener 2012a) but is presented as one example of breaking through established teaching behaviours to raise capabilities in digital education and scholarship (Vincent, 2008).

McGill's Synthesis report for UK JISC on Transforming Curriculum Delivery through Technology (2011) provided the main rationale for our local practical project:

"Evidence indicates that funding practical interventions that enhance the general student and staff experience …can have an impact on enrolment, retention and student satisfaction. These also lead to increased integration of institutional IT and administration systems." (p6).

The report makes it clear that students should be involved as agents of change and that learners should be offered multiple access routes into their curriculum to reflect their diverse circumstances – digital technology can support this flexibility, given the necessary investment and staff training. In particular, we took to heart the following from the report "Curriculum staff need to adopt an open-minded approach to the ways technologies are incorporated and used within the curriculum. There is no single right approach." (p8). Few staff had experience of using mobile devices, in particular tablet computers, so this hardware was identified as a disruptive technology which could be offered as an incentive to staff to take part in the project, specifically using a platform (Google Android) which most staff had not experienced before.

## 2. Methodology

The project was completed in three distinct stages. In Stage 1 we conducted a focus group with students, including local campus-based student representatives along with previous and current Student Union Vice Presidents with a keen focus on learning. The aim was to gain a sense of what local campus students believed was available to them in terms of learning technologies, and moreover, what they wanted us to use. In the session students were presented with the different learning technologies available at the University, and asked their thoughts/attitudes towards these. The session proved a constructive way to air frustrations students had about staff who demonstrated little use of learning technologies. We explained the basics of the proposed project and invited student views to help staff see what kind of take-up there was already among students of various technologies and mobile devices and to gauge student response to the possible increased use of digital technologies for learning and teaching.

These results were presented to academic staff in two lunch-time sessions stimulating debate and interest particularly among staff that had little prior experience of using learning technologies in teaching. Twenty staff agreed to take part in the project, wishing to experiment with mobile devices – in this case a Nexus tablet – and were offered the following deal:

A loaned tablet computer for experimentation and use in learning and teaching at no cost provided:

- They committed to using the university's SharePoint system for file storage
- They committed to using the mobile application for the VLE
- They allowed monitoring of the above
- They agreed to take part in two evaluation surveys during the next three month period.

The purpose of including the SharePoint system was to encourage uptake, as staff had infrequently used the system since launch. For staff operating at more than one campus site, as well as working from home, the system allows web access to all files at all places with Wi-Fi.

The purpose of encouraging the use of the mobile app for the VLE was to see how students were increasingly

accessing the VLE. Many staff were unaware that this view could be different from a computer view, so understanding the differences was seen as an important experience for staff. Overall the aim was to encourage staff through the project to use mobile computing for sharing ideas, updating skills and modelling good practice with students.

In Stage 2, once the mobile devices were distributed to staff, questionnaires were issued to gather feedback (at two months and four months into the project respectively). The aim was to assess the impact of the tablets on digital engagement, attitudes to mobile devices for teaching and learning and engagement with the two mobile apps (Mobile VLE App and Sharepoint).

Stage 3 consisted of semi-structured interviews with a sample of the original subject group. The aim was to further explore the impact of the tablet intervention, and the results of the questionnaires. Interviews were conducted on campus in a private room, with two researchers interviewing. The interviews were filmed (Sony, HandyCam) for data analysis purposes and lasted between 45 – 60 minutes. Subjects' identities were replaced with a numerical system to preserve confidentiality.

**Results – Stage 1 (Focus Group)**

General views ranged widely, with students both strongly positive and strongly negative about what technology was in use. There was a feeling that, since modules and courses differed widely in what they made available to students (for example through the Virtual Learning Environment) that it would be helpful to have guidance on this for students. Considerable time was spent explaining to some of the students what was already available to them as awareness and application was patchy. Students also understood that not all staff were yet comfortable themselves with many of the technologies on offer, and this inconsistency was a problem for students studying multiple modules with differing virtual profiles. This was very much in line with our experience and Weller's (2011) notion of digital scholarship – there is very little consistent understanding in the student body of how to employ digital technologies for learning.

To put these findings into a national context in the UK, a much bigger study of University of Sheffield students found that 55% of this population had smartphones, compared with 33% in the general UK population. E-marketer reported in June 2013 that Android compatible phone sales had increased massively in the last 12 months and the ownership of smartphones among the general UK population was estimated at 48-55%, suggesting that a higher ownership among students would also have increased. This was consistent with our small study. The much larger sample in the UCAS media survey of December 2012 suggested that 82% of new undergraduates owned a smartphone and 20% a tablet. This survey result proposed that today's students were more than 40% more likely to own a smartphone than the general UK population.

Student comments in session offered a clear set of messages to staff on campus:

- Students disliked the inconsistent offer of technologies to support learning and wanted staff to offer a broader range of digital learning support.
- Most students anticipated greater use of technologies in learning at university level over the next five years, although not all were positive about this.
- Students offered three main ways in which they thought technologies could help their learning: enabling better communication with and learning from teachers, getting prompt and detailed feedback from staff and helping students to put their learning into context.

**Results – Stage 2 (Questionnaires)**

The response rate for the initial questionnaire was 85 % (17/20). Results suggested the large majority of staff spent time online regularly, and over half would choose to spend any 'spare time' at work online. Most also described their use of ICT as frequent and with enthusiasm.

When questioned about VLE use (other than uploading lecture content), staff frequently posted YouTube videos, utilised online marking tools and created online reading lists for students. It would be worth noting that there is an expectation that both e-submission and online reading lists are utilised by academic staff at this institution. Other learning technologies (such as e-portfolios, quizzes and mobile voting tools) were not

taken advantage of by staff. This produces a real disparity with the focus group data from earlier in this study, highlighting learners' wishes to greater utilise learning technology in their study.

Staff were mixed in their responses on the Google Nexus tablet. Half felt they were successful in utilising it for teaching and learning, whereas the other half reported they didn't experiment with it enough, some due to lack of confidence. Confidence issues with ICT are a common barrier cited by teaching staff (Totter, Stutz & Grote, 2006; Pelgrum, 2001). However most staff utilised the tablet regularly and 70 % were satisfied with the device. There may be a difference here in the use of the device as a consumable item compared to a creative item for use in teaching – this will be explored further later. Interestingly 60% of staff involved owned a smartphone and 70 % owned a tablet, showing they had previous experience of mobile technologies. Some cited specific issues with the Nexus (compared to iOS devices) which may also explain some of the negative responses.

Results for the second questionnaire (issued November, 2013) reported positive attitudes towards the use of information technologies, however the response rate was much lower with this survey (45 %, 9/20) compared to the previous. This might have been for a number of reasons, including the questionnaires' timing (mid-semester) as well as feelings surrounding the Google Nexus Tablet itself. Due to the smaller sample size, care must be taken when analysing this data set. Staff use of the VLE remained unchanged, with the 'compulsory' elements frequently used. Assessing the impact of the loaned tablets on engagement with other learning technologies was difficult given the lower response rate.

One major aim of the project was to increase staff use of SharePoint for storage, backups and accessibility across campuses. When asked what further support was required, the majority of staff stated more training was needed on this system. Training sessions were offered prior to this project, and so one must ask whether the type of training being offered was suitable and matched the needs of academic staff.

There were also mixed attitudes in allowing learners to use mobile devices in the classroom. This is surprising given that this project was to encourage staff to see the benefits of promoting a BYOD culture.

Overall all staff that responded in stage two felt the project was a success in getting them to engage with mobile devices and become more comfortable with them in teaching and learning. As mentioned previously the aim of the project was to engage staff in updating their digital skills and improving their confidence, and this has partly been achieved.

However there were some areas identified for further exploration:

> How can the institution improve the confidence of teaching staff in using mobile devices?
>
> What challenges/barriers prevent staff utilising 'non-compulsory' digital tools in their teaching?

**Results: Stage 3 (Interviews)**

In order to triangulate the data and to further explore staff attitudes to learning technology, a number of short, semi-structured interviews were undertaken with staff who took part in the project. Seven staff from the original pilot agreed to participate to further explore the impact of the tablet intervention. Staff involved represented a range of academic disciplines, and were based at multiple campuses within the institution. The aim of the interview was to ascertain the individual's thoughts on a number of key issues that arose from the questionnaires. These included; thoughts on using mobile technology in the classroom, attitudes to compulsory and non-compulsory technologies within the institution, barriers to learning new technology and preferred method of learning new technologies.

<u>Mobile Attitudes</u>

As mentioned previously there had been a mixed response amongst staff questioned about their attitude to mobile technology in the classroom. The interviews revealed there was a 'balancing act' between disruption and augmentation of learning.

> *"Many like to take notes with mobile devices… I have to believe they are actually making notes!" (4)*

*"I think there's an element of getting distracted….. it's a tricky one…. Although my view is providing they are not disrupting others, it's ok". (1)*

*"Anything that encourages learning, I'm in favour of" (2)*

Staff also commented on the process of change within the institution, and how teaching staff are progressing at different rates with integrating the use of technology within their lectures.

*"I think it's changing, we underestimate the student's ability to use these devices in their learning. In some cases staff are ahead (with mobile technology use) and some are behind – and the same applies with students" (3)*

*"I'm uncomfortable – I have not yet developed a way of integrating their online presence with my teaching" (4)*

Interestingly one member of staff spoke about how using mobile devices in large lecture scenarios was not appropriate, but then admitted there was a need to increase the interactivity of lectures, probably using polling on mobile devices. This further develops the notion that staff are at a point of change, torn between 'traditional lecturing' and 'technology assisted teaching'. Some are more open to this change than others.

*"Engagement is a much broader issue – it doesn't matter if they have a mobile or not - if the engagement isn't there it isn't there" (2)*

There is also the question of whether students are comfortable with viewing such devices as 'work tools'. McCoy (2013) has suggested that, with students, such devices are habitual for non-class activities, such as social media. There is evidence that supports the digital distraction of mobile technology (McCoy, 2013) and fear of this is exhibited by academic teaching staff. This notion of a gap between owning a device and using it for academic study is concurrent with previous research (Chen & Denoyelles, 2013). It has also been reported that there is a larger divide for small mobile devices than tablets (Chen & Denoyelles, 2013). One suggestion raised was to move forward institutions' need to commit to a 'unified technology solution', where learners are provided with identical mobile devices which can be centrally configured and viewed as a tool for learning.

Barriers to New Technologies & Learning Methodologies

There seemed a wide scope for barriers to staff learning new technologies. First order barriers such as time to prepare materials and digital confidence were identified and concurrent with previous research (Prestridge, 2012). An interesting theme that emerged was the need for relevance – staff sometimes felt there was not a clear underlying pedagogical focus for using a new technology, which reduced its relevance.

*"If I don't immediately see the usefulness of it, I'm kind of half-hearted" (4)*

There is a real need for Learning Technologists to focus on the pedagogical need for such technologies, rather than just demonstrating 'how' they are used. These 'second order' barriers are also reported by Prestridge (2012). This may be crucial in tipping the balance and encouraging teaching staff to utilise learning technologies within the classroom.

There was a common theme that most staff were confident in learning new technology themselves, utilising internet walkthroughs and videos. If they were unsuccessful they would converse with a colleague or a learning technologist. The confidence in learning new technology independently but not with implementation highlights a complex paradoxical relationship in digital confidence. The difference may be explained by the staff simply not wanting to make mistakes in front of their audience, as one lecturer explained.

*"It's all very well sitting at your desk and getting it to work, but when you're in front of a group of people and it doesn't work as you thought it might… you get that hot under the collar moment" (1)*

It is also worth noting that on reflection staff highlighted the issue with this 'DIY' approach to learning, in that knowledge 'gaps' appeared, particularly with complex technologies. It would also be worth noting that there was no specific member of staff delegated to provide support or training during this project, which may have hindered staff adopting the use of the tablets.

Thoughts on the Tablet

Staff generally used the device provided, and agreed it had been a success in improving their confidence in using mobile technology. It must be stated however that this only reflected the view of a small proportion of the original sample (35%) and so notions of 'success' cannot be accurately attributed to the project as a whole. Also staff were using tablets mainly for productivity, not teaching – e.g. personal research, checking email etc. Some criticised its features for 'creating' material, preferring to focus more on its role as a 'consumer' device.

*"It's good for doing light pieces of work, for bringing to meetings, keeping notes on…. But in producing large documents it's no good" (2)*

*"(with the tablet) I was able to travel lighter – but the work I was doing required typing and creating, so I got back into the habit of using the laptop" (5)*

*"I've used it a lot for meetings... and our periodic review" (3)*

However none of the staff interviewed was using their tablets for teaching or learning activities. Some staff were using BYOD mobiles/tablet strategies in the classroom, but the general consensus was that this was limited and those that did use them 'could do more'. Again there seemed a lack of relevance for using these devices within teaching and learning and, contrary to expectations, this did not align with specific subject disciplines. This links back to staff attitudes on mobiles in the classroom – the lack of pedagogical clarity on the use of mobile devices can be used can lead to staff being wary of encouraging its use and implementation. Fabian and Maclean (2014) discuss an action research study of similar type to this one which did prove to result in staff using Android based tablets for learning and teaching activities. However, in that study, staff were selected on the basis of their innovative track record with technologies and given directed training, both technical and pedagogic, to support the tablets' use, also the project was focussed explicitly on using the tablets for teaching in the classroom. In the HE study, there was no direction and the staff involved, although mostly regular IT users, had not previously considered active use of mobile devices for classroom learning.

## 3. Conclusions

In this case study, with learning technology support being boosted at the campus, paralleled with an institution wide digital literacies project being implemented for staff, there was a real need to fully understand the concerns and attitudes of academic staff. This is to be vital in shifting the use of such technologies from the technically "literate" and innovative staff, to a culture of accessibility for all staff to utilise (Singh & Hardaker, 2014). The study provided a valuable insight into the challenges of institutional digital transformation – and particularly with this study, the challenge of engaging staff with technologies. One aim was to improve digital confidence, which some staff felt was achieved. Engaging staff with applications such as Sharepoint proved more elusive, mainly due to a lack of training provision and support.

It is worth considering the suggestions of Liz Bennett (2014) in her work in attempting to apply Sharpe and Beetham's Digital Literacies Framework (2011) to HE lecturers. In shifting the model to apply to teachers rather than students, Bennett finds that, rather than access to technology driving development of digital skills, practices and attitudes, as in the student model, this access was not a concern for staff. Rather it was the attitudes, teaching beliefs and confidence towards TEL which drove the design of learning activities with technology and the necessary investment in skill development and search for access. This suggests a strong role for teachers' dispositions towards TEL in the process of engagement. Moreover, Bennett identifies the over-riding impact of teachers' needs to improve learning opportunities for students (p9), a view supported by other researchers in this field (Masterman and Manton (2011), Ertmer and Ottenbreit-Leftwich (2010) and Cuban (1998) cited in Bennett (2014)). It is this commitment to supporting students' learning, which was evident in the interview responses from our campus study. The issue of personal self-efficacy and confidence with technology tools for learning was an, albeit strong, mediating influence rather than an obstacle in its own right. This suggests that rather than trying to tackle confidence improvement directly, for example through workshops and technical support, the objective should be to engage with teaching staff on the pedagogical issues they face and the potential opportunities for solving learning problems and improving learning opportunities for students through experimenting with proven learning technology applications.

The study has shown that whilst students hold an expectation of digital transformation, in practice there is still much to do in supporting this change from a teaching perspective. Just as shown in the Digital Practitioner Framework (Bennett 2014), there is a disconnect between student expectations and staff capabilities and motives. The pedagogical reasoning and methodology for the use of mobile technology is still unclear for some teaching staff, and it is this barrier that will prevent the utilisation of mobile learning within Higher Institutions. Where staff can be encouraged to improve learning opportunities for students through supported experimentation with learning technology tools, their confidence and their personal identity as digital practitioners is likely to increase. Higher Education institutions have to grasp the digital nettle fast, sheer enthusiasm will not do – reflecting Marshall's view (2012). Justifying the pedagogic purposes of mobile technology for teaching and learning, combined with support for teaching staff will help harness the current enthusiasm for mobile technology and tip the balance from uncertainty to an integration of mobile learning.

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