COACTION

Keep taking the tablets? Assessing the use of tablet devices in learning and teaching activities in the Further Education sector

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This article summarises the methodology and outcomes of an interventionist/ action research project to assess the benefits, and potential pitfalls, of the use of mobile devices in learning and teaching activities in a Further Education environment. A bank of 15 tablet devices were purchased and prepared for classroom use. Staff members were approached to scope potential activities and uses for the tablet devices. Three departments took part in the research activity: the Language School, Social and Vocational Studies and the Hairdressing department. Use of the tablets was varied in nature and included: use of multimedia tools, use of apps, creation and use of a bespoke app, multimedia manipulation and sharing, and creation of an online e-portfolio. Staff and student feedback was gathered during and after the project, and project authors were present during classroom activities for observation and recording purposes. Overall feedback was very positive, but there were issues with tablet use and administration. One of the major issues was the onerous nature of the security setup, and app administration.

Keywords: mobile technology; tablets; student attitudes; staff attitudes; mobile classroom

Introduction

There is a growing interest in the use of mobile technologies in the educational sector, evidenced by both research and uptake in the use of tablets and mobile phones in K–12 and Higher Education (Groupe Spéciale Mobile Association (GSMA) 2012; Wu *et al*. 2012). The recent New Media Consortium (NMC) Horizon Report (Johnson *et al*. 2013) identified that the adoption of tablet computing in higher education would occur within a year or less, signifying that adoption is actually already established in some areas.

Key opportunities in mobile learning include: encourage anytime, anywhere learning; reach underserved children; improve 21st century social interactions; fit with learning environments; and enable a personalized learning experience (Shuler 2009, p. 6). In their toolkit for adopting mobile learning, Joint Information Systems Committee (JISC) (2011) provided some tangible benefits associated with the use of mobile technologies. Most of these are examples on Shuler's list but also add the promotion of active learning, enablement of new learning environments, and accessibility, to the list of tangible benefits when using mobile technologies.

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1

Recently, the University of Hull was commissioned by the Scottish government to research the affordability and effectiveness of iPads in education (Burden *et al*. 2012). The study found that the use of tablet devices such as the iPad facilitates the achievement of many of the core elements required within the Curriculum for Excellence framework. It also noted that the adoption of mobile technologies comes with many attendant benefits for learning, which include motivation, engagement, parental involvement, and understanding of complex ideas. Furthermore, the study having tried several setups for implementing the use of the iPad, found that the personal ownership of the device is the single most important factor for successful use (Burden *et al*. 2012, p. 9). Although this report is encouraging, it flags up the issue of cost of implementation in Further Education, with more students, and many more simultaneous classes.

This pilot study aims to investigate the benefits as well as the potential issues in implementing the use of mobile devices as shared devices, and aims to answer the following questions:

(1) What are the benefits linked to the use of tablet devices in the classroom?
(2) What are the potential issues linked to tablet use?

Literature review

The rate of adoption of mobile devices in Further Education compared to K–12 has been at a slower pace and smaller in scale (Wishart and Green 2010). A search of education index databases using the search term 'mobile learning' in Further Education and its counterparts produced only a handful of results in comparison to a search of mobile learning in K–12 and higher education. Whilst dissemination of mobile learning in Further Education has been limited in peer-reviewed journals, m-learning in Further Education has attracted attention via a proliferation of case studies and good practice on the Internet.

Amongst the attributed benefits of mobile learning in Further Education were the improvement of communication channels, updating students about course materials via SMS (Derwen College 2008) and other forms of alerts and updates through mobile devices. This process has proven to be useful in engaging students and has improved learner welfare and retention (Northampton College 2010; Yorkshire Coast College 2010).

On a one tablet per class setup, there are cost benefits associated with cheaper applications on tablets and cheaper hardware (Bridgewater College 2013; Clydebank College 2012). Mobile devices also facilitated location-based assessments (Excellence Gateway 2008; South Lanarkshire College 2012) allowing assessors to document student progress using various multimedia. This highlights not just the digitisation of processes, but also the manner in which mobile technologies can widen the physical scope of the classroom environment.

Location-based learning using mobile devices facilitated learners to have meaningful language interaction (JISC 2005b) and explore concepts in authentic environments (Lius 2011; Mobiilisti 2012). In addition, the mobility of these devices allows learners to engage with their learning materials anytime, anywhere and not just in the classroom environment (JISC 2005a).

Mobile devices have now evolved from mere communication tools to pocket computers with their own share of added functionalities and limitations. Patten,

Sánchez, and Tangney (2006) identified seven functions by which a mobile device would serve educational requirements: administration, referential, interactive, micro world, data collection, location aware, and collaborative. The first four items are functions that can be carried out with traditional fixed-location computers while the latter three items highlight beneficial features of mobile devices. Patten's framework shows that a variety of learning activities can be carried out with mobile devices.

Puentedura (2009) introduced the Substitution Augmentation Modification Redefinition (SAMR) model for technology integration (see Figure 1). The framework states that technology adoption ranges from substitution, where the technology acts as a direct substitute for traditional tools, to that of redefinition, where the technology allows for the creation of new tasks previously inconceivable. These two frameworks of mobile use and technology integration will be used to evaluate the range of activities carried out in the different subjects during the intervention, alongside the evaluation of the benefits of using mobile devices.

Methodology

This is an interventionist/action research project that examines how the use of tablets as a shared device can contribute in a Further Education learning environment. The authors' role in the research was interventionist, in that propositions were identified, and then practitioners were consulted to invite their collaboration to help to prove or disprove the propositions. Action research was then undertaken in various classroom scenarios to observe, gather data, and evaluate outcomes.

Project description

The pilot project was undertaken between November 2012 and May 2013, covering a period of 6 months. Prior to the start of the pilot project, potential partners were identified. The subject areas chosen were Hairdressing, the Language School and Social and Vocational Studies (SVS) to spread the diversity of the pilot study.

Transformation

Redefinition
Tech allows for the creation of new tasks, previously inconceivable

Modification
Tech allows for significant task redesign

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Substitution
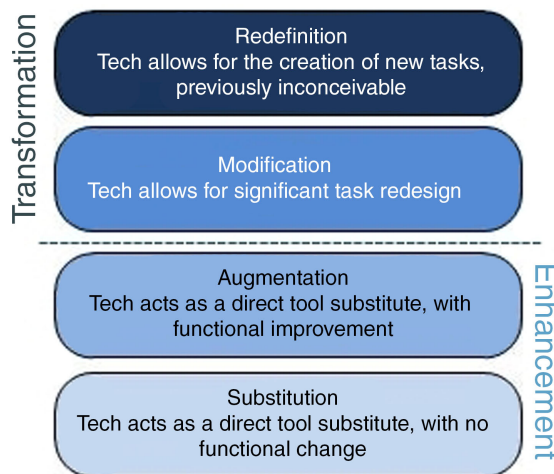Tech acts as a direct tool substitute, with no functional change

Enhancement

Figure 1.   SAMR model of technology integration (Puentedura 2009).

The SVS department at Perth College works with students with additional learning support needs, and these can be at the extreme end of the support scale. They work to ensure that students can attain and achieve, and progress through the system to obtain higher level qualifications.

Contact with lecturers from the three subject areas was established at the outset. The lecturers involved were briefed about the nature of the pilot study and were also given introductory training on how to use the tablets and potential learning activities. The lecturers were also provided with individual tablets for the duration of the pilot study to allow them to explore the various apps available on the market.

Lecturers decided when and how they would implement the tablets in their lesson planning, whilst trying not to disrupt the normal course of activities for the semester. Support from the Learning Technologies Centre was provided in terms of technical guidance on the use of the tablets; pedagogical support by providing exemplars of use; and in the case of one subject area, the development of a bespoke application. Throughout the pilot study, this partnership was maintained through immediate feedback on the part of the lecturers and on-going support on the part of the Learning Technologies Centre.

Joint Information Systems Committee Regional Support Centre (JISC RSC) Scotland were involved in this pilot project, offering support for the SVS project, which used the Infolio tool created by JISC Techdis, (York, United Kingdom). This tool is still under development, and the project offered feedback to JISC about practical use of the tool, as well as suggestions for its improvement.

Participants

The lecturers were nominated because of their track record in using innovative technologies in the classroom and their previous involvement with the Learning Technologies Centre. They also had ideas for specific uses for the tablets, and were prepared to plan and prepare for such use. These lecturers then selected the classes to trial the tablets. A summary of participant numbers during the pilot study is available in Table 1.

Equipment

Three operating systems were considered: Android, Apple and Windows 8. Windows 8 was attractive from an organisational viewpoint, because there was a potential for operating via the College network for security and identification purposes. However, at that time Win 8 tablets were not generally available and price was an issue. Android was chosen on the basis of two factors: price, and the relative ease of native app creation.

Table 1. Summary of participants per subject area.

Subject area	Number of practitioners involved	Number of classes involved	Total number of participants
Cluster 1: Language	1	3	54
Cluster 2: Hairdressing	1	2	50
Cluster 3: SVS	2	4	40
Total	4	9	144

A bank of 15 Samsung Galaxy Tab 2 10.1 tablets were purchased together with a 20-slot charging unit. The devices run on the Android 4.0 operating system, and have front and back facing cameras. This purchase was financed by the college.

Students did not always have 1:1 access to devices. Students in SVS had a 1:1 ratio during use, but hairdressing and Language School students had to share devices. Three was the maximum number of student groups.

Data collection and analysis

Data in the form of observation, video recordings, practitioner interviews, and survey data were gathered throughout the pilot study. The authors conducted all interviews with practitioners, and recorded classroom activity for analysis. One camcorder on a tripod and one portable flip-camera were used to record classroom activities. Practitioner interviews were conducted throughout the 6-month period; two informal interviews, and one final formal interview per curricular area. The informal interviews were related to progress and immediate issues, and the formal interviews were more evaluative in nature. Student surveys were conducted at the end of the intervention.

Results and discussion

This section outlines the results of the pilot study in terms of (1) the range of activities the tablets were able to support; (2) student engagement; and (3) issues encountered.

A variety of learning activities were carried out using the tablets as shown in Table 2. Most of these activities were carried out as group activities with 2–3 members in a group. In the SVS area, it was possible to provide a one-to-one student – tablet provision, with some activities carried out individually, and later converged into a group activity.

The assortment of activities carried out varied greatly, ranging from referential to collaborative activities. Table 3 shows how each subject area utilized the tablets

Table 2. Activities carried out with the tablets.

	Language	Hairdressing	SVS
Used the Internet to gather artefacts		✓	✓
Used the tablet camera (video and photos)	✓	✓	✓
Used free and paid for apps available from the Android® Market	✓[1]	✓[2]	
Used bespoke apps		✓	
Created content with the tablet (aside from photos and videos)	✓[3]	✓[4]	
Used the tablet to access Blackboard	✓	✓	
Used the tablets to create an e-portfolio			✓
Used the tablets for word processing	✓		
Used the tablets to carry out learning activities outside the classroom	✓	✓	

1. LearnEnglish Grammar; English Class Demo; Socrative Student; Skitch; Comic Strip It (lite).
2. Virtual Makeover; Hair design game; Clairol Studio; Polaris.
3. Annotated images; Comics.
4. Moodboards.

Table 3. Activities mapped into Patten, Sánchez, and Tangney (2006) functional pedagogical framework.

	Language	Hairdressing	SVS
Administration			
Referential	✓	✓	
Interactive	✓	✓	
Microworld			
Data collection	✓	✓	✓
Location aware			
Collaborative	✓	✓	

following Patten, Sánchez, and Tangney (2006) functional pedagogical framework. This shows that tablets can be suitable alternatives for the standard fixed-location computers. At the same time, the tablet's data gathering features, as well as its form factor, make it suitable for carrying out collaborative learning activities inside or outside the classroom.

The activities carried out with the tablets in the various subject areas are analysed in terms of the SAMR model. The tablet feature(s) used, the nature of the activity, information on how an activity is normally carried out without the tablets, and the mapping of these tablet-based activities to the SAMR model is available on Table 4.

From Table 4, it can be seen that some activities carried out with the tablets offer only minor enhancements, such as the use of the tablet for word processing, whereby the only measurable benefit, as the practitioner states, is that it made reading the student output a lot easier as opposed to a short story written on paper. In one case, this minor enhancement provided a functional improvement, namely, the case of using the Socrative App, which allowed the lecturer to see how many students had made a mistake. This allowed for instant corrective action or advice. The Socrative App allows the lecturer to ask questions in the form of a multiple choice question or a short answer without having to create the questions in advance. This way, the question can be elsewhere (e.g. from a textbook, or a totally new, impromptu concept), which is a valued feature over some traditional classroom response systems.

Some tasks constituted a transformation of the learning activity and from Table 4 we can see that these are activities that made use of the tablet's multiple features for the same task. This highlights how the multiple features and functions of the tablets make them suitable tools to be used in the classroom environment, making previously unrealistic activities feasible.

Student engagement and feedback

The practitioners reported that students enjoyed using the tablets regardless of which spectrum of the SAMR model this technology integration fell into. In one instance of using the LearnEnglish App, the practitioner reported that students spent as much as 45 minutes exploring the app and trying out the different exercises before eventually becoming disengaged and looking for further direction. Whilst the novelty of the device may explain this enthusiasm in engaging the students, it flags up that altering the usual course methodologies can come with benefits, such as improved engagement with the learning activity, and the ability to carry out tasks they could not have done by traditional methods.

Table 4.   Activities carried out with the tablets mapped into SAMR model.

Subject area	Tablet feature(s) used	Activity	How this activity is normally carried out	SAMR model
Language	Word processor	Students created a short story of 50 words in pairs using the tablet.	This was normally carried out using pens and paper	Substitution
Language	LearnEnglish Grammar App	Students used the app to do multiple choice exercises in pairs.	Students have access to exercises of the same kind using computers.	Substitution
Language	Socrative (classroom response system)	The practitioner asked a series of questions and had the students key in their replies using the app.	This can be done orally or by having students simply raise their hands.	Augmentation
Language	Video camera + Multimedia player	Students used the tablets to capture videos of themselves having a conversation with another student. They then played back this recording and tried to critique the conversations they had recorded.	Part 1 of this activity was normally carried out with audio recordings with pairs of students doing a recording one at a time. Part 2 of the activity is normally not carried out.	Modification
Language	Comic Strip It + Tablet camera	Students created a comics story using the app and the tablet's camera.	No suitable alternative.	Redefinition
Language	Tablet camera + Skitch	Students use the tablet to go around the campus to capture some photographs. After which, they go back to the classroom to annotate the pictures that they have taken.	No suitable alternative.	Redefinition
SVS	Internet, Infolio + Camera	Students used the tablet to browse the Internet, take photographs and create their portfolio using the online web service Infolio.	Students used to access Infolio using computers, which resulted in a poor level of interaction between students. They also used a separate camera to take pictures and upload content to their portfolio.	Modification
Hairdressing	Internet	Students browse the Internet to look for the latest fashion trends. Youtube was used to allow students to have peer discussions and debates after watching the clips.	In a one-computer classroom setup, the videos are shown to the class for discussion.	Substitution
Hairdressing	Polaris + Internet	Students browsed the Internet for pictures to create moodboards using Polaris.	This was normally carried out using cutouts of pictures from magazines.	Augmentation

Table 4 (*Continued*)

Subject area	Tablet feature(s) used	Activity	How this activity is normally carried out	SAMR model
Hairdressing	Video recorder + Playback	Students took videos of themselves as they were carrying out consultations. The recorded videos were then played back to the members of the group for peer-review and assessment.	This activity is normally carried out in pairs without the use of any technology.	Modification
Hairdressing	Bespoke app	Students used an app to help them check whether they were using the right colour choices and product for a service. In the app, students make a series of choices then click on 'submit' to find out whether their choices were correct. This results in more accurate and safer outcomes in terms of working with chemicals and hair colouring process. The app is being used in case studies and also with the hair salon clients. This app was installed on their own phones and in the tablets provided for in-class use.	Students do case studies using the book to aid in colour choices. There was no way to check whether the choices were right until they got to the part where they discuss their choices with the rest of the class.	Redefinition

Table 5. Student survey results.

	Language (n = 16)	SVS (n = 8)	Hairdressing (n = 46)
How much did you enjoy using the tablets as part of your learning activities?	3.28	3.83	3.26
How much do you think that tablets helped in class?	2.93	3.67	3.15
How would you rate the activities carried out with the tablet in terms of it being ...			
... engaging	3.2	3.83	3.14
... interesting	3.27	3.83	3.2
... relevant	3.27	3.83	3.14

Overall, the students have reported that they enjoyed most of the activities as evidenced in the evaluation questionnaire. A summary of the students' survey responses is available in Table 5. The survey was distributed at the end of the pilot study and uses a combination of questions using a Likert scale of 1 to 4 and open-ended questions. Most of the students rated enjoyment of the tablet-based activities as 3 or 4. A few students ($n = 6$) out of the total 70 students completed the end-evaluation survey and rated their enjoyment with the activities as 1 or 2. In the open-ended questions, a student clarified that she was not keen on using touch screen interfaces and preferred to use a standard keyboard. These results highlight that the use of tablets or new technologies will not be an automatic hit with all students.

Language school

Students reported in the survey that they liked the Grammar App and the discussion board best. Whilst the discussion board activity is not mentioned in Table 5, this was actually the end process for most of the activities in the language area. Completed materials – a video interview, a comic or an annotated picture – are uploaded to the discussion board and shared with the rest of the class for feedback. Students valued the higher levels of engagement encouraged by tablet use, but also valued activities that improved their level of English speaking, whether from peer or tutor feedback.

Students also reported that they liked the collaborative aspect of undertaking the activities. In the walkabout activity, they described the learning activity as fun, new and dynamic, referring to the seamless workspace the tablets provide. The students were only asked to annotate two pictures but actually uploaded more than what was required to Blackboard. The captions that they have provided on their journal upload with captions like *Photo Art, Crazy lesson and Lovely break* are all indicative of their positive engagement with the lesson.

Capturing video footage of the oral dialogues encouraged the participants to be creative with the activity and included fantasy role play by some participants. The students were all happy to share their videos, which provided an effective peer learning experience. This also provided a new method to critique their language skills, and develop softer skills such as awareness of their own presence, ways of speaking, posture, and personal interactions, as well as learning to be tactful and sensitive with feedback to their peers.

The use of tablets in this subject area highlights the variety of activities that can be undertaken with mobile devices. The activities they liked the most tended to correlate with the ones from which they reported learning the most.

Social and vocational studies

Some of the potential benefits the authors underlined to encourage lecturer buy-in at the start of the project were: the streamlined process of content, creation, consumption, assessing and sharing. The mobility of tablets allows users to interact with the environment as they carry out a learning activity. The tablet's form factor is another advantage over traditional computers because it does not take away the face-to-face element in a learning activity. These potentials were realised during actual use. Students would sit around a table in clear view of the lecturer as well as interacting with their peers. This setup of the learning space is superior in comparison to the traditional desktop computer setup, where students sit with their backs to the classroom and tutor, and, therefore, are disconnected from their fellow classmates.

In the survey conducted with the students, all students gave the highest rating of 4 in terms of enjoying the activities with the tablet. There was consensus that the use of the tablets helped in their class and that the use of the tablets is relevant, particularly where the tablets help to create a final product, or where they helped them to avoid mistakes. Students indicated that the tablet devices provided real opportunity to engage with one another.

In terms of ease of use, students indicated that there were problems with tasks such as copying and pasting items from the Web and also keying in text. There were also a few problems with the compatibility of some Web sites, such as Infolio, with the tablets, which were resolved by finding work-arounds for these limitations. These technical problems led to some frustration on the part of the students during the initial stages but they also highlight the beneficial role of peer and practitioner support readily available in a face-to-face environment.

Hairdressing

Informal and survey feedback from students was positive. Students felt that the use of the tablets made the lesson engaging and meaningful. The students particularly liked the cognitive tool, which was installed on the tablets and their own phones, because this helped them to track their own progress and flag up any areas where they were making mistakes. They also liked the electronic research process and creating mood boards using the tablets. Students reported that they liked the bespoke Android app because it helped them master the theories related to hair colouring, whilst the mood board activity allowed them to research the latest fashions and create ideas for haircuts and colours.

The range of activities carried out in this subject area facilitated a link between theoretical and practical knowledge. The design and implementation of tablet materials gave 'added value' to traditional class-based activities previously used, and encouraged students to engage with self-directed learning using their own mobile devices.

Issues

Whilst the overall use of the tablets can be classified as successful judging from the positive response from the students, the use of the tablets is not totally problem-free. These issues have been grouped into technical and activity design issues.

Technical issues

Students occasionally hit a brick wall due to unfamiliarity with the tablet tools or operating system, and there was the occasional system crash. Wireless connectivity and browser issues also caused students some problems. In these cases, the best solution was to shut down and restart. On the other hand, tablets only take about 30 seconds to power up so even these 'brick walls' were not much of an issue in practice, although they disrupted the continuity of the activity.

Tablets and current mobile devices are designed as personal devices. Multimedia items are stored for easy sharing, and browsers are designed to remember keyboard inputs to facilitate a better experience on the part of the user, with continued use of the device. These personalization features, however, had to be locked down in a shared setup, mainly for Data Protection and security issues. This means that apps native to the device that personalizes the tablet were removed or locked down (apps like Gmail and Email Client, Google Play and Settings). As the tablet setting is locked down, Internet connectivity is defaulted to the college network. Students would be able to login to the Internet via the browser using the same network username and password, but would not be able to connect elsewhere. Locking down the connection to the college network ensures that Internet activities on the tablet remain within the College acceptable use policy and Joint Academic Network (JANET) regulations.

The settings mentioned above were implemented before distributing the tablets for shared use. However, this did not eliminate all privacy issues. Pictures and other personal multimedia in the tablets had to be manually deleted after use. Students and lecturers were also reminded that they had to log out of Web services like inFolio, Gmail or Facebook every time they finish using the tablet, because these logins tend to remain active even after shut down. No data protection or privacy issues were raised during the 6-month trial with the three student groups.

Setting up a secure environment, loading the tablets with apps, and making any kind of administrative changes offered a serious challenge throughout the project. Dealing with app updates, removal of personal data and charging the devices, were all onerous in terms of staff time.

Activity design issues

Some of the difficulties were about the mismatch between technology and activity design. For example, using the tablets as word processors presented issues with input. Whilst the tablet's keyboard has the same layout as a standard keyboard, students were not able to do touch-typing as they would on a keyboard and this caused a lot of typographical errors. The tablet word spelling correction required precise input and was more time consuming for students. In this case, using a standard computer would probably have been the better choice.

All of the activities with the tablet were carried out collaboratively with the exception of the activities conducted in the SVS subject area. This setup was required mainly because of the limited number of devices available. However, some of the learning tasks were not suited for collaborative work. For example, in the reading task in language activities, a student commented that it is difficult to share a tablet, and for both to concentrate on a reading task. This is an activity where the pace of learners' progress can vary and different levels of student pace can cause issues.

In this example, one student had to wait for the other to finish before going through the next page, whilst the other student would probably feel more pressured into finishing the reading faster. This was also observed in an activity that required students to transcribe the dialogue from the video their classmates had created, where one student was controlling the technology in terms of when to pause and rewind. In this case, the person controlling the device was more active in the transcription whilst the other student was observed to step back.

Tablets are designed for one unique user. This is not to say that collaborative activities are mismatched with tablets, but rather that collaborative activities with tablets work best with activities that require joint decision-making and dialogue between members of the group.

The issues discussed here are not exclusive to this study but have also been discussed in other mobile learning papers (i.e. Clarke, Svanaes, and Zimmermann, 2013; Wishart and Green 2010), which highlights the importance of design factors in mobile learning activities.

When designing mobile-based activities, two design layers need to be taken into account during planning: the technical layer as well as the social environment. In the technical layer, we check whether the mobile device is suitable for the type of activity we want and in the social environment layer, we plan for projected student behaviour.

Conclusion

We have set out to identify the benefits linked to the use of tablet devices in the classroom and any issues associated with tablet use. In terms of learning content, the tablets were used in: content consumption, content creation and content sharing. In terms of the range of learning activities carried out with the devices, they were able to simulate activities possible with traditional computers, but at the same time provide the face-to-face interaction often lost when working with desktop computers.

The design of the activities carried out in this pilot project highlighted collaborative learning, student discourse and peer support. In these activities, the mobile devices can be seen as enablers that facilitated these student interactions. They also highlight how the design of mobile technology supported activities that started as in-class activities can be used to encourage students to engage with self-directed learning using their own mobile devices.

It might be worth underlining that the use of tablets in class is not a panacea. Whilst students displayed improved engagement during the activities, there were tasks that did not fit very well with the tablets and there were tasks that were not suited to be carried out as collaborative activities.

Practitioner buy-in is a critical factor in the successful implementation of the tablets, because the activities that produced the most positive student engagement were those that called for a redefinition of the learning task. In addition, these new technologies, including the apps that go with them, very rarely come with a manual, which underlines the need for practitioner commitment to explore the market, and to try various apps before use in the classroom. It became apparent that if practitioners were enthusiastic about tablet use, that enthusiasm was taken up by the student. If the same activities were repeated too often, or the tablets were used constantly, then the students could become disengaged. The influence of the practitioner's attitude in the successful use of such technology cannot be overstated.

It is apparent that there are advantages in the use of such technologies in the classroom. Some of the technical issues encountered may be eradicated in the near future as operating system manufacturers tackle the needs of educational use, and administration and central control will be enabled by device and app management systems. What is clear from this pilot study is that both students and staff enjoyed using the tablets, that student engagement was improved in many cases as evidenced by lecturer feedback and student surveys, and that tasks were carried out which would have been unrealistic in the 'traditional' classroom environment.

There has been much research conducted on the use of mobile technologies in classrooms, though the range particularly related to Further Education provision is limited. Political considerations may mean that future research and procurement of devices may need to be pan-organisational, to enable sharing of knowledge, and potential cost savings.

Notes on contributors

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