The Need to Balance Technological Innovation With Pedagogic Potential: A case study using Apple TV in classrooms

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Abstract
This paper reports the findings from a Scholarship of Teaching and Learning (SOTL) project funded by the Centre for Excellence in Learning and Teaching (CELT), which aimed to evaluate the potential of AppleTV, in terms of enhancing the pedagogy of staff and the engagement and learning of students. With an Apple TV in a classroom, it is possible to stream wirelessly any content from an Apple device, both staff and student, to the display screen.

Two tentative conclusions emerge from the project. The first, reinforcing the findings of Sintjago and McKay (2012), is that students are more receptive to technological innovation than staff, who can face a number of constraints when implementing change. The second is that for any spending on technology, there needs to be an attendant investment in staff training. This should go beyond the functional of how new hardware or software works; consideration needs to be given to the pedagogic potential of the new technology. This would seem to chime with the work of other in this field (Nguten et al, 2015).

Introduction
Beetham and Sharpe (2007) argue that pedagogy ought to come before technology. Rather than starting with what the technology can do, Biggs and Tang (2011) contend that the focus should be "what makes good teaching, and thus encourages successful learning, whatever media are being used". However, it could be argued that there are times, in the world of education, both in schools and university, where the reverse has been true. Evidence could be cited of the large sums of money that have been spent on the latest technology in the last decade without a corresponding investment in planning; one for example being interactive whiteboards. Currently the use of tablet technology is increasingly popular in schools and universities. The work of Nguyen et al (2015) shows how the higher education sector tends to react to the external market rather than building a sound pedagogical approach to what is perceived to be
cutting-edge technology.

The latest survey by the British Educational Suppliers Association (2015) claims that:

"71 per cent of primary and 76 per cent of secondary schools (an increase from 56 per cent in 2014 in both school types) are making use of tablets in the classroom."

The same survey cites:

"15 per cent of schools suggesting that they will have 1:1 access to tablet technology by 2016 and 44 per cent of schools having one tablet per child by 2020."

One of the catalysts for the increase in the purchase of tablet devices is the marketing of companies such as Apple, who claim that:

"something magical happens when you put Apple products in your classroom. You can create unique opportunities for personal learning at every level. Lessons become more immersive through the power of touch, motion and sound. Assignments can be sketched, scored, charted, coded or performed. And the work your students need to do becomes the work they love to do." (Apple, 2017)

Apple’s claims are supported by recent research; for example, the Scottish Government (Social Research, 2015) found there were benefits to the use of digital technology including: raising children and young people’s attainment; reducing inequalities and promoting inclusion; improving transitions into employment; enhancing parental engagement and improving the efficiency of the education system (Social Research, 2015).

Other studies support these contentions. Clark and Luckin (2013) claimed that tablet devices support learning which is “personal, collaborative, augmented and enhanced”. The benefits for tablets for supporting children with special educational needs was highlighted by Haßler et al (2015), who concluded how the "easy customization" of the devices supports inclusion, allowing "learners to adapt tablet-based resources to their individual needs". Furthermore, the "stigmatization commonly associated with bespoke assistive technologies is minimized, raising academic confidence" (Haßler et al, 2015).
Although these studies were focused on school aged pupils, it could be argued that university students could benefit in similar ways. In fact, there is now a growing body of research that students are found to hold a positive attitude about using iPads in their learning (Brand et al, 2011; Kinash, Brand & Mathew, 2012; Perez, Gonzalez, Pitcher & Golding, 2011; Rossing, Miller, Cecil & Stamper, 2012).

However, the value of technology is contested. The OECD (2015) found that:

"students who use computers very frequently at school do much worse, even after accounting for social background and student demographics."

Though the same report also conceded that:

"students who use computers moderately at school tend to have somewhat better learning outcomes than students who use computers rarely."

Other concerns relate to the ubiquity of mobile phones in a learning context. The results of a study by Beland and Murphy (2015):

"suggest that low-achieving students are more likely to be distracted by the presence of mobile phones, while high achievers can focus in the classroom regardless of the mobile phone policy."

Context
At Manchester Metropolitan University, there has been a surge of innovative practice in the last few years which recent editions of this journal have highlighted (Bober, 2016; Fisher, 2016; McCabe, 2016; McCullagh, 2015; Smith, 2015). These articles have demonstrated the value of technology in terms of enhancing student engagement. This has been mirrored in the Faculty of Education, which invested in iPad technology with monies from the university’s Knowledge Exchange and Innovation Fund (KEIF). In the academic year 2013-2014, all academic staff were provided with an iPad to support their professional practice and teaching. In addition, all students on the Primary PGCE programme received an iPad Mini for use both on campus and their school placements.
The evaluation of this project highlighted that:

"the iPads were generally highly valued and used heavily to support student learning (e.g. through email, internet searching, access to documents) but there was limited evidence to their integration in teaching within the faculty."

(Whitton and Overland, 2014)

This supports the findings of Lindsey (2011) who found that academics’ primary use of iPad apps was for administrative purposes.

Whitton and Overland (2014) concluded that:

"greater support and training in embedding mobile devices in pedagogic practice would be valued, so that best practice in the use of mobile learning is modelled to students."

It was suggested that one logical extension of this project could be the piloting of the installation of Apple TV technology in four rooms in the Brooks building, home to the Faculty of Education, alongside the purchase of a mobile unit which could be used in any of its classrooms. With an Apple TV in a classroom, students can connect to the display just as easily as their lecturers, even though they are on a different network; this means they can share content from their device with the whole class.

There are potential benefits of installing Apple TV in a teaching space. It allows the classroom dynamic to shift from the lecturer at the front, who controls what is displayed on the screen, to potentially anybody in the room. This means that knowledge is no longer the preserve just of the tutor, but can be co-constructed by a tutor working alongside students. Collaborative learning has a long history and can be defined as a process of constructing shared knowledge by all involved in the learning process with the aim of a convergence around a shared understanding (Roschelle, 1992).

**Findings from Staff**

The aim of the project was to evaluate the potential of Apple TV to enhance the pedagogy of staff and the engagement and learning of students. To gauge this, the following research methods were used with staff: observation of teaching, questionnaires and follow up interviews. Students completed a brief online questionnaire after
AppleTV had been used in one of their sessions. However, the data captured suggest that this main aim were not realised. Sintjago and McKay (2012) found differences between student and academic attitudes to technology, with the former being more positive whilst the views of the latter were more mixed. This was borne out by the findings from this project.

In terms of staff evaluation, caution needs to be exercised due to the limited amount of data. A staff questionnaire only received four responses and so it would be difficult to draw any conclusions with any reliability. However, two teaching sessions were observed and discussed afterwards with the tutors concerned and three semi-structured interviews were carried out with those colleagues who had made the most use of Apple TV. The main conclusions, emerging from staff are:

1. **The difficulties of integrating Apple TV into established units:**
The University decided centrally that fixed Apple TVs would be set up in the computer suites, assuming that the technology would be most used in this curriculum area. However, the interview with one of the computing tutors highlighted that this subject was constrained by the need to "deliver content that's already been predetermined"; in this case by the national government’s emphasis on programming and coding, which is most commonly delivered in school using software which only runs on computers. Thus, the content flexibility offered by the use of Apple TV was not relevant in this context...

Ironically, the one cohort with their own iPads were the ones who had no sessions using Apple TV in computing sessions; the limited curriculum time on a one year postgraduate course meant that there was insufficient time to use the devices.

This local issue is reflected more widely. As Nguyen et al (2015) found:

"it is not clear how best to align and integrate it (technology) within the academic programmes and workflows, and how best to manage it as a resource within a university’s organisational setting."

2. **Problems with the technology**
Yeung and Chung (2011) raised a concern that it is premature to use tablets in a classroom, particularly where there is a lack of university policy for technology support. This was borne out by frustrations
voiced by staff. For example, the Faculty has two sets of iPads (a set of originals and a set of iPad minis) but the content of one did not match the other. Further irritation was caused by the inflexibility of the university system when it came to requesting new apps; it was seen to be an unnecessarily complex process which only occurred once a year.

Rossing et al. (2012) revealed that the effective use of tablets was compromised by specific technical issues, such as unstable apps and connectivity. Although the former did not prove to be a problem, the latter most certainly was. Two of the staff interviewed were computing specialists, and their sessions took place in computer suites, though ironically only one of these had a sufficiently robust wifi network for the Apple TV to be used effectively. However, those tutors who had to teach in non-specialist accommodation using the mobile Apple TV, found there were few adverse issues with connections.

In one lesson I observed, the technology worked seamlessly with most groups, though there were two groups which encountered problems. One was relatively minor; a presentation slide froze. However, one group was unable to connect their iPad to the classroom display and as a result the pace of the session slowed discernibly.

3. Fears about student distraction
The interviews revealed some mirroring of the findings of Wakefield and Smith (2012) where staff might be resistant to the use of tablet technology, as it could create a distraction, with fears that the students would prefer internet browsing and so would not give their full attention to the lecturer (Gong and Wallace, 2012) There was a concern expressed by one tutor that unless all students were involved:

"a lot of them will just switch off for the period of time that one person’s work is being showcased. Also I’ve noticed a few on activities, but I have to keep an eye on them and make sure they’re doing what they should be doing rather than what they’re doing. There’s a few that check their emails while they’re doing it."

Despite some staff scepticism, from other tutors there was positive enthusiasm and the main benefits of Apple TV, from their perspective, were as follows:
4. **Apple TV maximises the potential of iPads**

One of the tutors interviewed, who only the previous year had been teaching in a primary school, spoke passionately about the positive impact of Apple TV in her school. She felt that when the school first bought tablets, they were "laptop substitutes". However, once an Apple TV was installed in every classroom, the use of the iPads:

"really started to fly...It completely changed how we were working in that the children became a lot more involved in their own learning and could see that they were expected to do research."

Apple TV was seen as being more flexible and convenient than the use of visualisers, which had been used previously to project the work of children in a classroom.

These views contrast starkly with those tutors. It would appear that begs the question why was the Apple TV more successful in the school rather than the university and this could be a focus for further research.

5. **Benefits for staff pedagogy**

For some tutors, having the Apple TV did enable a shift in pedagogy from the 'Sage on the Stage to Guide on the Side' (King, 1993). This was found to be liberating as one tutor said:

"And so from your perspective, actually having the Apple TV is a benefit simply because it frees you from being at the front and being didactic."

6. **Student engagement**

If the tutor is less didactic, then correspondingly then more onus is placed on the students to participate in their own learning. It does not require technology to initiate this, but, for some staff, one benefit of the Apple TV was higher student engagement in group activities:

"I think it makes them focus more because they know they’re going to have to talk about the work that they’ve created and demonstrated on screen."

**Findings from Students**

Extreme caution is required when interpreting the student feedback as the questionnaire was only completed by 24 students, though there were representatives from three different programmes:
undergraduate and postgraduate primary as well as postgraduate secondary.

The following tables summarise student responses to the survey of their experiences with the Apple TV:

<table>
<thead>
<tr>
<th>Table 1: Statement which best describes engagement in the session</th>
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<tbody>
<tr>
<td>I was more engaged in the session than usual</td>
</tr>
<tr>
<td>My engagement was about the same</td>
</tr>
<tr>
<td>I was less engaged in the session than usual</td>
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</tbody>
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<tr>
<th>Table 2: Statement which best describes belief about the use of Apple TV</th>
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</thead>
<tbody>
<tr>
<td>I believe it was beneficial to my learning</td>
</tr>
<tr>
<td>I believe it had no impact on my learning</td>
</tr>
<tr>
<td>I believe it was detrimental to my learning</td>
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</tbody>
</table>

Discussions with third year undergraduate students in one group highlighted that 20% had already used Apple TV whilst on their school placement and they spoke enthusiastically about being able to share, and discuss, children's work. However, for others, there were no mobile device in their schools. Yet irrespective of prior experience, most wished to experiment with its use in their future professional practice (see table 3). One Postgraduate Secondary Student was hoping their pupils would be able to "produce presentations and videos to share with the whole class".

<table>
<thead>
<tr>
<th>Table 3: Statement which best describes use of Apple TV in future professional practice</th>
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<tbody>
<tr>
<td>I am keen to try this in my teaching</td>
</tr>
<tr>
<td>I would be willing to try this in my teaching</td>
</tr>
<tr>
<td>I cannot see me using this in my teaching</td>
</tr>
</tbody>
</table>

Although there was a willingness to innovate, this was not always aligned to confidence (see table 4). This may because of limited exposure to best practice using the technology. As one undergraduate primary student (Year 3) said, "This is the only the
second time we have used iPads in a session during the 3-year course”.

<table>
<thead>
<tr>
<th>Table 4: Statement which best describes confidence using Apple TV in future professional practice</th>
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<tbody>
<tr>
<td>I already would feel confident about using it</td>
</tr>
<tr>
<td>I would feel more confident with more practice and/or support</td>
</tr>
<tr>
<td>I would not be confident about using it:</td>
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</tbody>
</table>

Others felt that what may work in a university setting would not be as successful in the more demanding environment of a secondary classroom:

"It took quite a long time for devices to connect and for different users to show their work. It was good for university to show our different ideas, but gave secondary school kids the ideal opportunity to mess or show inappropriate things."

(Postgraduate Secondary Student)

Conclusions

It would appear that in the case of this intervention, the technology was decided by the institution before a consideration of the pedagogy. Given this ran contrary to a key principle of Beetham and Sharpe (2007), it should not be surprising that the impact was compromised. However, this study may suggest that students do value the use of new technology in their learning, especially if it can benefit their own future professional practice. When staff are confident and enthused, there is some initial tentative evidence of positive impact. The staff who did use Apple TV were proficient in using technology; however, they represent less than 5% of the staff in the faculty. This underused potential could be realised with a greater focus on staff development and an opportunity to consider pedagogical, alongside technological, questions.

The nature of this study meant the focus was on student engagement and not attainment. I remind my own students that keeping their pupils engaged does not equate to learning, though clearly this cannot take place without that initial interest. Ultimately, the value of any teaching approach should be determined by the impact it has on learning and currently there is only limited research on this. Nguyen
et al (2015) concluded that the use of iPads was found “to enhance the learning experience but not necessarily lead to better learning outcomes”, drawing upon evidence of those, such as Perez et al (2011) who could not find any evidence of the impacts of iPad use on students’ final results. This contrasts with a survey of 209 students by Diemer et al, (2012) where there was a correlation between high level of engagement with iPads and a high level of learning. As gauging learning is so elusive, it can be difficult to ascertain the effect of one factor, whether positive and negative, when there are so many others which can make a contribution. Thus, exploring the impact of technology on student learning and attainment is an area where further research needs to be undertaken.

Acknowledgements
The author would like to thank both Nicola Whitton, for her support and advice at the start of the project, and Charles Neame, for his guidance and helpful suggestions during the writing of this paper.

References


Whitton, N & Overland, E (2014) Manchester Metropolitan University Faculty of Education iPad Project Evaluation Report