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COWpads: Sharing iPads in a range of secondary school classrooms

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Abstract

This article outlines a mid-point snapshot of the progress of a small teaching-as-inquiry project at Hillcrest High School in 2013. Three teachers (music, mathematics, French) volunteered to focus on using iPads in a COW (computers on wheels, hence the term COWPads) configuration with a junior class during 2013. Each teacher created their own teaching-as-inquiry question focused on specific aspects of their practice. A University of Waikato researcher supported the teachers by observing classes and meeting regularly for feedback, reflection and discussion. Halfway through the year the following themes have emerged: the technical challenges to using a device designed for personal use as a shared device; a positive impact on students' concentration levels and spans when using iPads, and shifts in teachers' pedagogical design and practice. The teachers individually contribute their voices to this article, describing their initial experiences of using iPads on a regular basis and what they concentrated on most during the first few months of the project.

Introduction

iPads, with their touch/swipe technology, have created new possibilities in education for learning. But the question remains as to whether or not they are a game changer, as has

been proposed (Furfie, 2010). Kendall (2010) for instance, as an early adopter of the iPad, noted that “the iPad has, and will continue to change the way I do my normal routine, my travel, my writing, and my time in the classroom” (p. 6). Kendall is not alone it would seem, for ever since the iPad’s inception, its use in classrooms around the world has exploded. It has since spawned other touch-screen tablets from competing companies. According to edSurge (2013) for example, over four million iPads are already in United States schools. In New Zealand, iPads are in educational settings as diverse as at Orewa College (*New Zealand Herald*, 2011), Timaru’s Bluestone School (Farrar, 2012), Southland’s Wallacetown School (Berwick, 2013), and even in kindergartens (Backhouse, Monday 26 November, 2012, and Khoo et al., in this issue). So what is it that makes these devices so attractive to schools?

The increasing mobility of devices that students may own and use to access information and social networks is not a trend that will abate. This trend may also feed assumptions about what students who use such devices can already do and know. As Bennett and Maton (2010) pointed out in the same year that iPads were launched, “there is a significant lack of consensus over what effects digital technology is actually having on young people” (p. 322). There is also not yet much evidence about what effects digital technologies have on learning in schools. As Bennett and Maton claim, “the advent of new technology always raises questions and claims about how it can be used effectively in education” (2010, p. 325). This issue is particularly relevant when iPads are the technology of choice.

Orrin and Olcese (2011) suggest that “Proponents of technology frequently paint pictures of technology use in schools that suggest it can transform teaching and learning. The reality of how technology is used in actual learning environments is often both more prosaic and less transformative” (p. 43). As Howard (2013) asserts, “the availability of technology has significantly increased in schools, but teachers continue to struggle with, and at times seem resistant to, integrating technology in their practice” (p. 357). The teachers involved in the project that is the focus of this paper report on their experiences in their sections following an outline of the project.

The project

The project we describe in this paper arose out of a local secondary school wanting to explore what it means to be a wifi, mobile-enabled school. The volunteer teachers (Mervyn, Sarah, Ingrid) wanted to discover how iPads might be used for learning in their context, and they wanted control over how this experiment would take place. Through a process of consultation, the researcher and the staff decided on using a streamlined *New Zealand Curriculum Teaching as Inquiry* (Ministry of Education, 2007) framework, initially designed for use in the tertiary vocational sector and subsequently used in an initial teacher education programme (see <http://bit.ly/Wlobo5>) as a framework for the investigations. The project's aim was to explore how iPads might work across specific curriculum subjects. Teaching as Inquiry was chosen as the research framework because of its *New Zealand Curriculum* links. Also, it is a process supporting evidence-based, reflective practice and it has links to the participating school's appraisal processes and key indicators of the Teachers Council Registered Teacher Criteria (<http://archive.teacherscouncil.govt.nz/rtc/rtc.stm>).

The overarching question framing the project is: *How do teachers use a modified Teaching as Inquiry framework to examine and advance their pedagogical practices with digital technologies?* Each teacher created a question to suit the class, the focus, and the learning they were intending to examine. For example, Mervyn wanted to see how the iPads helped a junior class develop notation knowledge and skills, while Sarah wondered if the iPads made a difference to students deepening their learning of French and improving their motivation to learn French. Ingrid, on the other hand, wanted to see if the iPads positively affected her students' mathematics learning. However, at the time of writing, it is not possible to analyse in full the students' responses to the teachers' questions. Instead, we concentrate on the experiences of the teachers as they began to use iPads with a class. In the article each of the three teachers outlines an aspect of their experience between March and August 2013, when this paper was being written. Mervyn in particular discusses some of the issues they faced, for his role in this project was as e-learning director as well as music teacher. The teachers' reports on their experiences are presented in a different font to highlight that this is their voice.

Teachers' comments on the first six months of iPad use

The first analytical account is by Mervyn, who not only trialled the iPads in a junior music class, but was also the person in charge of the COWPads. He was thus the “middle man” between the other teachers and the devices. Mervyn’s account is followed by Sarah’s, then Ingrid’s. In each case, Noeline as the researcher offers a reflective comment.

Mervyn’s experiences: Establishing the COWpads infrastructure

Mervyn has been instrumental in establishing the project. He described the infrastructure arrangements as follows:

Our intention was to have 30 iPad 2s working across three different subjects with different apps according to the numbers of students in the different classes. We have one COW (acronym for computers on wheels) servicing the 30 iPad devices. These are located in the music block so that I can ensure they are properly charged and ready to go for other teachers. The room they are housed in is also a secure space. The mathematics and French teachers retrieve the iPads as needed for their classes. The COW is set up with a MacPro server and use Apple Configurator to push out app purchases and updates to all devices. The iPad is principally designed as a personal device; there is no functionality to create multiple user accounts unless you jailbreak them and this would create warranty and other technical issues. This multiple user account issue has meant some adaptations have occurred since the devices are used by up to 60 students across three classes.

We have had to adapt our pedagogy and lesson plans to ensure our teaching and data collection happens in one-hour sessions to prevent students’ work being lost or wiped by other students later using the same device. To get around this we created email accounts for each iPad so individual students could take a screenshot of their completed work and send it to the teacher’s email account. Each time a student did this, they needed to remember to include their name and the name of the task in the subject line so the teacher could identify their individual work. It is fortunate that the school uses Google Drive. This system works to our advantage for it is quick to search for students’

work, and push out tasks to students via the email address of the iPad.

This has not been simple, for a number of issues have arisen, which have severely interfered with our teaching with these devices. To begin with, establishing a generic email address for each iPad in the school system was not a straightforward matter. Google promptly suspended all the iPads' email accounts because they thought it was spamming. We then had to review the email account setup on the school server to get it working as planned.

Our solutions continually throw up unforeseen obstacles, and just when we thought we had solved the setup process, a major setback occurred. Suddenly, updates were not being completed; apps weren't being loaded; email accounts were being deleted; and in some cases, all the information on individual iPads was wiped. After two months of not solving the problem, the COW manufacturer discovered that the COW does not work very well (if at all) with Mac OSX Mountain Lion. The iPad trial teachers discovered in class that there were dramatic changes to the devices from the previous day, so that what they had planned to do with particular apps following previous lessons, could no longer be achieved. This level of unreliability has been very frustrating. My role was intensely stressful, in that I needed to work on reliability solutions. This has led to the supplier changing the COW to mitigate effects we experienced, which made us more hesitant about using the iPads in our classes.

When working properly, the COW system is effective and efficient, with the software solution providing informative and instant feedback on students' progress. We also noticed different levels of concentration and on-task behaviour when students used the iPads, so we will persist with them; we just need the devices to be consistently reliable, and so the stability of the COW is crucial.

My advice to others contemplating such a configuration of shared iPads, is to ensure your IT service provider can reliably and promptly address the technical requirements needed for the task. This means they need to be fully aware of potential and actual issues with using COWPad configurations.

Postscript: three weeks later

The new COW has been installed, the iPads reformatted and the system is now running as it should. The initial problem was diagnosed as a hardware problem with the first COW unable to run the latest version of Mac OSX. However, the supplier was not forthcoming about the nature of the problem, and did not understand how important it was to solve the issue quickly: learning was at stake. It failed to quickly supply the school and the tech support with solutions. It took some serious top-level talks to impress the gravity of the situation on the supplier.

While the best of intentions drive the project, we think that other schools would benefit from learning a little of what impediments slowed the implementation process so that should they try a similar process, they can better account for, and address them. Briefly, some of the impediments were:

- difficulty in configuring a personal device as a shared one,
- problems with student accounts,
- limited mechanisms for teachers to monitor student work on the devices,
- narrow bandwidth and wifi capability, plus classroom proximity to these access points,
- the performance of the originally supplied COW (the Computer on Wheels housing for charging and updating the devices).

Noeline's comment

Since Mervyn's role was dual, as intimated earlier, his preoccupation was in getting the technology to work and this took an enormous amount of his time and energy. His role should have been that of focusing on the *learning* part of the e-learning role, but he had to take on the technical side when the IT service provider did not act quickly enough to solve the technical issues.

He worried that his classroom preparation suffered at times, as he wrestled to achieve solutions for the problems the technology created. It wasn't until one of the senior leadership team stepped in to have stern words with the IT service provider that things

changed – quickly. When the technical problems were solved about four months into the project there was very little time to regularly use the iPads in the classrooms and to try to discern any patterns or trends related to learning before we began this article. However, the UFB connection for the school has also been significant: the wifi is noticeably faster, more robust and accessible from the farthest classrooms (such as Ingrid’s mathematics classroom) than before. Once these problems were addressed, Mervyn’s ability to balance his e-responsibilities with his pedagogical ones stabilised.

In observing Mervyn’s lessons, I noted that students were willing to have several attempts at bass clef notation using the iPads when asked to position certain notes on the score ‘page’. In discussing this later, Mervyn said that when this task was done on paper, students often stopped at one or two attempts. He also noted that when they were using a specific app that taught sound and note recognition, students believed they were able to recognise the notes much faster than when they only had to listen. Perhaps this may link to involving more senses simultaneously when using the iPad – sight, sound and touch, but this would need further investigation. In terms of students making several attempts to add notes correctly to a bass clef while using the iPad, the immediacy of the edit process encouraged students to try and try again. Certainly there was immediate concentration on tasks the teacher set, and for long periods of time. This, Mervyn noted, was a noticeable behavioural and learning difference compared with lessons when the iPads were not used.

Sarah’s story of her experience: First impressions

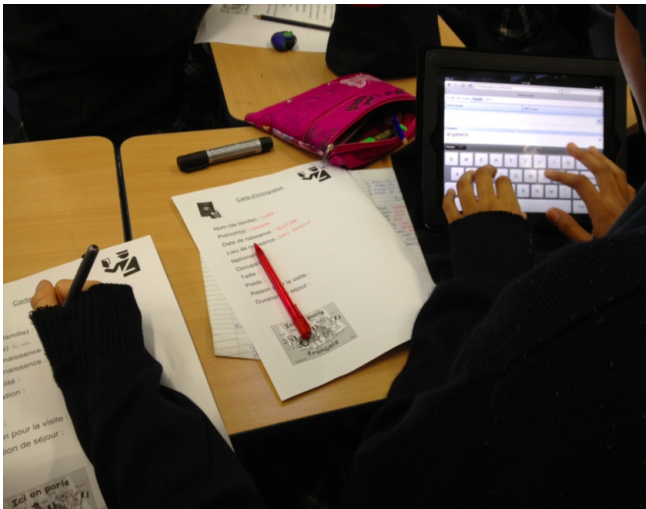
Sarah is the HOD of French. The analysis of her initial experiment with iPads in one French class follows:

As a languages teacher, I am constantly looking for ways to increase student motivation and retention, so I jumped at the chance of being involved in the COWpad trial. I hoped that the iPads would make it easier to provide individualised learning for my students, eventually leading to more of them wanting to continue with languages in the future.

The beginning of the project was frustrating, as it took a long time before the iPads were set up and reliable in the classroom. This was coupled with having to carry heavy

baskets of iPads from one side of the school to the other to get to my classroom and back again. This lack of proximity was not only time-consuming, but hard work.

However, it was worth it when the students first got the iPads in their hands. They were immediately on task and learning, and stayed focused for the whole hour! They had no problems working out how different apps worked. It was great to see them collaborating and critiquing the various resources.



Using the iPads has enabled me to change my pedagogy to a more student-centred, individualised approach.

I have found much more time to sit down next to students and to get them to tell me about what they are learning, or to work things out together. It has also allowed me to

be less restrictive about the content that students are learning. With quick and easy access to the internet, students were able to find out how to say the things that they really wanted to say, or choose topics that they were interested in. For example, students were to create a French language video on a topic of their choice. Some boys wanted to focus on BMX bikes, and so learned a range of vocabulary they may otherwise have not become familiar with. Ready access to the internet from the devices meant students could use an online tool to check the accuracy of Google Translate, and therefore develop some critical thinking skills about using online sites.

Through using the iPads, I have seen more evidence of independent learning, and I feel that my students have learnt a lot more about how to learn than they would have in one of my regular classes.

As with any tool, iPads need to be used creatively. Many of the language-learning apps for example, are restricted to memorising vocabulary. These can be motivating for a period of time, especially if there is a competitive element, but I soon found that

students were keen to produce their own content and to be more active in their learning. Access to authentic materials, like choosing your lunch at a real Parisian café or visiting a French BMX bike shop, was also very motivating, leading to high levels of concentration and task completion.

It has been a bumpy journey so far, particularly with technical problems, and I am sure that there will be a few more mountains to climb. There have been occasions when apps mysteriously disappeared, iPads couldn't access the internet and student work was lost. A major factor has been that the iPads are designed as a personal device, making sharing across three learning areas and different classes problematic. Even so, seeing students engaged and focused to the extent of not noticing that the lunchtime bell has just rung far outweighs the obstacles. If offered a COWPad again I would definitely say yes!

Noeline's comment

Sarah's experience is quite different from Mervyn's. While Mervyn's class was a large year 10 class, Sarah's class was much smaller. Perhaps this is why she was able to personalise the learning much more readily with the iPads. At the end of the class use of the iPads she conducted a short survey, asking her students to comment on points such as: which apps they found useful for learning French, what they thought of using the iPad, how it helped or hindered their learning, and what ideas they had about using the iPads in the future. One student comment that best illustrates the general view was:

The different apps have different teaching styles, so you can pick one that suits you. Also, it can use pictures, sounds and spelling at the same time, and everyone can learn at their own rate.

This notion of learning at one's own rate, and having different affordances to suit different needs was a common response, suggesting that students considered the iPad supported their learning. Similarly, another student observed that:

I enjoy using it, and it's great to be able to learn the spelling at the same time as the sound of the words. Also, the apps have different teaching styles, so

you can learn in a way that's suited to you. However, it does only teach you the language and not the ways of life or etiquette. Also, you cannot ask it questions. Overall, I think that using iPads as a teaching aid is a very good idea.

Ingrid's story of her experience: first impressions

Ingrid is a teacher of mathematics. She wanted to know if the iPad could positively affect her students' mathematics learning.

I was excited about using the iPads in my class, even though I had never used either an iPad or smartphone before. I was, however, determined to use the iPad as an aid to show students' thinking, to enhance learning and see how using such a device might make a difference. I did not want it for just skills-based activities. I am especially interested in using rich tasks in the classroom and making mathematics alive for students by solving real problems.

Some of the technical issues have already been described, but an additional one for me relates to the distance of my prefab classroom from a wifi hub. Additionally, it is a long way to carry the rather heavy iPad baskets to my classroom and back again to their secure storage in the music suite.

I focused on using the iPads with a year 10 class in which some students really struggle with maths. I wanted to see if this low ability group might improve if the iPads were part of their learning. Some students were already competent iPad users while others were not. Over time however, and with peer help, they became more confident. Many expressed a desire to have one for their own use. A couple of students' experiences illustrate some of the things that went on in my classroom when we used the iPads.

Student A is not strong in maths, and there have been issues in the past with her behaviour. When I introduced the iPads to the class, I was really pleased to see her in a different light because she was already an iPad user. It was impressive to see how quietly and constructively she encouraged those less confident and less proficient. By

sharing her knowledge with her classmates, her sense of responsibility grew, along with her willingness to engage in the mathematics through the iPad as the mediating tool.

Another student, E, who has a history of absenteeism, now regularly attends as he wants to be involved. This same student likes to show me how to copy images into a document, and helps me write notes on how to do this so others can do it too. This role reversal, of a reluctant student lacking in mathematics confidence, is teaching me how to use the iPad, since I lack confidence in using it. This kind of shift in relationships is mirrored in the forging of better relationships with other students. They now see me as someone who is also having to learn things and being stuck some of the time.

My own learning curve has been steep in order to fulfil my own goals for my learners. Although people say it an iPad is intuitive, at times I felt like throwing the iPad through the window, as it is quite different from a computer, and I struggle to transfer my knowledge from one device to another. Initially, I got confused setting up the student accounts, but having students use the same iPad each lesson helps streamline this. They can do so because each iPad has a number, is assigned to individual students. Initially, I had thought my own lack of knowledge was at fault when things didn't work as planned, but I soon realised that it was a technical issue beyond my control, like the weak wifi signal to my classroom.

Lastly, the shared nature of these devices requires extra time: to bring them to the class, issue them, collect them, return them and plugging them in to recharge. But will I continue using them? Definitely, because I can see that they are a way to mathematics “cool”.

Noeline's comment

Ingrid was very hesitant about her confidence in using the iPads, but is a creative and student-centred mathematics teacher. The students were keen to use the iPads to learn with, and new “experts” in the class emerged, changing both the dynamics and relationships of the class's culture in positive ways.

Similar alterations to class climate have featured in all of the classes in this trial.

Emerging findings and conclusion

When teachers across three subjects intend to share a single set of iPads, it is stepping into the unknown. Using an iPad as a shared device rather than a personal, individual one, has led this school on a steep learning curve. Even though this project was about six months old at the time of writing, some themes emerged that will be of interest to other schools and teachers contemplating using tablets for learning. Trying to solve the shared versus individual setup was the first hurdle. How could different students have their own accounts on such a device? During the process of solving this question, the school had to call their technical service provider to account for not addressing the technical issues quickly. The provider did not appear to understand the urgency required – that, in the words of one of the senior lead team in the school, “learning was at stake”. Perhaps this points to what schools and IT service provider need to establish as shared priorities when contacting services. Perhaps it also points to how creative IT service providers need to be in providing the technological support schools need, particularly when schools want to push technological boundaries.

The French teacher, Sarah, noticed how different her teaching had become in her iPad class – she was able to spend more one-to-one time with students, and the topics they could pursue were more closely linked to their interests. For both Sarah and Ingrid, their relationships with students appeared to deepen. And certainly in Ingrid’s case, there was less of the expert/novice divide, and more of a co-learner relationship.

For Mervyn, his role was more complex. He was not only the music teacher, but also in charge of the iPad set. He had to spend a lot of intellectual, professional, and physical time problem-solving, particularly when the IT service provider did not quickly to provide support. As a result, Mervyn felt that his ability to devote his full attention to providing high quality learning for all his classes had been compromised. This finding raises questions for schools in terms of the common practice of highly competent classroom teachers being given multiple roles, such as undertaking teaching, IT service provider and leadership roles. Together, they are a big ask of one person.

Possibly the most intriguing emerging finding is the effect on how students approach their learning, how they noticeably concentrate more specifically on the task at hand,

share expertise with their peers, and seek to create high quality learning products using the devices. Across all three classes – music, French, mathematics – something happened to student concentration and task completion when they used the iPads. For example, in the French class, students learned vocabulary that connected with their interests, they could hear French being spoken by speakers other than their teacher, and they could check how accurate Google Translate was. This made the learning tasks authentic and interesting. In music and mathematics, students helped each other if they got stuck, and learned content more quickly than before. At the same time, new expertise was shared.

In *Forbes* magazine, Woyak (13/9/2010) discusses the effects on students of providing iPads for learning, noting that in feedback from students on the value of the iPads to their learning, the majority said it encouraged them to explore other topics and made the learning more interesting, and for some, kept them more organised. These findings complement those in Sarah's short survey of her French class. One student commented that "They [the iPads] make learning fun and provide something to revise on and work on your vocabulary, also it is really easy to research for projects." These interim findings point to emerging benefits for using iPads as learning devices.

There is still much to learn from this COWPad trial. In the meantime, as a research and practice (praxis) project, it has meant a small group of teachers have been able to focus on one class and one type of intervention: using iPads as a learning tool in their respective junior classes. It has also allowed me, the researcher, the privilege of working with teachers prepared to step into the unknown and see what happens.

Postscript

From Noeline

A lot can happen in a month. I visited the team again in mid September. The mood of the three teachers was completely different. The new COW has proven to be reliable and, coupled with the school's UFB connection, the teachers have seen a leap in speed, connectivity and overall robustness and reliability as they use the iPads as a shared device. Their frustration has turned into a keenness to do more. In fact, the iPads are

now so reliable, these teachers are wanting to use them more and more, putting strain on the sharing timetable. The reluctance – and almost resistance (Howard, 2013) – that crept into the teachers’ thinking about using the iPads when they couldn’t rely on the technical side of things has all but disappeared. With the COW problem being sorted and the school now UFB-connected, they are also now much keener to evaluate specific apps across classes and subjects. The focus has shifted from the iPads themselves and related reliability and connectivity issues, to examining the cross-curricular use and value of apps. I’m really looking forward to my next classroom observations and reporting fully on the findings.

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