# Jam Today – Embedding BYOD into Classroom Practice

**David Parsons**
Massey University
Albany, Auckland, New Zealand
D.P.Parsons@massey.ac.nz

## ABSTRACT

An underlying assumption of the BYOD (bring your own device) approach to classroom learning is that technology is naturally embedded into the wider life of the learner. By not only allowing, but requiring, school students to bring their own devices into the classroom, teachers in BYOD schools are acknowledging that 21st century education must reflect 21st century society. However, bringing learners' devices over the threshold of the classroom is just the beginning of the story. The challenge for educators is to find ways to successfully embed personal technologies into the teaching and learning process. This is not simply a case of substituting one tool for another, or even enhancing current practice with digital tools. Rather, it requires a fundamental modification and redefinition of practice. Such radical changes to classroom practice cannot happen overnight. They require appropriate policies, preparation, infrastructure, motivation and reflective exploration. This paper reflects on the experience of a New Zealand school which is at the forefront of the BYOD movement. Based primarily on the public voices of the classroom teachers, this paper seeks to examine how BYOD has been tailored to suit disparate subjects, different teaching styles and the choices made by teachers in how they feel technology enhanced learning can work best for them and their students. This paper explores how the school has been moving through the pathway of substitution, augmentation, modification and redefinition, and shares experiences that may be informative to others embarking on similar projects.

## Author Keywords

BYOD, iPad, SAMR model, flipped learning

## INTRODUCTION

*"The rule is, jam tomorrow and jam yesterday – but never jam today. It MUST come sometimes to 'jam today', Alice objected."* Lewis Carroll, 'Through the Looking Glass and What Alice Found There' (1871).

For the last two years, Massey University researchers have been involved with a New Zealand school and their innovative project to integrate one-to-one digital devices into the classroom as a compulsory stationary item. This project began in 2012 with the introduction of devices into year nine classes (in New Zealand, year nine is the ninth year of compulsory education, with students aged thirteen and fourteen.) In 2013, the project has been extended to further years within the school, in a process that will soon see all year groups using one-to-one devices. The most radical aspect of this initiative was that this was the first New Zealand state school to require parents to provide devices for their children (with the iPad2 the recommended device) as a compulsory educational item. Previous similar initiatives had focused on laptops as the preferred device. As such, it has generated a great deal of interest for teachers, researchers, government and media within New Zealand. In 2013, the school's second public conference on the theme of BYOD was titled 'through the looking glass', prompting the question, is it yet jam today?

This is not a formal research paper. Rather, it is a personal reflection on our experiences of observing the school introducing one to one digital devices into the classroom. It is based on a number of visits to the school, including attending two conferences hosted by the school. We have spoken to staff and students and other important stakeholders in this project. This initiative has raised a great deal of local interest and we hope that this paper goes some way towards sharing the valuable experiences gained by the participants.

### Bring your own device (BYOD)

The 'bring your own device' (BYOD) concept has grown from its initial stages to widespread acceptance in education in a relatively short period of time. According to a recent New Zealand survey, 35.2% of secondary schools, 20% of intermediate schools and 6.9% of primary schools already operate a BYOD policy. 75.7% of those surveyed supported the idea of BYOD in schools, 14.3% were still undecided, while only 1 in 10 surveyed did not support the idea (Adobe, 2012.) However accepting the principle of bringing learners' devices into the classroom is only the first step on a complex journey towards integrating these technologies into teaching and learning. The aim of this paper is to reflect on how a BYOD policy has impacted on the teaching and learning process at one New Zealand school that is one of the leading proponents of BYOD in the secondary sector.

This paper is structured as follows. First, we look at the background to the project, including the important preparatory work and infrastructure. Next, we look at the theoretical basis of the project, and the key educational ideas that underpin the initiatives taking place. Then we look at some generic approaches to using one-to-one devices in learning that span multiple subjects. These include the use of social media and common tools such as video, cameras and internet data search, storage and retrieval. We follow this with a section that looks at some subject-specific ways that one-to-one devices have been used at the school. The paper concludes with some final observations on the current status of the project, and reflects on some broader themes in the BYOD story.

## BACKGROUND AND INFRASTRUCTURE

Before the BYOD project was launched at the school in 2012, a number of important preparatory steps were required. Most fundamentally, no one-to-one digital device initiative can work without a wireless network that can provide adequate coverage and speed, and be able to cater for high concentrations of devices in small areas accessing digital resources concurrently. Such technology does not come cheap, however the cost benefit analysis, even leaving aside the intangible benefits of hoped-for improvements in learning outcomes, does take into account some associated reductions in costs in some other areas. While there will continue to be significant fixed infrastructure costs, including ultra-fast broadband, teacher devices, professional development, and software systems for student and learning management, other investments that may have been required in older models of ICT provision, including specialist computer labs, lease of computers, technical support and maintenance, can be reduced, as hardware and software is increasingly brought to school by the students,

Of course technology alone cannot provide the required changes in teaching and learning. Once the physical infrastructure is in place, the staff need to have a common vision of the school and how teaching and learning will take place within it. This needs a culture of learning in the staff and a willingness to embrace change. Broader support from stakeholders is also required, including from the board of trustees and the parent body.

A good pastoral system is also necessary, ready to handle the issues that may arise in the transitions to a digitally enabled school. Management software such as Kamar is important for managing and monitoring student issues. Usage contracts are required, with appropriate sanctions against students who break those contracts. Such sanctions typically involve temporary withdrawal of access to digital resources.

## THEORETICAL BASIS

New Zealand's digital strategy states that "New Zealand will be a leader in the use of Information and Technology to realise its economic, social environmental and cultural goals, to the benefit of all its people" (Ministry of Economic Development, 2008.) Part of this process must necessarily involve the transformation of education to take full advantage of current and future ICT tools. Further, the New Zealand Ministry of Education, in the context of the national curriculum, have identified the following five key competencies, which school students need to develop in order to live and learn today and in the future: 'Thinking', 'using language, symbols and text', 'managing self', 'relating to others' and 'participating and contributing' (New Zealand Ministry of Education, 2012.)

It is in the context of the need for ICT to support these competencies that the compulsory BYOD project has been developed, enabling changes such as the flipped classroom model (Educause, 2012) and greater degrees of freedom in the structure of classes, timetables and use of physical environments.

### SAMR Model

The school has adopted Puentedura's (2010) model of substitution, augmentation, modification, redefinition (SAMR) to guide the development of its teaching and learning processes. This model recognises four phases in the use of technology in education. Initially, technology may be used only as a direct tool substitute, with no functional change, for example a class might be required to answer questions in an on-line quiz, directly replacing a paper based quiz. The next stage is augmentation, where the technology provides some functional improvement over the manual tool it is replacing. For example the on-line quiz might provide feedback, and adapt its questions to reflect the students' answers. Both of these stages are seen as aspects of *enhancement*. The classroom activities are essentially the same as they were before, but technology is providing some enhancements to the way those activities are executed. Clearly, moving from substitution to augmentation is simple, since most ICT solutions instantly provide functional improvements, for example writing with a word processer rather than writing with a pen and paper automatically gives additional functionality such as formatting, spell checking, collaborative writing etc. However these changes do not fundamentally change the teaching and learning process. Thus the model has a clear division between enhancement and the following stages, which are grouped together as *transformation*.

In the transformation phase, the impact of ICT tools allows the very nature of the teaching and learning process to change. The first stage of the transformation phase is modification, where the technology allows for significant task redesign, For example a class might collaboratively create an on-line quiz, developing and sharing their own questions, answers and feedback. They might distribute their quiz globally and get feedback from students in other schools across the world. The final stage is redefinition, where the technology allows for the creation of new tasks, previously inconceivable. For example students might use a range of tools and resources to explore the relationship between quizzes and learning; performing experiments, researching the concepts beyond learning through the Socratic method, and developing deeper questions about their own knowledge and learning processes.

### Learning spaces

In addition to the transformations of classroom practice, there are also evolutionary changes in the ways that learning spaces may be utilised. BYOD enables a move to a more student-centred approach to teaching and learning, including flipped classrooms and project based learning. These changes will provide opportunities for the use of physical classroom spaces to be more flexible. One popular metaphor that can help to focus these changes is the learning spaces model ascribed to Scott Morris (Australia Learning and Teaching Council, 2010.) This model likens education to a journey through different environments: the cave (independent, reflective learning), the campfire (listening to and absorbing

knowledge), the watering hole (informal learning, discussing and creating meaning with others) and the mountain top (presenting, publishing and demonstrating understanding.) One-to-one digital devices support learners in transitioning between these various environments by providing a range of digital media, applications and affordances.

## GENERIC USES OF ONE TO ONE DEVICES IN LEARNING

There are many uses of one-to-one digital devices in the classroom that can be applied regardless of subject area. One of the most basic is the capture and use of digital media (photos and videos) using the devices. For example in Food Technology, students video the processes of cooking and take photos of prepared food. In Science, photos of various stages of the experiments can be added to the lab book. These simple activities might be categorised as enhancement activities in the SAMR model. In technology, students record practical demonstrations, for use when needed, replacing the old model of the whole class crowding round a single workbench for demonstrations. Across the curriculum, collaboration, digital skills, and information literacy are common themes of integrating one to one devices. For example one aspect of technology enhanced learning is the kind of project based learning that spans multiple literacies; a given project may involve creating a video recording on the device, sharing a presentation using social media, writing a blog post about the resource, and tweeting the link. These activities are more transformative, modifying the learning process.

### The role of social media

A similarly generic approach to the use of one-to-one devices across different classrooms is the use of social media tools such as Facebook and Twitter, and RSS aggregators such as Flipboard. The role of social media is very powerful in the transformation of the classroom. The basic philosophy is that students are already 'living' on social media, so if schools are to encourage learning being embedded into students' everyday lives they need to reach out through such tools. If school courses appear on the screen when a student logs into Facebook, they are more likely to engage with learning. This can be done without connecting teachers to students' personal information. Teachers and students post content and dialogue on course group pages only available to the class or year group in question. This integration of social networking tools into learning could be regarded as redefining the learning process (in the SAMR model), as it breaks down the barriers between learning spaces and blurs the boundaries between learning and everyday life. It should be noted, however, that not all teachers embrace tools such as Facebook, for a range of reasons including privacy, suitability, age limitations and legal terms of use. For this reason, alternative social media tools with an educational focus such as Edmodo are also being explored by some teachers.

### Challenges of device use

As well as the common benefits of certain types of device use, there are of course also a number of common problem areas with teaching with one-to-one devices that apply to all classes, regardless of subject area. Infrastructure challenges such as Internet connectivity, speed and coverage are well understood in any organisation that relies heavily on wireless broadband. Historical classroom issues such as lack of student preparation, and students being off task are also unlikely to be eradicated just by introducing a BYOD policy, but the specific issues have evolved, for example students not doing their preparation for flipped classroom activities, whereas in the past they may not have completed their homework. Students also need grounding in basic digital skills such as efficient web searches and guidance regarding appropriate web sites.

Finding and testing the right applications for a particular subject and teaching context takes time, filtering out apps that are unsuitable and finding ones that will work in classroom where not all students have iPads. Some websites need Flash, which is particularly problematic in mathematics teaching, but also in some other subjects, where much of the available on-line content has been created using Flash. Although it is possible run Flash on an iPad using browsers such as Puffin, or apps such as Rover, the experience of the teachers is that execution can be slow. The distribution, storage and submission of work can also be an issue. One of the commonly encountered problems has been students relying on iCloud, which is a mirror rather than a backup. Some students have lost work because they misunderstood the role of iCloud. Alternatives such as Dropbox have to be used but these are less transparent to the students. There are many issues arising from these practicalities, but key questions arise such as: Should non iPad owners be required to share with iPad owners to use some apps, and how does this make them feel? Should valuable digital resources be abandoned because they are incompatible with the chosen platform? Which applications should be promoted as common across the school to ensure consistency of use? and what areas of digital literacy need to be addressed generically across all subject areas?

## ONE TO ONE DEVICES FOR SPECIFIC SUBJECTS

While there are many ways of using one to one devices that can be applied generically across multiple subject areas, there are also specific ways in which teachers have tailored device use to their own subjects and classroom requirements.

In mathematics, for example, games are used extensively for learning. Different on-line resources are chosen for different aspects of the maths curriculum; some popular maths sites such as Khan Academy provide overseas content, but there is also local content available (such as the IXL web site). In physical education, devices are used for analysis of performance, integrating practice and theory, and making it easier to involve non-participants in the physical education process. In dance and drama, one to one digital devices mean instant feedback through visual means, self-observation and analysis, and immediate access to exemplars and research. An example of innovative thinking is applying the Ubersense app, which is marketed for slow motion video analysis in sports, to the context of dance. Mind mapping tools have proved useful in both drama and English classes, used to analyse action, storyboards and characters. Other tools used in

English include Wordle (for word collages) and Skitch for annotating media. In sociology, digital literacies involved ensuring a critical thinking approach to study. The teachers' aim was to convince students that they cannot use information that they do not actually understand. Through carefully planned activities, students found out through discovery and experience that reading Wikipedia alone is not enough to explore a topic. In technology, one of the main drivers for change is that technology ideally needs more than one teacher in the room. This is because students will be trying to learn practical skills from demonstrations, but will be working at different paces. Establishing a simple, student-centred process for recording and sharing technology demonstrations has made fundamental changes to the technology classroom, freeing the teacher to focus on individual student needs. In languages, various tools and applications enable language learning to be embedded in engaging activities, so that language can be explored in the contexts of collages, graphic design, blogging etc. Language interactions can also be videoed and analysed, with students role playing characters in conversations. In music, the devices are used for teaching theory, as reference tool, for composition, as virtual instruments, and have replaced sheet music for performance work.

These various examples of practice show that one of the key features of BYOD is finding the appropriate fit for each subject area. Some uses of the devices may be enhancement, while others will be more radical and enable transformation, but not every use of the devices has to be transformative to be valuable in learning.

## SUMMARY

Teachers have reported a number of fundamental changes to teaching and learning as a result of moving towards one-to-one devices. They report changes to the way that both the students and teachers present their own work. Student activities are different, and how the teachers provide feedback is changing, along with the way that student work is showcased to the world. Student collaboration is easier, and staff collaboration more relevant and useful, exchanging information, ideas and tasks. Further, the role and nature of home learning has changed, as flipped learning concepts come into play, with students reading, listening to or watching material outside the classroom to inform and contextualise the activities within it. The popular 'flipped classroom' definition, that it only means students preparing for lessons using short videos is, however, flawed. The idea that every lesson needs to be run this way is also flawed. Variety is important, and changing preconceived ideas in students' minds is part of the mix.

### Lessons learned

- The new 'normal'; Use of one-to-one devices is becoming 'normal' so now we need to address what happens next?
- Some boundaries are becoming clearer; Teachers are becoming familiar with the boundaries between use of digital devices, and situations where more traditional tools and materials are still more appropriate (e.g. music manuscript books). There is also a point where the students have had enough use of digital devices and just want to get on with the activity. We are learning how to decide where this boundary lies, so the devices do not become the only tool.
- Some boundaries are becoming blurred; Some teachers are embracing public tools from the students' own lives like Facebook, while others prefer tools specific to education. This is an ongoing debate and exploration. We are learning that such choices are not simple.
- Not just flipped; On-line videos of instruction (preferably made by the students) are enabling not only flipped classrooms but a more fluid model of teaching where no teacher to class presentations are required. Teaching becomes individual. We are learning that one-to-one devices can indeed redefine what happens in the classroom.

Overall, the process involves finding out how one-to-one devices can be made to work in all subjects for all types of student. This may take several years of reflective practice before all the lessons have been learned.

## ACKNOWLEDGMENTS

## REFERENCES

Adobe. (2012). ICT in Schools Survey. Retrieved 1st May 2013 from:
http://interfaceonline.co.nz/articles.cfm?c_id=43&id=1529

Australia Learning and Teaching Council (2010). Spaces for Knowledge Generation. Retrieved 1st May 2013 from:
http://www.skgproject.com/pdf/skg-forum-1-report.pdf.

Educause (2012). 7 Things You Should Know About Flipped Classrooms. Retrieved 1st May 2013 from:
http://net.educause.edu/ir/library/pdf/eli7081.pdf

New Zealand Ministry of Education (2012). National Curriculum. Retrieved 1st May 2013 from:
http://www.minedu.govt.nz/Parents/AllAges/EducationInNZ/TheNationalCurriculum.aspx

Puentedura, R. (2010). SAMR and TPCK: Intro to Advanced Practice. Retrieved 1st May 2013 from:
http://hippasus.com/resources/sweden2010/SAMR_TPCK_IntroToAdvancedPractice.pdf

New Zealand Ministry of Economic Development. (2008). Digital Strategy 2.0. Retrieved 1st May 2013 from:
http://www.aotearoapeoplesnetwork.org/sites/aotearoapeoplesnetwork.org/files/Digital-Strategy.pdf