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The first blended or hybrid online course in a New Zealand secondary school: A case study

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Abstract

Aiming to generate some guidance for effective online blended/hybrid education in secondary schools, this study examines a teacher's first implementation of online learning in a Learning Management System (LMS) as part of a Home Economics course in a New Zealand high school. Further research is urgently recommended to inform professional and organisational development at a time when the government is 'rolling out' ultra-fast broadband to 95% of New Zealand schools. The research was embedded within the postgraduate programme in eLearning in which the teacher and researcher studied. Data collection included observations of the online and face-to-face learning environments plus interviews with the teacher and selected students.

The positive outcomes of the blended course implementation in this case study included: opportunities for extended and flexible learning, development of ICT confidence and skills, enhanced interactions; independent learning with increased self management and higher order thinking skills; a variety of authentic resources; and the teacher's professional growth. Challenges included students' limited access to ICT, confidence, ability to self direct their learning and interact online; the teacher's lack of previous blended teaching experience and limited school support and infrastructure. This study tentatively suggests that New Zealand schools adopting online learning consider the

following strategies: ongoing review of student needs; design of concise course structure and outcomes; provision of onsite support for students including face-to-face interaction. Implementation requires commitment of teachers and school leaders plus ongoing professional development.

Introduction

Educational providers globally are adopting online education, either with fully online taught courses that replace face-to-face instruction or blended (hybrid) courses, where traditional instruction is enhanced with online content (Means et al., 2009). According to Cavanaugh et al. (2009), enhancing student motivation, expanding educational access, providing high quality learning opportunities and improving student outcomes and skills are among the benefits of online education. In addition, online modes for education can play an important role in preparing students for the 21st century where learning is recognised as a process that results in generating new knowledge, a motive power to do new things. Most importantly, knowledge can be replaced and developed by students whose minds are "resources that can be connected to other resources for the purpose of generating new knowledge" (Gilbert, 2007, p, 119).

Preparing students for learning in the 21st century should enable them to become autonomous lifelong learners and being proficient eLearners, as many information sources will be accessed digitally (Davis, 2008; Wright, 2010; Davis & Fletcher 2010). For these reasons, schools have a professional responsibility to expose students to eLearning, particularly secondary schools.

Online school education in New Zealand

Across New Zealand, schools have been equipping both teachers and students with computers and internet access. But despite many students' familiarity with everyday ICT use, they still need more guidance in using digital technologies in meaningful and educational focused ways (Wright, 2010).

Three ICT strategies for New Zealand schools (Ministry of Education, 2002; 2006; 2010) have contributed to substantial growth in the effective use of ICT to support

learning and teaching in New Zealand schools (Dewstow & Wright, 2005; Wright, 2010). Laptops for teacher programme and eLearning clusters of schools have provided significant professional and organisational development (Bolton, 2008; Cowie et al., 2008; Sahin & Ham, 2010).The current government policy includes rollout of ultra-fast broadband to over 95% of schools with the expectation of increasing equitable access for the nation (see http://www.beehive.govt.nz/release/ultra-fast-broadband-investment-proposal-finalised).

In addition, the Virtual Learning Network (VLN) consists of around ten regional clusters of schools brokering over 160 online courses and related professional and organisational development (Bolstad & Lin, 2009; Ministry of Education, 2011). Examples include OtagoNet cluster of rural schools established in 2002 with the vision "to create a broadband VLN linking the Otago Secondary and Area Schools, to strengthen existing relationships and collaboration of these rural and geographically dispersed schools." (Pullar & Brennan, 2008). CantaTech was the first rural eLearning cluster (Davis, 2010), and it is currently involved in expanding blended learning across three eLearning clusters incorporating thirty schools in the South Canterbury district (see http://wikieducator.org/ SCD).

Some scholars argue that blended approaches, are more suitable for school students compared to fully online taught courses, due to the enhanced onsite support and face-to-face interaction opportunities within the classroom that facilitate students to engage more easily in self-directed learning (e.g. Doering & Veletsianos, 2008). Although the body of literature on blended learning is limited, it is clear that this mode of school education is developing fast (Condie & Livingston, 2007; Horn & Staker, 2011). Unfortunately, most research on online education involves adult learners and few studies focus on K-12 contexts (Means et al., 2009). As school students and adult learners have different needs and characteristics, further research is needed to inform practices in online and blended modes of education in schools (Barbour, 2010; Kachel et al., 2005; Davis, 2011 submitted). It is also useful to note that practical subjects include particular challenges and opportunities for blended learning; for example physical education is one of the most popular courses offered by the state-wide Florida Virtual School with hundreds of students choosing this mode or study (Cavanagh et al,

2009) and Maori student athletes choose to study through a sports academy in New Zealand (Davis, 2010). Case studies to inform good practice for Iowa Learning Online include an award winning approach to home economics with a chef youth apprenticeship programme (see http://ctlt.iastate.edu/~vhs/bettendorf.htm).

Therefore this paper provides a case study the first step in the adoption of blended learning with a Learning Management System in one high school by a teacher of home economics. Aiming to reflect on effective early implementation for secondary schools, the study investigates the ways through which the blended course was implemented including the perspectives of the teacher and students.

Methodology

The study was embedded within a longer professional development programme led by the third author. The study was conducted by the class teacher (first author) and a fellow student researcher (second author) who are both completing Masters in Education, and with a particular interest in eLearning, digital technologies and 21st century education.

The research questions were:

1. In what ways is the online content blended into the home economics course?
2. What are the positive outcomes and the challenges occurring throughout the implementation of the blended course?
3. How can the outcomes of this study inform and be informed by the literature on effective practices to implement blended learning in secondary school settings?

The school involved is a decile 3, urban multicultural high school including European, Māori, Pasifika, and Asian students. The small class of eight students were studying for National Certificate Educational Achievement (NCEA) Level 2 Home Economics are described in Table 1. The students were of mixed abilities and skills, aiming for a range of different career pathways. Four of the students were interviewed, while the class was observed as a whole during the study.

Student 1	Hard working, needs to link school activities with career plans to be engaged. Rare use of ICT, no access to computer at home, limited computer skills and confidence, cell phone used occasionally to communicate with family.
Student 2	Easy to work with, learns quickly. Frequent ICT use, computer at home without Office software, cell phone user.
Student 3	Easy to work with, bubbly personality, sometimes needs encouragement. Frequent ICT use (basically for social networking), good ICT skills, cell phone user, computer access at home, confident to engage with ICT.
Student 4	Year 13, first 4 years high school in alternative behaviour & learning unit, successful home economics student at Level 1. No access to computer from home before term 4, cell phone user, slowly gained confidence on the compute, term 4, became more engaged and focused, willing to try new web 2.0 applications.
Student 5	Academically able, enjoys this independent style of learning. Good computer skills, own computer at home without Office software, cell-phone user.
Student 6	Year 13 student completing Level 2. Own computer, excellent technical computer knowledge, frequent ICT use (member of Local Area Network (LAN), social networking, computer games), cell phone user.
Student 7	Year 13 student completing Level 2, finds siloing of subjects difficult. Own laptop, frequent ICT use (member of Local Area Network (LAN), social networking, computer games) cell phone user.
Student 8	Mildly dyslexic. Own laptop, frequent ICT use (for social networking and exploring www), cell phone user.

Table 1. Characteristics of the eight students in the course, their skills and access to ICT

The teacher is an experienced department head of home economics and implemented an online learning environment for the first time in her school, using the Moodle platform (approximately since the beginning of term two in May 2010). She has used ICT daily for the last twenty years, has her own laptop (as part of the TELA program) which used for educational, communication, information and entertainment purposes. She has a good understanding of the potential of digital tools and how they could enhance 21st century student learning. The teacher learned her computer capabilities from trial and error and by asking others and more recently, her three digital technological literate sons. In 2008 she was awarded a Microsoft Innovative Teaching Scholarship (MINTS) with four other recipients, learning much from them and from the reading completed during the scholarship time and more from attendance of two large national Ulearn conferences. Until enrolling in a University of Canterbury Masters in Education course led by the third author of this paper, the teacher had had no experience of online learning, blended learning or how a Learning Management System (LMS) operated. During the implementation she and the researcher were also supported by two MEd courses. The researcher (second author) was also enrolled in same two courses and this research forms a pilot study for her Masters thesis under the supervision of the third author.

Three types of evidence were collected and analysed following approval from the Educational Research Human Ethics Committee at the University of Canterbury. Information letters and consent forms were administered to the students, their parents, the teacher and the school principal. The data collected was:

1. Observation of the blended course's online and face-to-face learning environment.

The focus of the observations was to understand how the online content is implemented, the face-to-face instruction, its organisation and structure and the teacher's and students' presence within the blended class. The observational field notes were further discussed between the two researchers for triangulation and clarification.

2. Teacher interview, followed by open discussion, including self-reflective practice.

This interview focused on the teacher's ICT experiences, active presence and role in student learning, the shifting conceptualisation and knowledge undertaken in making this change. With a written questionnaire containing open-ended questions (as required from the teacher, to enhance self reflection) the interview was followed by two meetings to discuss and clarify aspects from the questionnaire. These discussions were audio recorded and transcribed.

3. Focus group interviews with two pairs of students.

Four students (students 1, 2, 3 and 4) were interviewed in groups of two, focusing on their perspectives on their blended learning experience. The interviews were audio recorded and transcribed.

The observational field notes and interview transcripts were analysed using codes and themes, aiming to find connections and to create overall themes (Coffey and Atkinson, 1996). The themes were triangulated with current relevant literature. The study was limited to one teacher and her small class. Data collection was further reduced by the Christchurch earthquake. School was closed for one week and the emotional effect on people was carefully considered. The earthquake dictated the condensing of the school programme and other school commitments.

The blended course

There are eight learning areas in the New Zealand curriculum. Home economics is one of the teaching subjects from the health and physical education learning area (see http://nzcurriculum.tki.org.nz/Curriculum-documents/The-New-Zealand-Curriculum/Learning-areas/Health-and-physical-education). This class (NCEA Level 2, curriculum teaching level 7) was taught face-to-face for three hours a week and the students were timetabled one hour a week in the library with pre-set work, which is a common adjustment for small-sized classes in New Zealand schools. Additionally, three of the students involved in a GATEWAY programme spent one day each week gaining

industry experience, which caused them to miss one of the taught lessons. This prompted the teacher to blend two online units into this course. The first unit of work was "Healthy food for the school canteen" with the assessment (NCEA 4 credits) using Achievement Standard 90243: Explore a nutritional concern for a targeted group. (see http://www.nzqa.govt.nz/ncea/assessment/search.do?query=90243&view=all&level=01). Also, the class was part of a Crown Public Health trial "CTV for Schools Project" (for more details, visit: http://www.cph.co.nz/Files/HPS27.pdf). Students engaged in activities related to the school canteen and community, such as trialling food in the canteen, speaking about the activity at assembly, posting information in the school newsletter. The best product was presented by two students who were filmed, resulting in a four-minute clip screened on CTV lifestyle programme with recipes submitted to a recipe book for canteens.

The second unit of work was "Fuel for Performance" with the assessment (NCEA 4 credits) using Achievement Standard 90245: Examine the nutritional considerations of people with high energy needs (see http://www.nzqa.govt.nz/ncea/assessment/ search.do?query=90245&view=all&level=01).

The creation of a fully online course would have been impractical for many reasons. A blended teaching approach was selected, as the teacher knew that high school students are not independent enough to work online asynchronously and felt that a full online programme would not be viable within a home economics course that requires formative discussions and assessment during the practical sessions. The teachers' goals included enhancement of student engagement, eLiteracy skills, independent learning while embedding the key competencies (Ministry of Education, 2007) into the teaching programme.

Findings

The findings are presented in the way the themes identified by the literature review and analysis. The positive outcomes are presented before the challenges. These are followed by suggestions for schools that arise from this case study and our review of relevant literature.

Extended flexible learning opportunities

For the teacher, flexibility was an important advantage of the blended course, as it gave her the opportunity to manage timetable issues, due to the reduced teaching schedule and when absent.

For the students, flexibility was a benefit, as they were provided with extended learning opportunities, independence, 24/7 availability of their lessons especially for GATEWAY students or students absent from class due to sport, culture and music obligations, sickness, attendance at a meeting such as counselling or even truancy. For example, student 2 said: "I use the online environment at home if I don't catch up [in school]". However, despite the extended learning opportunities, not all students could fully benefit from this flexibility. They could use the online environment at school to enhance their learning, but some could not access computers and internet from home. For them, flexibility was restricted to within school hours (see Table 1).

Oblender (2002) argues that the implementation of blended teaching and learning "provides opportunities to progress through the course at a pace that best suits students' learning styles and individual schedules – in addition to working at school, students can also access and complete their course work at home" (p.45). Literature indicates that many students enjoy the flexibility of online learning, including fully online taught or blended courses (Chandra & Fisher, 2009; Mupinga, 2005). However, limited access to computers and internet after school hours is often identified as an issue for online learning (Cavanaugh et al., 2009).

Increased confidence and ICT skills

The teacher observed that the blended course enhanced students' ICT skills and ability to use technology in a more sophisticated way which resulted in increased eLiteracy confidence, enhanced student engagement and motivation, which were all among teacher's goals. For example, one student with limited computer skills (student 1) grew to comfortably use technology, resulting in higher self-confidence, as illustrated by his attitude and work completed during the exploration of new Web 2.0 tools.

Although students were not able to identify how the blended course had enhanced their ICT skills and confidence, they all acknowledged that the more they interacted with the online content, the more familiar they felt. For example, student 4 said: "It's a bit confusing (at the beginning), but I just got used to it … I find that pretty easy (now)".

O'Dwyer et al. (2007), comparing student outcomes in an online and a face-to-face algebra classroom, found online classroom students were more confident on their ICT skills at the end of the course, compared to students in the face-to-face classroom. Tunison and Noonan (2001) found that although online learning was a challenging experience for most students, learners acknowledged that they developed their ICT skills.

Encouragement of face-to-face and online interactions

During the course student–student and student–teacher online and face-to-face interactions were enhanced, in order to support and help each other. For example one student (student 3) said: "Didn't understand how to find anything on this site at first, was very confused but after exploring and getting some help from [another student], I now know how to find the things I need to".

Students discussed with each other course-related and social subjects beyond class time. Interestingly, the students preferred to interact synchronously with each other through the online chat, rather than asynchronously through the forums. Nicholas and Ng (2009) also found that although participants in their study communicated asynchronously through online forums, they preferred to communicate using an instant messaging service that was not actually provided by the online learning environment.

The student–teacher communication and collaboration was enhanced through interaction after class hours through the forums (see Figure 1). Also, the teacher often used the Moodle News section to encourage student participation and to provide feedback on students' work.

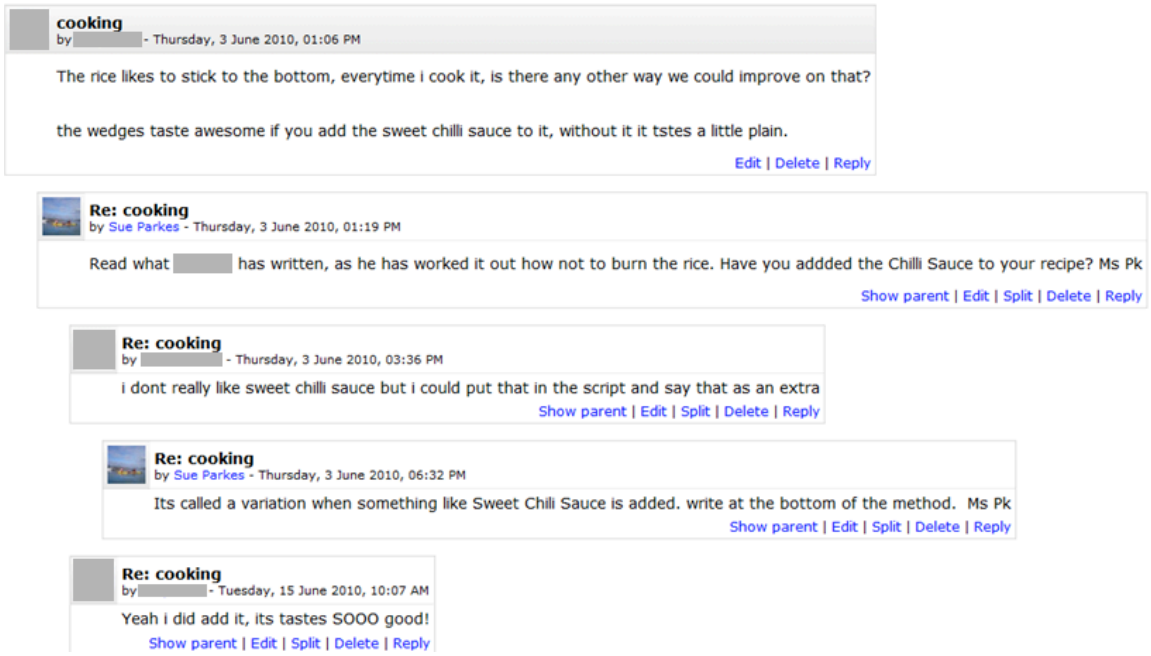

Figure 1. Teacher and students communicated through the online forums

The students communicated online with the teacher for course-related and social topics. The teacher explained in an interview: "[Student 1] texted me during the school holidays asking me how to cook chicken pieces and [another student] texted me to tell me that the school rugby league team won the final". This finding contradicts findings in other studies, where students are not confident enough to communicate online with the teacher (Chandra & Fisher, 2009; O'Dwyer et al., 2007) and may indicate the importance of fostering a friendly atmosphere within the online and the face-to-face learning environment.

Development of independent learning skills

According to the teacher, the students developed self-directed learning skills at some level. "They were better scaffolded and guided on their tasks with the use of the online learning environment". Students' independent learning skills development occurred at different levels, depending on their learning styles. For example, one student with low confidence but high potential (student 4) "developed independent work habits with the realisation that the assessment credits were essential for acceptance into a 2011 tertiary course". Another mature and self-motivated student (student 5) who was absent for some of that term, informed the teacher that she enjoyed working independently and wished to continue studying online. In addition, a student with low ICT skills and

confidence who depended highly on teacher guidance and support (student 1) "has come in twice during study line to work independently without peers and already I could see growth in his cognitive processing".

Student ability to work autonomously seemed to develop throughout the blended course implementation. By the beginning of the final term in October (term 4), some Web 2.0 tools had been incorporated into the blended course, and students felt more comfortable to explore the new tools independently, rather than following verbal instructions provided during the implementation. For example, student 4 said: "I guess [I could benefit from the direct teacher instructions], but I felt more comfortable after doing this by myself".

Students often value the opportunity to develop independent learning skills, but simultaneously they acknowledge this as a major challenge (Tunison & Noonan, 2001). As Bolstad & Lin (2009) argued, independent learning skills are a requirement and result of effective online education. In this research, it was obvious that at some levels students could work autonomously and there were important improvements, as a result of students' maturation process and the teachers' professional development.

Development of self management and higher order thinking skills

Through the online learning environment, the students could better organise their study. They had blog pages where they were encouraged to upload their work or keep electronic notes and monitor their learning process. The teacher remarked that "after week one, some 'wallowing in the shallows' [beginning to understand the learning environment, before moving to deeper understanding and familiarization (Collison et al., 2000)] and time management skills begun to develop".

The students developed higher order thinking skills and improved their use of language, symbols and texts. The forums enhanced language and literacy development and helped students move from understanding to applying, even analysing at some level, according to SOLO taxonomy (Biggs & Collis, 1982). For example, some students considered more carefully their written communication, as illustrated by this observed student during class (student 5): "I don't seem to remember 'Level 2' language so will

definitely need some help with that Miss". Some students moved beyond this realisation and improved their written language, for example, this much improved evaluation of a dish by one student (student 8): "The rice pudding was cooked to perfection. We served it with bananas and a sprinkle of cinnamon which help bring out the flavour."

Similar to our study, Luckin et al. (2009) found that most students used technology in unsophisticated ways, but some signs of critical thinking and reflection were apparent. In our study however, as with independent learning skills, this area can be further improved.

Provision of resources and enhancement of authentic learning opportunities

In this study, the online environment enhanced student learning by making information available from a variety of websites and by providing hyperlinks to credible resources, digital clips and Web 2.0 tools. This material was not available in paper resources; therefore the online mode improved the breadth and depth of student learning. Students often enjoy content that includes a variety of media, such as images, audio, video and interactive elements (Ng, 2008).

Access to websites facilitated students to link their knowledge to authentic contexts, enabling more reality-based and contextualised learning. For example, for their assessment, the students were required to propose menus for the school canteen and they used hyperlinks to authentic resources, such as local supermarket and cooking/recipe websites. "A good online course must go far beyond a read-this-and-respond correspondence course to an environment where students are actively engaged in authentic learning activities" (Kachel et al., 2005, p.14). The students expressed their confidence in using search engines for additional information. However, not all could distinguish reliable and credible web resources by themselves, as better illustrated in the following interview excerpt:

> Interviewer*: Would you feel that you need more resources in there (the online learning environment), more hyperlinks, or is it something that you can do by yourself?*

> Student 2*: You can just go on google and find them anyway.*
> Student 4*: But, google makes it hard to find things, sometimes...*
> Student 2*: Well it depends where you're searching, I suppose... go onto Wikipedia...*

When using Web 2.0 applications, the students were able to present their tasks in different ways, with various presentation tools that they chose which enhanced the blended course's ability to address different needs and characteristics, increased student motivation and engagement. One of the students (student 1), who was less likely to engage with assessment tasks, illustrated high motivation to complete his assessment, because he could personalise his work with the use of the online tool *glogster.edu*, which "Was fun", according to his comments.

Professional growth of the teacher

The blended course implementation gave the teacher further opportunity to advance her ICT skills, while increasing knowledge and gaining expertise on blended teaching approaches, though at times she said: "I felt like a novice teacher again!". She was motivated to read related literature and was encouraged for continuous self-reflection, aiming to improve her pedagogy. This was important as the process of teachers learning to use ICT effectively in supporting learning and teaching is linked to the adaptation of education to the context of the 21st century (Davis, 2008).

During the process, the teacher sought to examine students' perspectives on their blended learning experience as well, in conjunction with her own observations and self-reflective practice, to improve her pedagogy. The teacher argues "my classroom practice with these students did change. By having to work online, I was organised differently; in some ways there was less flexibility for that spontaneous teachable moment that you get face-to-face. My instructions were definitely more defined, but there is definitely room for improvements". The importance of ongoing assessment of teachers' practices is argued by Cavanaugh et al. (2008) who argue that "inservice teachers need a high level of detail related to instructional variables that enhance effectiveness of education approaches, and they need the skills for interpreting that data

in a way that will translate to improvement in their own situation, whether it is online for face-to-face." (p.4).

The students readiness to learn online was a challenge

One of the most important challenges within the blended course implementation was student readiness to learn through the online medium. This contradicted the teacher's assumption that they are "digital natives" (Prensky, 2001) and able to transfer their digital literate social skills and enthusiasm across to educational digital learning. She soon realised that access was a major limitation, as "students with ICT access at home felt more confident to explore the online environment, in contrast with students who had limited access to computers who still felt confused and challenged to easily navigate".

The teacher noted that at times it was difficult for the students to understand the importance of the online environment. In her interview, she noted: "[Student 1] hasn't realised yet how this can help him and I had to keep reminding him of the link between what we do at school and his future goals … [Student 4] needed little steps to understand the benefits of ICT to her future goals". This was also illustrated by students' comments that they were using the online content mainly because the teacher recommends it.

Some students interacted through synchronous chat, but their inexperience with asynchronous online discussions was obvious. Most students expressed their reluctance to use the online forums and reported that they prefer face-to-face communication. The students didn't understand the extended communication opportunities that the forums provide, particularly in the early stage of implementation.

The teacher acknowledged that students are not always capable to self-engage and learn independently. They require scaffolding to become confident autonomous learners. The students also said that they found it difficult to work independently without the teacher's onsite presence and it was challenging not to become distracted by other websites or other students' presence. For example, student 2 said: "You don't mean to when you end up talking to everyone anyway", and student 4 noted that "I prefer to write things down, coz it's just distracting for me to use the computer (for my

learning)". All four students interviewed admitted that focusing without the teacher's presence would be challenging, as she provided support and guidance.

Although students are often competent users of technology in their everyday life, they have difficulties in using ICT in sophisticated and educational focused ways, thus needing support from teachers to effectively use technology in the classroom and develop higher order thinking skills (Luckin et al., 2009). "My teachers don't have to know where to click. I can teach them that. I just want them to teach me the parts that I am not thinking about yet" (student cited in Kajder, 2007, p.215).

Furthermore, research shows that students often face difficulties in self-directing their learning through online education (e.g. Barbour, 2008; Oblender, 2002). Student engagement and motivation is often improved by the presence of an onsite facilitator, who may guide them and keep them on track, while they learn at their own pace (Frid, 2001; Nicholas & Ng, 2009). The students in this study were not an exception and the teacher also acknowledged this need for onsite facilitation.

Teacher was a novice in online teaching

As the teacher was a novice in blended teaching, this experience was initially a challenge for her. For example: "A student [student 2] emailed me saying he could not log into the course. My inexperience was showing up. I telephoned my supervisor for assistance."

With a blended online learning programme, the teacher workload changes as well as the demands on teacher time, for example, answering emails in evenings and responding to questions in the forums. To improve her understanding, the teacher read related literature and continuously reflected on her practices, acknowledging she still required further opportunities for professional development, to use and effectively implement the available tools. During her interview she explained:

> *I am a novice, my experience of (blended) online learning or LMS such as Moodle is very recent. Prior to this, I had a basic understanding of the principles with no theoretical underpinning knowledge; this is still*

> *developing exponentially, as an enthusiastic digital immigrant. There is still much to learn. It's a challenge in keeping abreast of the changes, new applications, new knowledge and in using the hardware, software and let alone the available tools.*

The teacher, agreeing with Davis (2008) felt that preparing students for the future was a moral and professional responsibility and this motivated her to implement ICT in her pedagogy. Therefore, for her it was necessary to "get out of her comfort zone". However, aspects of the blended course, such as the online environment interface, student support and facilitation of online discussions could not easily be moderated, without previous blended teaching experience.

Dewstow and Wright (2005) discovered that the teacher's inexperience in some aspects of the online course was a challenge, whereas a teacher's familiarity with some other aspects was a catalyst. Teachers' unfamiliarity with ICT implementation in the classroom often makes them feel intimidated to use technology tools (Ladbrook, 2008). However, Lee (2006) found that teachers' exposure to professional development programmes enabled them to more easily design and implement online content according to their needs and working styles.

School support and infrastructure

School support is a very important factor to successfully implement online courses (DiPietro et al., 2008). In this study, the school was initially apprehensive towards ICT implementation and some staff had difficulty in understanding the teacher's rationale behind her blended teaching practices. Also the infrastructure was inadequate, as the computers were slow and this created further problems. During the interview the teacher reported: "Often I went home to work through the technical issues".

The school server blocked some useful websites, because it was aiming to limit students' access to inappropriate content and to help them to remain focused. However, the teacher acknowledged the importance of enabling the students (from preschool onwards) to use the web appropriately and to control their level of distraction, agreeing with Richardson (2006) who argues that regardless of the practices to block online

content at schools, the reality is something cannot be blocked. An interesting example in our study is illustrated by one of the students (student 3), who logged in to a social networking site while waiting for her work to be saved (the computers were too slow), but once it was saved, she immediately returned to her task.

Lee (2006) found that teachers required release time to plan their practices according to students' needs. Like our research, inadequate infrastructure is frequently acknowledged as a limitation of eLearning practices (e.g. Chaney, 2001), as well as lack of leadership support to the teacher (e.g. Lee, 2006). However, the teacher noted that school culture was changing and a movement towards embracing online learning was apparent. Early in the year a review of the school's ICT systems was completed by an external company and this resulted in some infrastructure and cultural changes. Also, other teachers' interest towards online education developed over time and some staff members, including school leaders expressed a willingness to engage in professional development programmes related to effective ICT implementation in the classroom.

Suggestions for schools

Our findings, triangulated with other studies on online school education, helped us to generate some suggestions for effective blended course implementation in secondary classrooms. However, given the many limitations of this study, the following suggestions should be critically evaluated.

1. Ongoing review of students' skills and characteristics.

Students in our classrooms, often referred to as *digital natives* or *Gen Y,* are dependent upon the technology that they own and use. These include digital tools such as cell phones, laptops and other mobile devices to communicate, collaborate, socialise, and to share information constantly in their daily adventures (Prensky, 2001; Wright, 2010). However, as found in our study, not all students are familiar and have access to ICT and even when they do they may be still neophytes in understanding how to use them purposefully and in educationally orientated ways (Luckin et al., 2009; Wright, 2010).

In addition, Roblyer and Marshall (2002/2003) argue that students need to have some specific characteristics to succeed in online learning. Together these factors that depend on their ICT skills and characteristics result in students presenting different needs and learning styles, that the blended course and other support is expected to address (DiPietro et al., 2008).

Ongoing review of student skills and characteristics will help teachers to provide them with adequate support and counselling, as well as to use teaching practices that fit their needs and cultural contexts. This is essential for New Zealand where students come from a range of different cultural backgrounds and present a variety of characteristics and the Ministry of Education requires school facilitate all students to develop their full potential whilst considering their individual differences (Ministry of Education, 2007).

2. Concise online course structure, expectations and objectives.

In our study, the students gradually familiarised with the online environment's structure, which they found most difficult at the beginning. Concise course structure not only enhances easiest navigation, but also helps learners remain focused on the content and avoid distractions (Kachel et al., 2005). Students also identify interface design clarity as an important factor for online learning success (Barbour, 2008).

Moreover, students had difficulties in understanding the usefulness of some activities and realising their progress throughout the blended course, so particular care of these aspects is recommended. "An effective user interface is essential to the enabling of students who try to explore knowledge presented in the learning environment and who, in monitoring their own learning progress, hope to avoid overwhelmingly complicated content" (Wang & Yang, 2005, p.305). Clear performance criteria, possibly including assessment rubrics, can facilitate students to better understand the process of learning and increase their metacognitive skills (Herring, 2004).

3. Provision of onsite support and facilitation.

Wang and Reeves (2006) found that the opportunity students were given to learn independently during their blended course resulted in taking responsibility of their

learning and thus increased their motivation. However, the challenges students often face during independent learning discourage and frustrate them (Tunison & Noonan, 2001). Research of school students in New Zealand showed that many are not always ready to self-direct their learning (e.g. Bolstad & Lin, 2009), which was also found in this study.

Blended approaches can help students to increase their independent learning skills, with the support of an onsite facilitator (Oblender, 2002; Davis & Niederhauser, 2007). In our study, the teacher found that her presence was important to her students, who depended highly on the teacher's onsite support and this helped them to gradually familiarise with independent learning. "For secondary school students whose instruction is still conducted primarily in the traditional way, it is beneficial to ease them gradually into a very different learning environment online" (Nicholas & Ng, 2009, p.322). This can be achieved by allowing some time where students practice in self-directed learning with the onsite support of the teacher.

4. Face-to-face interaction opportunities.

Online interactions help students to expand their relationships and develop social learning skills (Knowlton & Knowlton, 2001). However, they are often influenced by prior relationships with their teacher and classmates. Online social presence development can be encouraged by students' physical social presence. Consequently, when students cannot physically interact with each other, they are less confident to communicate and collaborate online (O'Dwyer et al., 2007). In our study, although students were not familiar with online dialogue, their previous relationships with each other helped them to begin to develop their online social presence and to expand their interactions beyond school hours. In this way, students become confident to interact online and benefit from the extended communication and collaboration opportunities of online discussions.

5. Teacher commitment and engagement in professional development.

The implementation of eLearning practices relies greatly on teachers' ability to use effective pedagogies and strategies (Kajder, 2007; Spires et al., 2008). In our study,

despite the teacher's inexperience in blended teaching, her willingness was an important factor to improve her practices, as she engaged in professional development opportunities. These included course work, reading and collaboration with other teachers, which she used to inform her work on her blended course.

Teachers are not always ready to commit, because their workload is often very heavy (Lazarus, 2003). However, teachers' willingness to commit and improve practices is vital for effective online education (DiPietro et al., 2008). "The success in integrating web-based learning is very much dependent on the teachers. The professional development of teachers and the support given to them is crucial when implementing such a new learning environment" (Frailich et al., 2007, p.194).

6. Leadership support and adequate school infrastructure.

In our study, the teacher often had to overcome problems by herself, such as technical constraints and workload issues. Some students had access to computers and internet only at school and infrastructure issues could not be addressed from home. Other studies found similar challenges (e.g. Chaney, 2001; Tunison & Noonan, 2001).

Lee (2006) argues that schools often have to change their whole culture when implementing online learning. The role of school administration is essential to provide adequate infrastructure and to support teachers to undertake their new role and manage any workload issues (Davis, 2008; Davis, 2011; DiPietro et al., 2008). In our study, leadership support was a challenge during this first year of implementation and there are encouraging changes in school culture and ICT implementation. This is not surprising because few school leaders have preparation or experience of online learning (Davis, 2011).

Conclusion

The challenges of implementing blended and online learning in a school are complex with many threads connecting to make it happen (Davis, 2008; Gorskii, 2009). The current push by the New Zealand government to implement ultra-fast broadband for almost all schools is raising expectations and natural disasters such as the Christchurch

earthquake's disruption to schooling in this region. However, misperceptions of the complexity of change necessary for the adoption of online learning are rife. Research has shown that there are many misperceptions relating to online education for school students and that there is a need to provide field experiences with teachers who have adopted effective practices to benefit their students (Picciano & Seaman, 2009; Compton, Davis & Mackey, 2008). Practical subjects such as physical education and home economics provide both additional opportunities and challenges (Davis & Niederhouser, 2007). For these reasons this study of the early innovation of an experienced home economics teacher as the first teacher in her school to adopt online learning through a learning management system into her course for upper high school students is a valuable addition to the research literature and has potential to inform practice in New Zealand schools at a critical time.

Through this study we sought to investigate the first steps of a school teacher implementing blended learning at her secondary school and the implications for the students, teacher and her administrators. The first researcher's role as an insider (teacher) enhanced the breadth and depth of understanding of the context, while the second researcher's and the supervisor's outsider role provided a more objective viewpoint throughout the research. The third author in her role as teacher educator and supervisor directed the project and provided expert guidance. The findings of this study and the generated suggestions that are linked with published research to enhance validity and credibility. We look forward to readers' views and plan to continue our work in this growing professional community of practice.

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