



New beginnings: Facilitating effective learning through the use of Web 2.0 tools

Vickel Narayan

Te Puna Ako: Centre for Teaching and Learning Innovation
Unitec New Zealand

Lee Baglow

Department of Transport Technology
Unitec New Zealand

Web 2.0 is driving change both in the mainstream society and education. Web 2.0 enhances the experience by allowing users not to only download pre-packaged content but by empowering them to become active contributors and publishers. Web 2.0 affordances such as the ability to network, communicate, collaborate, co-create and aggregate knowledge offer considerable opportunities for learning and teaching. The growth of Web 2.0 technology and rising easiness to collaborate, communicate and co-create provides an opportunity to move away from a transmission method of teaching to one that empowers learners to learn collaboratively through interaction with peers.

Trade education is perceived by many as “learning the skills”. In this era of fast changing technology, learning the skills is not enough. The need to continually up-skill and the ability to learn on your own is fast becoming a necessity to deliver expected outcomes. The Certificate in Mechanical Automotive Engineering (CAME) is a foundation level mechanical course that in the past was mainly geared towards ‘teaching the skills’ and also suffered from poor student retention and success rate. This paper explores an example of how Web 2.0 tools were implemented in the curriculum to address these problems: student retention and success and gearing students towards becoming independent learners.

Phase 1 of the proposed 3-phase scaffolded student-centred learning model is implemented in the course. The design and use of chosen Web 2.0 tools for use in the course is described. An overview of the outcome from semester 1 of 2-semester research is discussed. Data for the research was collected using various methods: the administration of post semester survey (student), student and staff blog, data gathered from discussions and reflections in the community of practice that was established with students and staff and an evaluation of student results at the end of the first semester.

Keywords: social constructivism, pedagogy, Web 2.0, ICTELT, community of practice, staff development, learning and teaching

Introduction

The CAME is a foundation level automotive and mechanical engineering course that prepares the students for entry into higher qualifications such as the Bachelor in Automotive Technology. Students enrolling in the CAME are mostly teenagers and a high percentage are students who had dropped out

of school and are now wanting to complete a formal trade certificate for entry into higher qualification or the job market.

The CAME over the last 3 years had suffered significantly from low retention and success rate. Statistics from the last 3 years showed that on average CAME would lose 40% of its student by the 6th week of the course.

Most staff teaching trade courses like CAME perceive trade education as being 'learning the skills' course. The teacher in the course takes the students through a set of activities that will teach them learn the skills needed to repair an automobile. A typical class would be the teacher delivering content to students with occasional discussions. To assess, end of semester exams would be administered. Students in CAME over the previous years also had to submit a written portfolio. The portfolio was designed by staff and given to students as a book that had guided questions such as fill in the blanks, short answer questions and labeling the parts of a component.

Theoretical perspective: learning and teaching with Web 2.0 tools

Robinson (2003) states that learning has to be more than just meeting the requirements needed in the job market. The rate at which technology is developing and changing the global economy requires people who are capable of adapting to the frequently changing circumstances (Robinson, 2003). "Education is meant to be a process by which we enable people to engage with social and economic change" (Robinson, 2003, p. 42).

For decades learning has been viewed as an individual activity, it is linear – has a beginning and an end, and that learning is exclusive of all interactions and experiences and that learning is a result of teaching (Chen, 2002; Wenger, 1998). To facilitate such learning, students are kept away from activities that may hinder them from paying attention to the teacher or focusing on an exercise (Wenger, 1998). To assess learning students sit a test and are expected to demonstrate learning out of context and collaboration with peers is considered cheating. As such learning is seen as "irrelevant and most of us come out of this treatment feeling that learning is boring and arduous and that we are not really cut out for it" (Wenger, 1998, p. 3).

McLoughlin and Lee (2007) broadly define Web 2.0 as "a second generation, or more personalized, communicative form or the World Wide Web that emphasises active participation, connectivity, collaboration and sharing of knowledge and ideas among users" (p. 665). Web 2.0 enhances the experience by allowing users not to only download pre-packaged content but by empowering them to become active contributors and publishers. Web 2.0 affordances such as the ability to network, communicate, collaborate, co-create and aggregate knowledge offer considerable opportunities for learning and teaching. The growth of Web 2.0 technology and rising easiness to collaborate, communicate and co-create provides an opportunity to move away from a transmission method of teaching to one that empowers learners to learn collaboratively through interaction with peers (Rogers, Liddle, Chan, Doxey, & Isom, 2007). McLoughlin and Lee (2007) also talk about the potential of web 2.0 tools for collaborative remixability – where the users use the information and resources shared with them to create 'new forms, concepts, ideas, mashups and services' (p. 665).

Web 2.0 applications can provide the answer to meeting the needs of today's diverse learners by 'enhancing their learning experience through customization, personalization and rich opportunities for networking and collaboration' (Bryant, 2006 cited in McLoughlin & Lee, 2007, p. 665; Redecker, Almutka, Bacigalupo, Ferrari, & Punie, 2009). The 'social' nature of Web 2.0 tools provides leverage for enhancing student learning, the sociability aspects form a base for student-centred learning mainly (1) it promotes interactions and could turn into meaningful conversations, (2) group feedback, the user has opinions and experiences from others to make his own meaning, (3) it promotes networking and collaboration between its users and (4) the way context is driven by its 'egocentric' collection of users (Boyd, 2007; Redecker, et al., 2009). Herrington (2006) explains the importance of context in learning. Authentic contexts play an important role in higher order learning and they should provide a 'purpose and motivation for learning, and to provide a sustained and complex learning environment that can be explored at length' (p. 3). Web 2.0 technologies help facilitate an environment to discuss context by allowing people to share their experiences with others. This helps stretch learning as conversations evolve with regard to context that can be explored from multiple perspectives and provokes users involved to reflect on their learning.

The research study

Trade education at Unitec New Zealand is seen as ‘learn the skills’ hence learning and teaching in the classrooms is like walking into a classroom of a bygone era. Traditional transmission styled teaching is prevalent in almost all courses. This research aims to identify:

1. What impact does integration of Web 2.0 tools have on teacher pedagogy?
2. How does integration of Web 2.0 tools affect students’ learning, retention and success?

Use of Web 2.0 tools in the course: description and rationale

McLoughlin and Lee (2008) state that the most effective setting for utilising web 2.0 tools is either in a blended approach (hybrid of face-to-face and online) or an online environment as these settings allow flexibility to realise the full potential of web 2.0 technologies. The underlying pedagogy in the design and facilitation of CAME was underpinned by social-constructivist pedagogy and is student-centred (Vygotsky, 1978). Student-centred learning emphasises the active role of the learner in learning, on higher order learning, the learner is responsible of its own learning, the learner has increased autonomy and there is a strengthened relationship between learner and teacher (O’Neill & McMahon, 2005).

O’Neill and McMahon (2005) claim that a student-centred approach for some students could be overwhelming, especially for students who have been through a teacher-centred learning for almost all their life. This could be made worse by the introduction of etools in the process. In student-centred learning students decide what to study, how and why however students who are entering tertiary education may not have the knowledge needed to make these decisions. Hence in the CAME phase 1 of the proposed 3-phase scaffolded student-centred learning model was implemented, Figure 1 below outlines the role of the teacher and students as they progress through the phases while working within the limitations set in the current program documents and course outline.

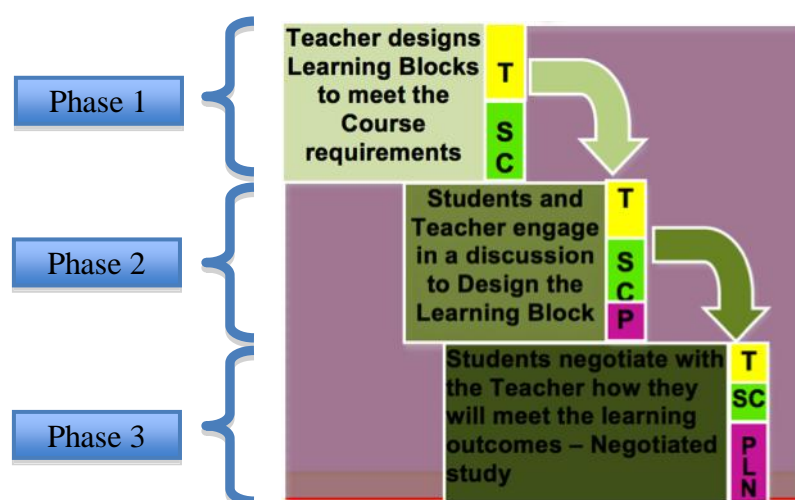


Figure 1: scaffolded student-centred learning model (Key: T=Teacher, SC=Student Community, P/PLN=Personal Learning Networks)

- Phase 1: The teacher in this phase creates the context for students to learn in. This could be in form of guided questions. Students are actively involved in exploring the concept together through conversations with each other thus leading to student created content. The students at this stage build the skills needed gradually, skills such as cognitive skills and digital literacy skills. The teacher and the student community is the critical component in this phase of learning.
- Phase 2: While phase 1 focuses on students gaining an understanding of the subject, phase 2 opens the process and students are now able to negotiate the context in which learning happens. Learner autonomy is at a higher level. Learners start to take control and ownership of their learning but still in negotiation with the teacher, hence the establishment of personal learning networks (PLN) – students identify other sources to learn from. Teacher involvement in the learning decreases while student community and PLN’s take importance.

- Phase 3: The learner is in control of learning hence decides the context of learning as an individual. The teacher's role is peripheral mainly to ensure the students are on the right path, giving feedback and guidance. The PLN takes greater priority as learners become more independent.

Context according to Luckin et al. (2008), is 'learner-centric ecology of resources' and these could be put together by a group of people, the teacher or the individual themselves to meet the learning needs. The meaning of context hence moves away from context as in 'physical location' to the types of interactions the learner may have with different spaces and time. The 3 phase scaffolded student-centred learning model construct aligns with the PAH continuum proposed by Luckin et al. (2008, p. 10) outlined in table 2 below.

Table 2: the PAH continuum

	Pedagogy	Andragogy	Heutagogy
Locus of control	Teacher	Learner	Learner
Education sector	Schools	Adult education	Doctoral research
Cognitive level	Cognitive	Metacognitive	Epistemic
Knowledge production context	Subject understanding	Process negotiation	Context shaping

To implement the first phase on the 3-phase model, Moodle (institutional LMS) and Google combo was chosen for use in CAME. Moodle was used as a scaffold for students and staff for getting them familiar with the tools that were going to be used, namely Google Docs, Picasa, YouTube, Blogger and Google Calender. Technology support was provided to the staff and students on a weekly basis hence establishing a community of practice (CoP) and the role of the author as 'technology steward' (Wenger, White, & Smith, 2009). Figure 2 outlines the setup of the Moodle and Google concept.

Technology and CoP have existed in harmony for a long time. From the beginnings of PLATO, telephone, bulletin boards, Web 1.0 to what has slowly evolved to be Web 2.0 (Wenger, et al., 2009). A technology steward plays an important role in a CoP, they take the needs of the CoP and help them select and appropriate the use of technology on a continual basis (Wenger, et al., 2009).

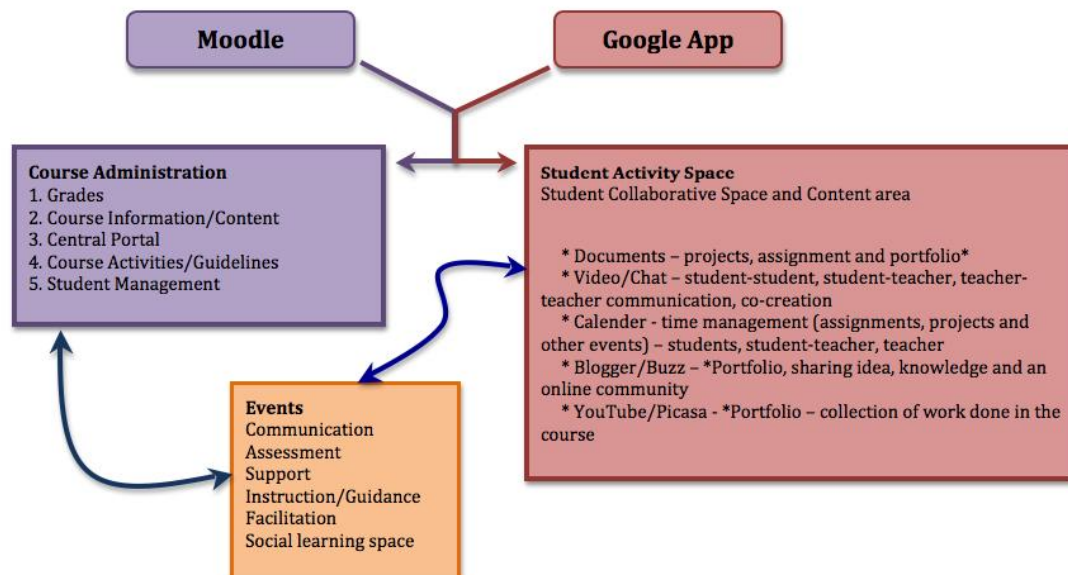


Figure 2: Moodle and Google concept map

The CAME required students to buy mechanical tools that cost students in excess of 700 dollars and books worth in excess of 200 dollars. In consultation with the staff and the program coordinator a few changes were made. The department purchased a set of tools for use in class by the students and the prescribed book for the course was dropped. This freed up enough money for the students to invest in a

netbook/laptop. Students were sent out a letter before the start of the course that explicitly stated that a laptop/netbook was a mandatory resource for the course and outlined minimum specifications such as having webcam and wifi capability.

Students were in the first week taken through the process of creating a Google account. This gave them access to Google Docs, Gmail, Blogger, Picasa, YouTube and Calender. The use of these tools in class by students were as follows:

- Google Docs – for collaboration on projects with peers and group members
- Gmail – communication with peers and teacher
- Blogger - for setting up an eportfolio
 - To encourage reflection and critical thinking on their learning
 - To provide a platform for feedback, support and collaboration with peers and teacher
- Picasa – sharing and storing pictures with peers and teachers
- YouTube – storing videos taken during class and for sharing of playlist with peers on relevant information found about the topic/course
- Calender – time management.

The implementation and use of Web 2.0 tools in the course were carefully planned to actively involve the students in the learning process to encourage communication, collaboration and co-creation - allowing students to create content, knowledge and meaning together. All assessment events were revisited and changed where needed so that it could be embedded within the learning process; this was achieved through implementing student blogs. McLoughlin and Lee (2008) state that student-centred learning activities require students to create their own meaning and understanding and it involves cognitive activities for this reason activities students take part in that don't require cognitive engagement are not constructivist. The teachers' role was to introduce the topic and concepts to the students, design follow-up learning activities/blocks that required students to take an active role in investigating the concepts introduced further, required students to reflect on the cognitive processes in completing a task and to provide regular feedback and guidance in class and on students' blogs. An assessment rubric was designed in negotiation with the students for assessing the blog posts. The teachers were encouraged to model the approach hence they also created a teacher blog (team.came) where the teachers shared their opinion and reflections on what happened in class.

Data collection

The four staff involved in the project were asked to reflect on their experience three times in the semester, first at the beginning of the semester, second at mid-semester and third at the end of the semester. The choice of how these reflections were captured was left up to the staff, most choosing a combination of VODcasts (video blogs on YouTube) and blog entries. Student progress and quality of work was monitored through their blogs, the end of semester survey and the overall student success and retention at the end of this semester. The end of semester survey was voluntary for students and 38% of the students (n=30) completed the survey. The community of practice established with staff and students also allowed for participatory action research (PAR) hence verbal reflections from staff on weekly bases were noted and are used. PAR is defined as "collective, self-reflective enquiry undertaken by participants in social situations in order improve the rationality and justice of their own social...practices" (Kemmis & McTaggart, 1988, p. 5). End of semester students survey results can be accessed here:

<https://docs.google.com/fileview?id=0B8bMAxI3fn9NNTFINjFmZjktNWEzMi00NjNiLWlxZjctMTYyZDc3NzUxNmJl&hl=en&authkey=CiASu-gF>.

Results

The findings discussed are based on results from end of semester 1 of a 2 semester (1 year long) program.

Impact of the approach on staff pedagogy

Transcript from a VODcast from a CAME lecturer reflecting on the use of Netbooks and Web 2.0 tools in class with students:

The difference between previous teaching and current is chalk and cheese. If you consider a standard lecture, you go in and perhaps set the scene, provide an introduction and recap the previous session... With CAME, I don't feel I have done all of that at all. When we first started to deliver this program and the Netbooks arrived, it was very, very difficult to stand at the front and not take total control of the learning... I certainly know my workload has increased exponentially but not in the classroom, it's all outside of the classroom, what we have done is we have taken ourselves from in front of the classroom where we were dictating the learning and we have put ourselves amongst the students where we are actually facilitating the learning. (CAME Lecturer_1, YouTube link: <http://www.YouTube.com/watch?v=QmuZt7hWz14>)

However this new approach is so incredibly different that it gives an opportunity to actually stand back from that, to actually not be in front of the students, having to fill them with the content, the students find their own content, they are just given directions. (CAME Lecturer_2, YouTube link: <http://www.YouTube.com/watch?v=4TDsA7nB3rw>)

The course lecturer immediately compares his previous teaching practice with what was achieved this semester with his students. He firstly identifies the disruptive nature of wireless devices in this case the Netbooks used by students. Disruptive technologies have the potential to disrupt a 'carefully managed classroom' by allowing conversations within and outside of the classroom environment, and by allowing students access to resources on the web (McLoughlin & Lee, 2008; Sharples, Taylor, & Vavoula, 2005). The shift of the role in classroom from being a teacher to being a facilitator, 'where we were dictating the learning and we have now put ourselves amongst the students where we are actually facilitating the learning' hence the lecturer had to involve himself in the discussion and among the students, this in-fact as outlined by Kember (1997) is a characteristic of student-centred learning.

The analysis of data collected (reflections) in the CoP established with the staff, all four lecturers involved in the project by the end of the first semester had identified their role as a facilitator. The data also indicated that it wasn't the technology that brought about this change, it was combination of the change in the pedagogical design of CAME and the use of Web 2.0 tools in the learning process that created room and opportunity for a shift in teacher pedagogy to occur. A combination of design and social tools as the catalyst in the process created an environment that no longer suited a transmission-styled teaching hence instigating teachers to reconsider their teaching-style and adapt to the situation. The author's role in the community of practice as a technology steward also played an important role in scaffolding teacher pedagogy through providing frequent support, guidance and by creating a comfortable environment for the teachers to discuss own issues and fears.

The lecturers while reflecting on the approach and events in class identified the shift of workload from the classroom to when s/he is not teaching. The time outside of classroom is spent on going through student blogs and in giving feedback and engaging in meaningful conversations with students via comments and Google video chat.

A surprising value from this project has been the transition the lecturers in CAME have made to being open about their current and past teaching practice and sharing the experience with others. They had invited other staff in the institute to come and experience the 'new way' of learning. The staff in the faculty have taken advantage of this offer and borrowed ideas that they can go back and implement with their students. The CAME staff have had over 30 visits from staff in the faculty as well as visits from staff from other institutes wanting to implement something similar in their trade courses.

Reading the posts on the team.came blog and according to reflections from the teacher's in the established community of practice also highlighted that the staff involved were now continually reflecting on their practice in class and evaluating it to explore new ways and strategies for improving their practice for better student engagement and success.

Impact on student outcome and learning

End of semester (Jan-June, 2010) student results indicate the change in pedagogy and integration of Web 2.0 technology in the learning process has made a vast difference to student success and retention

when compared to the results at the same time last year. The CAME at the start of this year started with 80 students, at the end of the semester CAME had only lost 2 students (2%), at the same time last year CAME had lost 46% of its students. The completion rate at the end of this semester stood at 70% compared to the same time last year when it was 54%. The 28% who last semester didn't successfully attain the credits are continuing this semester working achieving the credits to graduate at the end of this year.

The CAME has successfully managed to hold on to its students even those who struggled to keep up with the class, in the past these students would have quit the course.

There are so many advantages with this style of teaching that it totally numbs the way we used to teachand what is surprising is that this is only really evident when you start going through this process yourself Once you have become a facilitator and when you stand back and you watch the students take the responsibility and ownership of their learning, you realize that learning is actually really happening rather than drilling the content into these students. (CAME Lecturer_2)

The course lecturer identifies students taking responsibility and ownership of their own learning, this has been documented in literature as an influential motivator for students (Jones & Issroff, 2005; O'Neill & McMahon, 2005). Data gathered in the community of practice on staff reflections also highlighted the willingness from students to engage in the learning was far better when compared to students over the past 5 years. In the end of semester survey, 86% of the students (n=30) indicated that the use of technology namely blogs helped them in their learning. All students who participated in the survey stated that the course had helped them gain confidence and self-esteem. This could be attributed to the evolution of a community of learners in the course and the social dimensions associated with it (Wenger, 1998). Course lecturers identified that the degree of collaboration and support between peers was high; students were helping others with the tasks they were struggling with, not by sharing their work but through discussion and conversations. 90% of students who filled the end of semester survey indicated that the use of Web 2.0 tools made conversations and communication easier between peers and teachers.

My son Smith attends Unitech, and you are one of his key lecturers. He (Smith (pseudo name)) is doing the pre-entry course that runs through to the end of the year. Smith is at a very good stage in his life now; thoroughly enjoying what he is doing and growing his personal confidence. ...I am seeing a very determined Smith now (Letter written by Smith's mother to a lecturer in CAME.)

Smith is one of many students who enrolled in the CAME course who did not finish high school or has no formal qualification. Increased interaction between students and student-teacher in CAME was established a clear channel for students to seek help and motivation. The teachers are able to identify the students who need help at an early stage and are able to provide additional support and attention this helps keep students motivated and builds confidence.

Student attitude towards use of Web 2.0 tools in class

If I had to point one outstanding thing CAME has done so far is this - we all believe is that teenagers are naturally proficient at using all this technology. (CAME Lectuer_1)

Data received from the end of semester showed that 90% of students who attempted the survey had a laptop/desktop prior to enrolling in CAME, 97% of them had internet at home, 63% had used other web applications prior to enrolling in CAME. 90% of the students indicated that they would prefer to use Web 2.0 tools in future courses they'll be enrolling in at Unitech.

The majority of the student's (87%, n=80) in CAME could be categorized as GEN Y (Digital Natives) and are normally perceived as digitally savvy (Prensky, 2001; Thompson, 2007). However the authors experience in working with the students in CAME on weekly basics in the community of practice established showed the perceived savviness associated to be untrue. The use of digital device and media by majority of the students in the course was seen to be superficial and mostly entertainment focused. The students were aware of technology, for instance YouTube. Students had used it to view videos but weren't active contributors or content generators. Other than browsing for videos, the

students had no knowledge of how to create or upload content. The willingness however to engage with Web 2.0 technology and the speed at which students learnt how to use and adopt the technology once introduced and demoed was phenomenal. The affordances and social nature of Web 2.0 tools had to be shown to the students and modeled for them to understand and start using it as a collaborative tool. After experiencing the use of Web 2.0 tools in the course for learning, 90% of students in the end of semester survey indicated that they expected use of similar Web 2.0 tools in future courses they'll be enrolling in.

Choice of the blogging platform – a comparative analysis

Establishing the student community in CAME was a critical element of the design. To encourage students to network, provide peer feedback and support, collaborate in creating knowledge and understanding together Blogger (www.blogger.com) was chosen as the platform for use in class for students to post blog posts and effectively establishing an ePortfolio for the course. Blogger was chosen to avoid students creating another account they would have to look after and remember the user details (username and password) for. Blogger allows users with Google account access without having to create an account. As students started using Blogger in the course, the course lecturers found it difficult to manage 80 plus blog posts every day. The students also found it difficult to connect or follow blogs from other students in class. Comparing Blogger to another blogging platform like Vox (www.vox.com), Blogger is missing some critical elements that allow the formation of an online community. On Vox, the neighbourhood feature allows users to easily start following or to keep an eye what the others in class have done. Vox also allows its users to create and manage groups, something Blogger doesn't. The staff had to work around this problem and had to use Google Docs for group projects and assignments. The biggest difference between Blogger and Vox could be said to be that Blogger treats your blog separate and as an individual space where as Vox creates a 'social' feel. Vox allows space for a community to form and supports and encourages members to stay connected, collaborate and communicate, all the elements that align it towards a good social-constructivist platform for use in learning.

Conclusion

The implementation of Web 2.0 tools in the course underpinned by social constructivist pedagogies has made a marked difference for students and teachers. The retention and success rate is markedly higher when compared to results from the previous years. The change in the pedagogical design of the course and use of Web 2.0 tools in facilitating learning and teaching has had a positive impact on the students and teachers alike. The change generated more conversations amongst the learners and between the learner and the teachers. The teachers were able to spend more time with students needing help and support and in guiding the students when required. The use of Web 2.0 tools in the course acted as a catalyst for the teachers to revisit their practice in class hence helping them identify and shift from what was a predominantly teacher-centred teaching to the beginnings of a student-centred learning environment.

The change in pedagogy and integration of Web 2.0 tools in the course created a social environment for learning hence learners found more support from peers and social aspects in the class strengthen their relationships leading to high participation in learning activities, willingness to engage in discussions and increased motivation and confidence.

The research also proposes a scaffolded model of implementing student-centred learning (3 Phase scaffolded student-centred learning model) while working within the limitations of legacy curriculum and course outlines. The scaffolded model closely aligns with the PAH continuum of learner development (Luckin, et al., 2008). Early indications from this research suggest the first-phase of the model was implemented successfully. The critical elements in the implementation of the first phase in this research has been the role of the technology steward, careful planning and design for use of Web 2.0 tools in learning and establishment of a community of practice with teacher and student to provide support and guidance regularly. Future projects are planned to fully implement to model to explore the effectiveness and impact on course, learner and teacher.

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Author contact details:

Vickel Narayan, Academic Advisor (Learning Technologies)
Te Puna Ako: Centre for Teaching and Learning Innovation
Building 180, Unitec
New Zealand
Private Bag 92025, Auckland Mail Centre, Auckland, 1007.
Email: vnarayan@unitec.ac.nz
Lee Baglow, CAME Lecturer (Automotive)
Department of Transport Technology,

Building 107, Unitec
New Zealand
Private Bag 92025, Auckland Mail Centre, Auckland, 1007.
Email: lbaglow@unitec.ac.nz

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