

## **Constructing knowledge using web 2.0 in a geography classroom.**

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### **ABSTRACT**

*Digital technologies were integrated into a New Zealand year 12 geography classroom to help students construct an understanding of urban processes within their own urban setting and Sao Paulo. This involved the use of an online learning environment, student developed blogs, interactive quizzes and an interactive whiteboard. The aim was to help students to construct their understanding of geographical concepts. This paper explores the responses of the students to the use of the digital technologies to construct knowledge. It was found that while the teacher introduced a constructivist approach to the way that learning occurred in the classroom, many of the students remained focused on completing notes and memorising the 'right' information for exams.*

### **BACKGROUND**

The current generation of school students studying geography use a range of digital technologies in their lives. Students join social networks such as Bebo where they share information online, they take part in online gaming and are in constant contact with peers through cell phone technologies (Lenhart et al, 2005). The use of interactive digital technologies is not necessarily limited to learning beyond school. All secondary schools in New Zealand have broadband that gives students and teachers the potential to interact and exchange ideas or information through the internet using web 2.0 applications (Johnson et al, 2005).

Web 2.0 is also known as the interactive web where participants not only access information (as with web 1.0), but are also able to comment, present their own ideas and information and collaborate online without needing to know computer based languages. Geographers are able to access information from around the globe, form networks, interact and share ideas with each other through web 2.0 applications. Geography is a subject that makes use of internet-based resources at school. In a UK study by Kitchen et al. (2007) it was found that geography teachers were more likely than other subject teachers to use internet based resources frequently with 51% doing so in half or more lessons. The study did not report interactivity through web 2.0 applications which is a relatively new technology to be used in school situations. The ability to develop ideas collaboratively makes it an appropriate tool for use within a constructivist learning environment.

In a constructivist learning environment the learners are individuals who actively construct meaning around phenomena (such as geographical processes) and these constructions are idiosyncratic, depending in part on the learner's background knowledge and experiences. The development of meaning can take place in a social setting (such as a classroom or family) where individuals within a group construct meaning collaboratively (Richardson, 2003). Constructivist

pedagogy includes (but is not limited to) students being active participants in their learning, having multiple opportunities to understand and apply a concept and building learning by making links between new contexts and familiar contexts.

The use of web 2.0 in education remains in the early stages. While many teachers report using ICT in their teaching, 80% of secondary teachers in Britain reported that they rarely or never use technology to support learners working together. (Kitchen et al, 2007). Much of the research into the use of ICT in classroom practices focuses on changes in teacher beliefs (Cuban, 2001, Becker & Riel, 2000, Webb and Cox, 2004), examining what happens to the teaching when ICT is introduced. The focus in this paper is the perceived impact on student learning, when digital technologies are used to support a geography teacher who values a constructivist, collaborative learning environment for his students.

## METHOD

The research examined a single case study (Yin, 2003), which was a class of 16 year 11 and 12 female students in a high decile school studying urban settlement processes as part of a programme towards gaining qualifications at NCEA level 2. The geography teacher aspired to use web2.0 tools to help engage students in learning through active participation and collaboration.

The researcher and classroom teacher discussed the use of technologies and aims of research. The students were introduced to the research plan and invited to take part prior to starting their study of urban settlements. At the conclusion of the study the students completed surveys and participated in an open focus group interview/discussion about their experiences with the researcher. The research had approval from the Victoria University of Wellington Human Ethics committee.

### The use of digital technologies in a geography classroom

Digital technologies were integrated into the geography classroom to help students construct an understanding of urban processes within their own urban setting and Sao Paulo. This involved the use of an online learning environment, student developed blogs, interactive quizzes and an interactive whiteboard.

### Online learning environment (OLE).

The school had an online learning environment in which a range of resources and links were placed that students could access 24/7. This included powerpoints, teaching notes, links to Youtube videos, blogs, old exam papers and interactive games. 15 of the 16 students in the class had an internet connection at home. All of the students had access to the computer suites at school during lunchtimes, study periods and after school.

### Blogs

Students in collaborative groups of three or four students carried out an inquiry into a particular urban process within the local area. The students spent time in the urban environment, took photos and gathered information that they then summarized and displayed within blogs. The blogs were linked to the online learning environment. At the end of the year these blogs were used again for revision on how a range of processes had influenced the local area overtime.

### Interactive games

Students developed “fling the teacher” multichoice quizzes to help them learn or revise details from case studies and relevant terms. The quizzes involve 15 or more questions with multichoice answers, which change in order each attempt and require the student to get all questions correctly to complete. The students would design the questions collaboratively with one student or the

teacher uploading them and making them available through the school's learning management system. The students used the quizzes in class as a cooperative group activity through the interactive whiteboard and were able to access them at home through the OLE. An interactive whiteboard was used also with groups of students for a mapping activity which used aerial photographs and aided the students' interpretive skills and spatial understanding of the local setting.

## FINDINGS

Students were asked to estimate how often they accessed the resources beyond timetabled classroom times, and the time spent. Table 1 shows the collated results.

	Students' reported frequency-accessing each technology (not during geography lessons). N=16					Average time reported spent using the resources (by those who accessed).
	0	1-2	3-5	6+	average	Minutes
Powerpoint(s)	7	6	3		1.25	40 minutes.
YouTube links	13	3			<1	10 minutes
Handouts	3	3	6	4	4	112 minutes
Links to websites	6	2	7	1	3	107 minutes
Past exams	4	6	3	3	3	123 minutes
Blogs developed by the class	6	3	4	2	2.5	72 minutes
Fling your teacher quizzes	2	4	2	6	4	99 minutes

Table 1. Accessing digital technologies beyond timetabled hours.

Students were able to access the resources from school or offsite. All but one student was able to access the OLE from their home. All of the students had access to the computer suites at school during lunchtimes, study periods and after school.

Students were asked what they did when online and what they learnt. The majority of the responses indicated that students downloaded the resources to check the information that they had in their notes, to complete their notes, to gather facts and information, or in the case of past exams, to practice answering questions. Over half the students accessed the blogs developed by the class with the purpose of learning about urban processes. The 'fling your teacher quizzes' were used primarily as mastery learning tools to memorise facts and self check their learning. Two thirds of the students explored links to other sites posted in the OLE.

The students worked in group using an inquiry process to investigate an urban process. Each group developed questions to examine how a different process operated in the urban area in which they lived. Their findings along with photos were put into a blog. Each blog was accessible to the whole class through links in the OLE.

Ten students noted that they worked outside of class time developing their own blog and/or accessing other group's blogs to find out about the other processes. One student reported spending more than five hours beyond the geography class, developing her group's blog.

Students were asked how useful the range of technologies was in helping them to learn. The results are collated in table 2.

<b>Activities:</b>	Made geography easy to learn	Helped me to learn	Didn't help me to learn	Made it more difficult to learn
Developing a Blog website for Research Project	2	6	4	3
Using Year 12 Geography information from OLE.	4	9	3	
Drawing diagrams with the Interactive Whiteboard	5	5	6	
Fling the Teacher quizzes	8	8		
YouTube videos of Sao Paulo	3	7	5	

Table 2. Student reporting of digital technologies and learning.

The students were positive about using 'fling the teacher' quizzes with all seeing it as beneficial to their learning. They were least positive about developing a group blog, though over half of the students saw this as beneficial.

The students who reported finding learning more difficult through developing the blog than using a more traditional paper based project noted that the technical aspects of the blog were complicated or time consuming. Being able to access other groups' blogs was seen as a positive outcome of using blogs. One student noted: *'I don't think it (developing a blog) made much of a difference (to learning), I would have preferred to write it out. It did help with study with access to it now though.'*

Students were generally positive about using the OLE. It was perceived to be of value as students could make sure that they had all the information they needed:- *"Was sometimes hard to access, but very helpful in getting all notes"*. There was a focus on getting complete and 'correct' notes as a basis for study and the OLE allowed the students to do this. Three students noted that it didn't helped them to learn, for one it was because she didn't have internet access at home and two chose not to access it.

The responses to the use of the interactive whiteboard for mapping varied with some students finding it confusing and indicating a preference for the whiteboard and others finding the personalised help that was available made this way of learning much clearer than using a whiteboard.

### Students' concepts about learning

The comments that the students made about learning in the surveys were analysed to see if they reflected constructivist ideas about learning. The teacher had introduced the range of digital technologies to fit with constructivist teaching and learning. During analysis it became apparent that three ideas about learning were reflected in the comments; mentalism, behaviourism and constructivism.

Mentalism is a learning theory about how the mind works as it assembles a mental model of the external world. Learners internalize an array of external 'objective' prescribed knowledge. This view of learning sees schooling as a linear process where students learn through prescribed knowledge as the 'take things in' or their 'minds are like sponges'. The use of learning styles is based on this learning theory (Davis et al, 2000). Comments reflecting mentalism showed that memorising facts and information was seen as learning for the majority of students. For example, students were asked *what they thought was their biggest achievement in Geography while studying urban settlements?* a student responded: *'Learning a lot of facts.'*

A student who spent more than five hours in her own time developing her group's blog said: *"because you weren't just reading it, you had to put it in your own words, that makes things easy to remember"*. Many of the students talked about how the technologies helped them to remember or how they accessed facts or not (one student noted the youtube clips didn't have enough 'facts' in them). Students also noted that the visual aspects of the multimedia helped them in their learning, with a number of students stating that they were or were not visual learners. Using the technologies was... *'A good idea, different learning technique that helped me to remember the topic.'*

When asked to talk about their learning, students sometimes framed this in terms of what they did rather than what they learnt- this was interpreted as reflecting a behavioural approach to learning. Most commonly students were concerned with completing a correct set of notes. Biggest achievement... *'I have made some good comprehensive notes for myself with class notes and printed out powerpoint with case study examples.'*

The majority of comments about learning reflected the mentalism or behavioural perspective- memorising facts, information and completing and checking notes. A few students, three in particular were focused on constructing their knowledge.

One of the aims of the research was to use digital technologies to get students to construct their understanding of geographical concepts. When asked to talk about learning a few students did reflect ideas about knowledge construction as they talked about their own learning, things becoming 'clearer' and their understanding of concepts or the topic. Biggest achievement... *'Learning about Sao Paulo and how they live, totally different to our lifestyle.'* *'Able to understand concepts and situations through the interactive whiteboard.'*

## CONCLUSION

Much of the research into the use of digital technologies in the classroom centres around changing teacher pedagogical beliefs. Webb and Cox (2004) noted that ICT may be enabling teachers who want to adopt a more student centred approach, which is the case in this study. There is limited research reporting on students' reflections of learning when teachers do use technologies in a constructivist way. The classroom teacher in this study was aiming to use Web2.0 tools to enable students to collaboratively construct their understanding of geographical concepts.

The use of digital technologies in the classroom was successful in engaging the students in learning and was used extensively by the students beyond the timetabled classroom hours. The opportunity to have 24/7 access beyond class time was taken up by all but one student, with most accessing the resources available repeatedly. This class did spend time studying all of their subjects beyond timetabled classroom hours, access through digital technologies did not increase

or decrease the time students spent on geography study. While there was a novelty factor reported by some students in this different way of learning, the use of digital technologies was underpinned with constructivist pedagogy in mind, which would negate the longer term decline in motivation that has been recorded when learning is focused on the technological aspects rather than the learning aspects of a digital technology Moss et al. (2006).

All the students in this study reported that using digital technologies helped them to learn in some way. Where students identified that using digital technologies helped them to learn it was often within the context of memorisation or learning facts and completing the 'correct' notes rather than constructing understanding of geographical processes, which was the teacher's pedagogical aim. The majority of the participating students appeared to believe that learning geography at NCEA level 2 involved having complete and correct notes, and memorising facts from case studies. Given this, it is not surprising that all the students perceived the interactive quiz as being beneficial to learning, as this gave instant feedback on the memorising of facts. The activity that was the closest aligned with constructivist pedagogy (inquiry learning, developing a blog collaboratively to share understanding of geographical processes) was reported as being useful for learning by half the students.

The way that students view learning doesn't automatically change when a teacher introduces a different way of teaching such as using digital technologies to enable collaborative constructivist learning.

*'Technology is good provided it does not require too much extra effort and time on top of learning the actual geography content'. Year 12 student.*

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