

The Role of Technology in Learning/Teaching

with a focus on modern technology

The greatest technology that has ever occurred is the development of reading and writing. However, most of us never consider this as a technology because we've been immersed in it for many generations now. You are accessing learning resources right now through this technology. In other words regardless of the computer and it's associated screen, if you couldn't decipher the patterns on the screen you would not be able to understand the information. Reading and writing meant that we could record intricate details that would not get lost or transformed (a lot) over time. No society that has a cultural memory that can be recorded through writing, has ever built a space shuttle!

Probably the next greatest technology is the printing press, that allows mass printing to occur, and at a relatively cheap price.

For the most part though, I'm not going to spend the lecture on these monumental technologies. Nor will I spend much time on either radio &/or television. Both of these technologies, when professionally produced and presented are indeed most excellent teaching and learning opportunities. Instead I'm going to focus mostly on modern information and communication technologies (ICTs) which range from computers, through to the world wide web and also mobile telephones.

A Brief (& select) Overview of Education Technologies

Radio	Radio held one of the original 'technological' breakthroughs in education. Radio shows by eminent lecturers could reach out beyond the lecture hall and reach every household that tuned into the radio programme at the right time. Originally radio shows were 'live' but soon the ability to record shows allowed the shows to be repeatedly broadcast even in different nations. The reason it didn't take off was probably because it was too expensive to produce well crafted educational programmes. Attempts to merely record a lecturer misses out on the many non-verbal cues that are given when you are there in person.
TV	Really an extension of radio except with the addition of vision. Once again of produced well, the television programmes could demonstrate and show wonderful and intricate details whilst they were being explained. So a television programme might explain how a honey bee might dance out the location of a new store of nectar to her hive mates, and whilst the explanation is occurring, diagrams, cartoons or even recorded video could be shown explaining the dance more precisely.
OHP	The humble overhead projector may seem it is like an extension of the blackboard or whiteboard. In a way it is, however, the ability to also place up acetate sheets or prefabricated slides, made the presentation of class material in a class or lecture far easier.
Laboratories	Whether it be science or art or music laboratories, these are dedicated spaces that are there to show more practical or demonstrable aspects about a particular topic. Normally in a way that is far more 'real' or 'close-up' than a traditional 'chalk & talk' session. A very elaborate version of this is the 'children's museum'.
Blackboard, whiteboard	There appear to be a number of causes for dyslexia but it has to do with not being able to consistently recognise shapes and orientation of letters. Dyslexics may often be labelled as slow learners, or intellectually challenged because they cannot complete our modern literate heavy curriculums.

Computers	For a while it seemed that the 'next great thing' was going to be the multi-media revolution in education. Computers with the help of huge information on compact discs, could deliver a suite of text, diagrams, photos, music and dialogue and even video. Just like the production world of radio and television, this only worked when significant production resources were put into it.
Web 1.0	When the internet was turned on in a commercial way in the mid 1990s (that's only 15 years ago!) the global village 'shrank' because of the interconnectivity provided by email and the world wide web. Email meant that contact between individuals (or one to many on email distribution lists) could be conducted at an affordable price by many people. However, the technology was really still only textual information that was relatively bland to look at (raw text), or in the case of web pages, was restricted to static web pages (the information once published electronically rarely changes), or commercial dynamic pages (think electronic shopping like Amazon, where the database of items are all updated according to the user's interaction with the pages).
Web 2.0	This is the underlying technology that allows people to start interacting in a way that is (i) in a transparent technology (most people can point and click and type very rudimentary messages; (ii) and starts to built up a core of information that itself is of value. Think of Web 2.0 in social network systems such as Facebook, Twitter, where people are actually contributing to the publishing of the content. Web 2.0 is (apparently) the foundation of a totally new way of thinking about education.

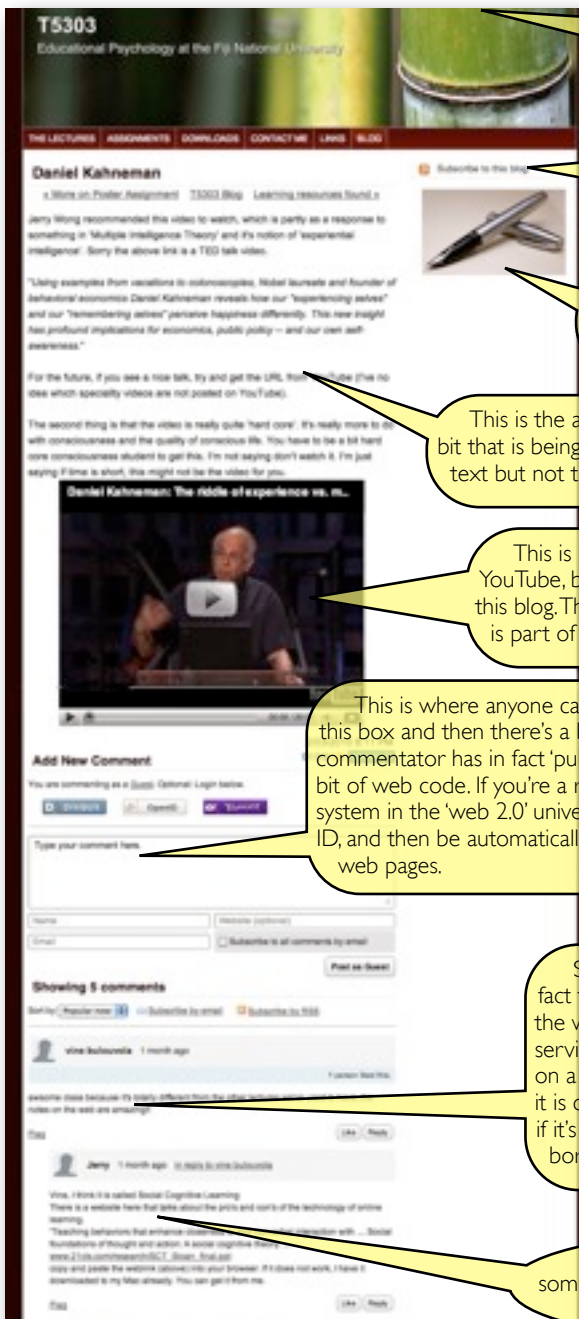
Publishing

Previously to publish, it was an expensive and normally restricted to a few people who could publish normally under publishing houses. The publishing of yesteryear lent itself well to an educational model that suggests that students and pupils are there as empty vessels to be filled up with knowledge provided by a trained expert (the teacher/lecturer). The information 'flows' one way namely from the printed material to the reader.

Modern publishing however, allows for interaction to occur. That is a dialogue can occur between the author and the reader. This allows for interactive participation. This is the part that modern educators are getting excited about because students/pupils can interact with active members of a community.

Blog

Blog stands for 'web log', which is a simple template layout that allows writers to write up anything and attach pictures, video, maps and pretty much anything. Cutting and pasting code can add information that is updated on a different part of the web but is included on the bloggers page. It's possible to keep a blog for free (after you've accessed the internet) which is media rich and yet not know anything about coding for the web. Furthermore these articles can be commented on by others reading the blog. These comments can be automatically published on the page, or they can moderated (vetoed before they are published to screen out any defamatory or irrelevant comments). It is possible to start your own blog for free (once you are on the internet), two popular ones are '[Blogger](#)' and '[Wordpress](#)'.



This is a royalty free picture, I did not take it.

The anatomy of a blog pages is given in the graphic to the left.

This is called an 'RSS feed', which is a way for interested people to subscribe to this blog. They are informed every time something changes on it.

What this means is that a teacher could ask her or his students to create their own blog on which they publish their own essays. The teacher, other pupils in their class, and even their parents can see the essay and provide insight and commentary to the essay. This kind of technology is part of what the 'Community of Practice' is relevant in terms of how blogs and blogging might be incorporated in to a future teaching scenario.

This is another royalty free picture, I did not take it.

This is the actual blog entry, the bit that is being published. I created the text but not the layout or design

This is a video that is posted on YouTube, but the code was pasted into this blog. The appearance is as if the video is part of this published page.

Wiki

This is where anyone can post a comment. They simply write in this box and then there's a button called 'post' and that's it. The commentator has in fact 'published' on the web without knowing a single bit of web code. If you're a regular commentator or part of another system in the 'web 2.0' universe, then you can log in with your established ID, and then be automatically linked to your own blog, or Facebook, or web pages.

A way of creating a database of related articles through the web. That is members can sign up to be contributors to this database and can create or edit articles.

Someone's already put a comment here. In fact the comments are stored on a separate part of the web. The author (me) subscribes to this free service, and the comments and comment settings are on a completely different part of the web. However, it is clever enough to snip the actual comments in as if it's part of this actual web page. Notice that the borders of the page continue on as before.

Open wikis are ones in which pretty much anyone can post or create relevant articles; the most famous of which is currently 'Wikipedia', which is a good initial

And somebody else has replied to this comment

reference for much of the information that we've been talking about on this course. Many other wiki's exist such as the psychology

wiki. The wiki phenomena works on the principle of the '[Wisdom of the Crowd](#)', which suggests that information by an individual may be highly biased towards a particular view point (contributors to traditional Encyclopaedia are ideally selected on the basis of their impartiality and yet high expertise in an area); but the ability to have many contributors to an article will allow a more balanced view to occur. This is particularly true of wiki entries about very common issues (such as the history of colonial Fiji), but less so for highly specialised topics (such as Bayesian statistics applied to national decision making on health issues in South America).

A class might be involved in group work to construct a wiki on their particular definition or understanding of a topic. A teacher can find out which people have made changes to a document, and how it changed over time, with just a few mouse clicks.

Collaborative Document Construction

Similar to Wiki construction, collaborative documents are now available online, where a document can be constructed with multiple authors and multiple times. Of course such documents were possible previously when an author would write something and then send it off to a co-author. The latter would add and possibly amend. Online collaborative document construction however

allows multiple authors to work on the document at the same time. Each version of the document can be saved so the various edits are not lost. An example of this would be [Google Docs](#), which can do both a word processing document and also a spreadsheet.

Students or pupils can (like a Wiki) collaboratively construct a project document (say on the impact of Global warming to small Pacific Island Countries). A facilitator or teacher can quickly see who contributed to the document construction (and when) allowing an assessment as to the individual contributions.

Social Networking Site

A social networking site is a web site that allows interested parties to subscribe to each other's individual pages. The pages are constructed of profiles, likes and dislikes, a status page, message page and photos and videos. One of the largest social networking sites currently is [Facebook](#).

A social networking site can be created to host the progress of a class project which interested parties can become 'friends' of the project and see its progress as it evolves.

Microblogging

Microblogging is a bit like a blog and a social networking site blended together. You 'follow' other microbloggers and people will follow your microblogs. They typically allow only a limited amount of characters to be sent (eg that of [Twitter](#) is only 140 characters), similar to a text message sent on a mobile phone. When you post a small message, everyone who is 'following' you will receive that post. Likewise you receive the posts of those that post a message and whom you are following.

Micro-blogging probably is not currently something that school children would use for teaching/learning. Tertiary students might use it as a 'back channel' to discuss a presentation as it's happening, or provide a rich source of additional supplementary material as a demonstration is being given.

Mobile Phones

The price of mobile phones is becoming so cheap that many children in Fiji have access to one. For the moment this is probably not a significant medium in which teaching can occur because the cost of making calls and sending text messages on the phone is relatively high. Mobile phones currently however, have been of significant help to students studying at distance in developing countries, through the use of simple text messages that can be relayed to them, mainly for administrative purposes. Mobile phones can be used in conjunction with other technologies, such as being informed when a blog gets updated.

The advent of 'smart phones' such as the iPhone or the Blackberry means that theoretically pupils and students will have a way to interact with the world wide web in a highly mobile way. The 'big thing' being geo-tagging, where students and pupils might go on a field trip and their smart phone updates them with specific information related to the actual location that they are in. The cost of smart phones is currently too high, however, like everything else technology is undoubtedly going to come down in the next few years. So this is a technology that you're likely to encounter in your professional life.

Simulations in Modern ICTs

Although publishing has taken on a qualitatively different role now that interaction can occur, there is another kind of learning that is possible through ICTs namely in game like situations, or more properly in simulations. Simulations have been used for many decades, the most advanced of which is in military training, and more recently in commercial worlds such as training airplane pilots. These simulations (like print, television and radio) were successful only if significant production costs went into them. Simulations were for the most part restricted to situations where the cost of learning in 'real life' were significantly high which offset the significant production

costs¹. ICT's however have made the possibilities of simulations with a significant community of active participants or core people within a *Community of Practice* possible.

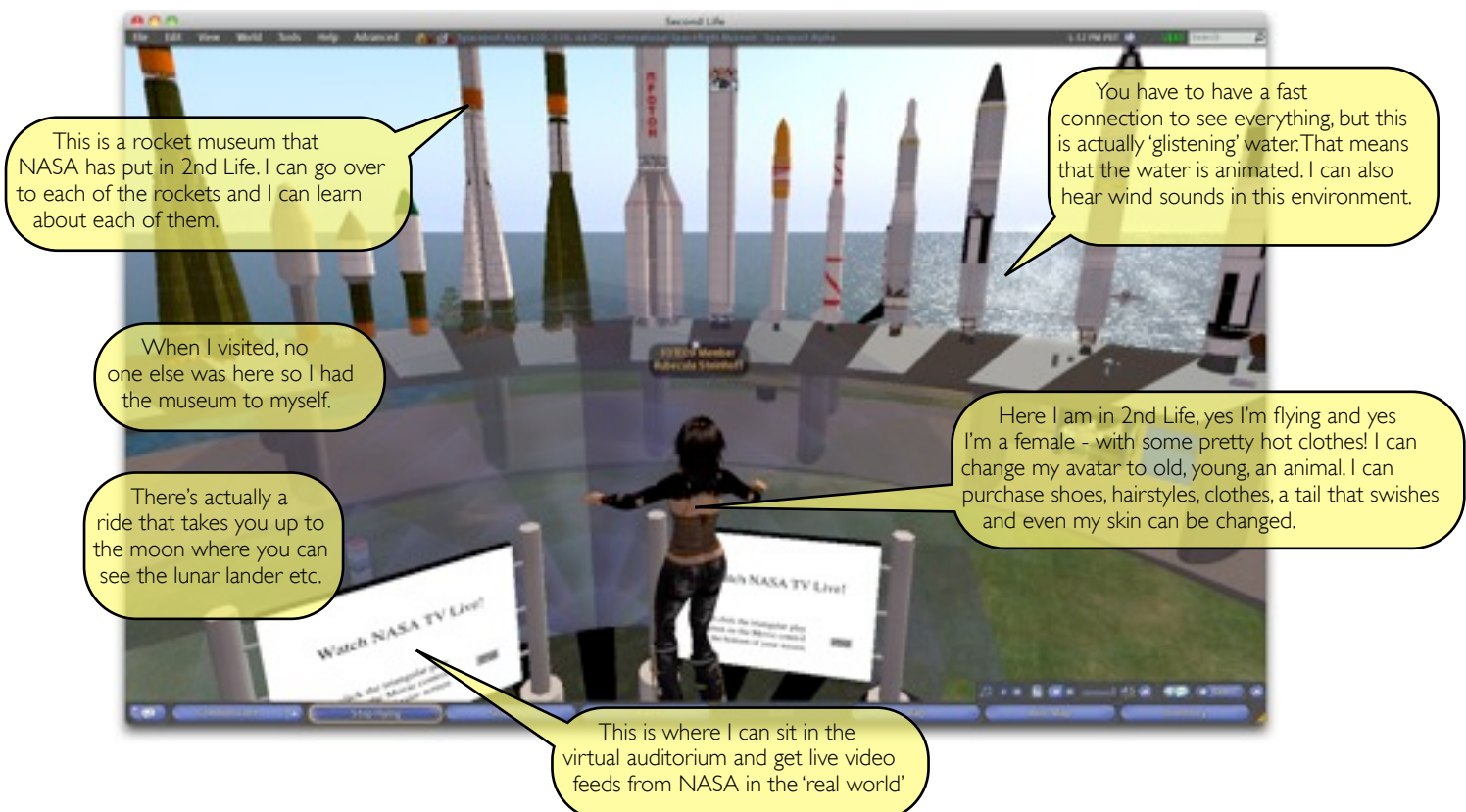
Massively MultiPlayer Online Role Playing Games (MMORPG) are virtual worlds in which players take on roles that is normally depicted by a representation of yourself, the first ones being just a text identifier and modern ones showing a 3D avatar. Normally you have missions that you complete in this virtual world with team members (who are real people also logged in), often pitting yourself against other team members (who are also real people). In other words these are virtual worlds but they are operated by real people rather than just artificial intelligence 'robots' within the world (as you would have in a traditional computer game).

One of the largest is called World of Warcraft, which is similar to being inside a Lord of the Rings film. There are warriors, sorcerers, trolls and dwarves. Learning to how to behave in this world and how to execute the mission involves significant investment into teaching the new player how to interact (otherwise they will not return and will not pay their monthly dues).

This has led some commentators (Castronova, 2008) to suggest that most learning will take place in the future under the guidelines of MMORPGs because they:

- Match task complexity with current ability
- Keep the learning tasks inherently interesting and motivating
- Allow freedom of movement and exploration to cater to different learning styles.
- Allow freedom of individual expression (customisation)
- Can simulate authentic situations (ie authentic learning possible)

One of the most intriguing MMORPGs is called [2nd Life](#). 2nd life takes MMORPGs to the next level by allowing the 'residents' of 2nd Life to create their own worlds: their own buildings, machines, clothes, games, landscapes. Everything is can be customised except the virtual world physics (how objects interact with each other).



¹ It's cheaper to learn in a simulation how to not fly a Jumbo 747, than it is to learn by crashing a real one!

Imagine if you will a chemistry class with children in Class 7 who are taken down in this world to the molecular level where they could become a sub-atomic particle and they could 'interact' with other sub-atomic particles. Or imagine a scenario where you become an indigenous Fijian in pre-colonial Fiji and move about a traditional village interacting with other players.

The technology, and imagination is here today but it's currently hampered by the requirements of a fast computer with advanced graphics card and a broadband (fast) internet connection. So not 'today' but 'soon'.

Summary

- The most significant technology that has helped in teaching/learning contexts has been reading and writing. We don't think of it normally as technology.
- Print technology to make relatively cheap reading material available is probably the next biggest technology.
- Technologies such as radio, television and CD-ROM multi-media have all be demonstrated to be excellent teaching/learning resources **but** only if they are properly produced, which means expensive resources.
- There is significant reason to believe that education may be affected by the current technology spurt which has been termed 'Web 2.0'.

Bibliography

Castronova, E. (2008) *Exodus to the Virtual World: How Online Fun Is Changing Reality*. Palgrave Macmillan,

Glossary

Technology	strictly this means only 'away from the norm' which is the 'majority' of the population. In a statistical sense this means anything that is not scoring at the mode (the most frequent ability score).
Blogging	Blog stands for 'web log', which is a simple template layout that allows writers to write up anything and attach pictures, video, maps and pretty much anything.
Web 2.0	an approach to dealing with children with special needs that has then attend a standard school but with special tuition set aside for these children to work with their particular needs.
Wiki	A way to construct a collaborative information resource.
Mash up	The ability for someone to take a diverse set of digital output and repurpose it into something new. Currently it is seen in movie clips where an alternative sound track is provided, or in mixing two different songs together. Or constructing a web page that dynamically updates automatically from different sources.
MMORPGs	Online virtual role playing worlds in which you are represented (currently by a 3D avatar) in some way, and in which you do tasks or missions with other players who are also operating 'within' the virtual world.