

# ENGAGED LEARNING: USING CONCRETE SIMULATIONS TO TEACH ABOUT AN ONLINE WORLD

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## **Abstract**

*When IT resources are scarce or in high demand, whole class or large group activities using learning technologies can be logistically challenging. A response to this challenge is to devise creative 'low tech' teaching strategies that can still powerfully explore terminology and issues encountered in the online world. In this paper we describe several such activities that have been used successfully with tertiary students in the University of Melbourne's B.Ed Primary course's Computers and the Primary Classroom subject.*

## **Keywords**

*innovation, overcoming limitations, creative solutions, teaching strategies, internet, emerging technologies, computer education*

## **Passive vs. Engaged Learning**

When IT resources are scarce or in high demand, whole class or large group activities using learning technologies can be logistically challenging.

This applies not only in developing nations where access to computing equipment may be limited, but also in countries like the United States and Australia where for socio-economic or budgetary reasons certain schools, institutions and sections of the community might have reduced opportunities to participate in the new information-based economy. A 1999 report of US Department of Commerce concluded that Americans on the wrong side of the so-called Digital Divide are about 20 times more in danger of being 'left behind' (Irving, 1999).

The easiest response to this challenge has the instructor demonstrating the technology at the front of the class, with students passively looking on, perhaps taking notes but not actually engaging with the concepts presented. *Project Pegasus*, an IT initiative of Edmonton Public Schools, Canada (1999), encourages educators to overcome these limitations in more creative ways, asking educators to think about the difference between engaged and passive learning.

In a nutshell, *passive learning* involves lower-level thinking skills such as comprehension and recall, focuses on content rather than the process and is generally physically inactive. This sort of instruction is a component in many tertiary courses.

*Engaged learning* involves processes of inquiry, problem solving and creativity in which the student works both with other people and materials. However if computer resources are limited – or even non-existent – the challenge is to find or develop materials for students that will engage them and enable them to gain an understanding of and confidence in online technology.

One response to this challenge is to devise creative 'low tech' teaching strategies that can still

powerfully explore terminology and issues encountered in the online world. To be effective, these activities must *engage* students in learning, whether or not technology is used.

Following are several ‘low tech’ activities about the Internet and online technology we have used with teacher education students in the University of Melbourne’s B.Ed (Primary) course’s *Computers and the Primary Classroom* subject. These activities have also been used with Primary School students, and as part of inservice activities for practicing Primary School teachers. (The photographs included in this paper are of Year 4 primary students participating in the *PaperNet* activity).

These activities are effective because they start with existing reference points the students understand. Abstract concepts such as hosts, packets, glitches, security, anonymity, confidentiality, acceptable use, ‘spam’, the perils of ‘chatrooms’ and even cyclical redundancy checking become clear when students use concrete objects such as balls, pens and paper, and each other to explore the issues. By engaging in the learning process, the students are able to gain an understanding of issues relating to being online and how the Internet works, in ways passively listening to a lecturer standing at the front of the room – or even watching a slick multimedia presentation – cannot.

## PaperNet

PaperNet, an activity co-developed by the first author (O’Brien & Nicola, 1998) is a ‘pen and paper’ exercise that introduces issues raised by online chat and email.

If an organisation is developing an Acceptable Use Policy, active engagement in this exercise could help the participants involved understand the implications of such a document.

In this activity each participant is given a number – that represents their ‘email address’ – and sits in a large circle, facing outwards (Figure.1). The participants send ‘email’ messages, written on paper, to the others that are delivered by participants inside the circle representing the ‘network’. Because (initially) no-one knows who anyone else is, those taking part gain an understanding of being participants in a chat-room.

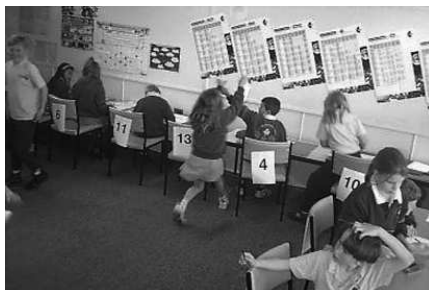


Figure 1: In the *PaperNet* activity, students gain an understanding of chat rooms

Later, the participants sit facing inwards and repeat the exercise. Because they now know who they are communicating with, it is like sending and receiving email.

Following the *PaperNet* activity, complex issues can be discussed and explored further. During a debriefing discussion questions that might arise include:

- *What are the advantages/disadvantages of being anonymous on the Internet?*
- *How easy is it to pretend you are someone else? What are the implications of this when communicating online?*
- *Should ISPs be responsible for what people say to each other over the net?*
- *Did anyone send or receive a bogus message? Discuss the implications of this kind of online behavior.*
- *How do we know someone is who they say they are? Should we give our personal details out over the Internet?*
- *What things can we do to make using the Internet safe?*

Second year B.Ed (Primary) students participated in the *PaperNet* activity. Following the debriefing discussion, they were asked to reflect on how participating in such an activity might help a novice user's understanding of how the online technologies actually work. Reflections by B.Ed students included:

- *"The illustration and parallel between the game and the reality of email is really concrete and visible. It is solid demonstration, rather than a teacher just talking about it."*
- *"The activity makes a sophisticated 'invisible' procedure visible, accessible and easier to understand. The working demonstration of email can integrate into the participants' preexisting knowledge."*
- *"It is a very good and simple way of introducing and demonstrating how seemingly complex technology works. I like the way it gives you an idea of what is possible."*
- *"Users can see that there is a whole lot that happens to emails that are sent across the net before they get to another computer. It goes through a delivery process by third parties and things can happen to it during delivery. Information can be seen by others, lost or tampered with."*
- *"Participants see that caution needs to be taken when chatting/communicating on the Internet as users can assume a 'fake' identity. Similarly there is an etiquette to follow."*
- *"This game helps understand how something like a network that can't be watched or easy views actually works. That the system can crash, and you may not receive a message."*
- *"It shows how online communication works by breaking it down into a simple and easy to understand format. Anyone can send a message to you, if they know your email address and that crashes are sometimes unavoidable."*

Here are some additional comments by Year 4, 5 and 6 students (aged 10-12 years) who played the *PaperNet* game. At the time – just as their school was embarking on an ambitious project where it would eventually serve as a model for 'best practice' in new technologies (EkinSmyth, 1998) – none had ever used email or chat before:

- *"I liked the first Internet game the best because no one knows who you are and you can annoy people. I also liked being a networker."*
- *"The Blind game was the best because I couldn't see who I was writing to. I got an email saying, 'Who do you love?' I wrote 'Tom Cruise' as my answer."*
- *"I liked the second game because I got lots and lots of mail. I got a letter that I hated. It said, 'You've got lovely eyes'"*
- *"It was hard being a networker, there was so much mail to deliver I couldn't handle it."*
- *"Someone asked me if I was a boy or a girl, and I said that I was a boy when I'm really a girl. It was fun pretending to be someone else."*

## Other Activities

Stephen Gard's *The Internet: A Resource for Australian Schools* (Gard, 1998) has been a useful resource. In a game called **Internet Ball** the participants stand in a large space in a grid pattern. Each participant represents a 'host' in the 'network'. The aim of the game is to pass a ball – that represents a message sent over the Internet – from one end of the grid to the other, as fast as possible. Hosts unexpectedly become afflicted by 'glitches' and become non-functional, and an alternate host must be found.

This activity demonstrates the original purpose of the Internet: to create a highly reliable system for data communication. If one host in the system is knocked out, there is always another to turn to and the message gets through.

Another effective activity from Gard (1998) is **Packet Panic**, a game that demonstrates how messages are passed over the Internet in 'packets', with 'error-checking' to ensure that the whole message has been passed, and that its parts are reassembled in the correct order at the receiving end.

This is similar to the childhood game where a child is given a message and it is whispered to the next child and so on until the last child tells the group the message they received, which after passing through a succession of players invariably ends up different to the original.

Where Packet Panic differs from the children's game is that the 'sender' and the 'receiver' also maintain a dialogue in which they compare notes about what's been sent: any lost or damaged packets are resent until the message is complete and correct. The activity vividly demonstrates that modern data transmission techniques ensure almost error-free message handling (cyclical redundancy checking).

## Creating a Scaffold of Understanding

Activities such as these can be useful anywhere where IT resources are scarce or in high demand. Students must learn to use technology well in context. By immersion in engaged learning activities such as these activities and others like it, students create a scaffold of understanding by operating within paradigms they are comfortable with. Abstract concepts can be explored, discussed, and dissected. Technology novices can gain confidence and awareness of what awaits them in the online world, even before they have access to a computer or the Internet.

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