

Online Learning Objects

A joint project between the University of Tasmania, the Education Departments of Tasmania and Victoria, and the Catholic Education Offices of Tasmania and Victoria.

A Report from RazzamaTas 1

This project was organised to run for the first six weeks of the last term in 2003. It involved two classes from Launceston, Tasmania and two classes from Victoria in each of Year 5 and 9: a total of 8 classes. The Victorian classes were not able to join the project until the last three weeks of the scheduled duration. A course was established in WebCT containing six learning objects, a chatroom and discussion board, a calendar and 'Send in your Report' quizzes. The objects available to each year group are described in the following table.

Grade5/6	Grade 9
Grumpy in the desert: distinguishing compounds from chemical elements.	Give Me A Brake: predict the way different vehicles and weather conditions affect the length of a skid.
Inter-Galactic Cook Off: reactions that cause a chemical change.	Biology Food Web: Roll your mouse over each Antarctic creature to find what eats it, and what it eats.
Metal Munchers: Identification of metallic elements.	It's About Numbers: Find out how the numbers of one species affect the others in the ecosystem.
Ecosystem Game: Construct a food web.	It's Not Just Wind: Design a windmill to generate electricity throughout the year.
Field Trip: Load a field pack for a scientific trip in Antarctica.	Far Out Lenses: Simulation of building a telescope and discover the optical principles involved.
Gobbliser: compare your diet with the Recommended Dietary Intakes.	The Robbery: solve the crime using forensic science.

The objectives of the project were to investigate:

- ❖ What makes a good learning object (what are the characteristics which make an online objects work or not work well)?
- ❖ How are teachers able to capitalise on the opportunity to interact with another class using the same object?
- ❖ What are the implications for teaching when all students have access to the online learning objects outside school?

An average of three Pentium II computers loaded with licensed, free and open source software were supplied to each class in Tasmania to ensure every student had one at home. Some parents were also supplied with introductory internet connection kits which increased the proportion of students able to access the materials from home. Data were collected through teacher meetings, WebCT log files and quiz responses, presentations by teachers at the RazzamaTas1 sharing conference and individual teacher interviews.

This report looks at the experiences of the Primary Schools (Grade 5 Science), the High Schools (Grade 9 Science) and the Appendices describe participant perceptions of the individual learning objects.

What was learned

A good learning object was hard to define, comprising issues related to bandwidth requirements, local computer capacity and responsiveness and degree of interactivity. Most teachers believed that the online learning objects required introductory whole-class discussion before use, and many thought that some kind of confirmatory exercise (possibly an assessment) was needed after use to verify students had learned what was intended.

In practice it proved very hard for teachers to capitalise upon inter-class communications using a particular object as a focus. However, in the one instance where such a connection was established, it proved very popular and self-sustaining. The conversations between students quickly went beyond the focus object to embrace all those available. Learning was widened by these conversations in the 'chatroom'.

In the case of the primary schools, 22% of object accesses were outside core school hours. Some students accessed many objects frequently outside school, indicating both a general and individual opportunity to extend learning through the use of the online materials.

Grade 5 Science

The following table shows the popularity of each online learning object. Gobbliser had nearly twice as many hits as the next most visited object, but each page was only looked at for a short time.

Page Name	Hits	Time	Time/Hit	Posts
Great Food! Great Health! - Gobbliser	398	18:22:09	2:46	0
Inter-Galactic Cook Off	207	20:08:06	5:50	0
Ecosystem	164	17:44:11	6:29	0
Grumpy in the Desert	162	12:26:32	4:36	0
Field Trip	140	13:35:40	5:49	0
Metal Munchers	135	12:47:21	5:41	0

The number of hits made by the 96 students enrolled in the course varied from 0 to 211, as shown by the following decile table:

students	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-96
max hits	0	6	13	21	29	37	46	57	74	211

The time of day indicated of out of school use. The mid-decile student was investigated to find out the extent of this non-school use.

students	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-96
number of school accesses (08:30-15:00)	0	4	11	5	12	17	27	16	12	0
number of home accesses	0	0	0	3	0	3	3	17	8	62

An analysis of time of day of the first and last access of the materials showed that 78% of these were at school, 22% from outside school.

AJ – P Primary, Tasmania

Accessing the learning objects became part of the daily routine for this class, which had 6 computers, and the children liked this. Towards the end of the project a link was made with a school in Victoria. Children used the chat rooms in the course to discuss the ‘Field Trip’ object. Although setting up this link was difficult (identifying common times within the schedules of different schools), children organised subsequent sessions themselves. They used the chat room link for socialisation as well as topic-focussed discussion. AJ soon found that the objects needed a class discussion to clarify existing knowledge and introduce the concepts children would need to make the best use of them.

AL – AC Primary, Victoria

This class joined the project late but were very enthusiastic. They were studying ‘Asia’ but had previously done units on forensic science, so were able to tune into the Inter-Galactic cook-off online learning object by making sherbet in class and a discussion. The students tended to click through the introductory text of objects to get rapidly into the activity, and hence did not focus their learning on the intended outcomes.

The teacher would be happy to incorporate online learning objects into future planning, since they are far better than worksheets. The ability to track student learning in terms of responses to object-specific quizzes would be important [teachers in the trial did not have access to this facility]. Also, the interactive chat facility was a very good way to extend student learning – the students in this class were stimulated by online discussions with another class to investigate other learning objects, and consequently picked up specialist vocabulary such as ‘decomposer’ in ecology. The speed with which students shared collective knowledge was astounding “they had their own language, my head was spinning: one grade 5 student [from a school in another state] was chatting at 6pm and talking about individual children in my class!”.

AE – St. M’s School, Victoria

This class was comprised of mostly non-English speaking background children. AE initially directed the students to interact and play with the learning objects, but soon realised that there was a significant language barrier to overcome. For example the children had no concept of what a ‘Penguin Rookery’ was, and a hyperlink to a picture and short explanation/definition would have helped immensely. Larger font text and ‘plainer English’ would also have helped.

Positive object characteristics were sound effects, videos and the cartoon characters such as the alien in *Inter-Galactic Cook-Off*. AE modified the technique for accessing the objects by having the kids on the floor and talking about necessary concepts. For instance, she demonstrated light reflecting from a metal surface in preparation for the *Metal Munchers*. One of the effects of using the objects was a heightened awareness by pupils that too much sodium in your diet was bad for you (observed through overhearing pupil conversations).

Grade 9 Science

Page Name	Hits	Time	Time/Hit	Posts
Give me a brake	179	26:58:53	9:02	0
Investigate the robbery	146	22:13:06	9:07	0
Food Web	103	7:15:28	4:13	0
It's not just wind	93	8:09:34	5:15	0
It's About Numbers	71	7:34:08	6:23	0
Far out lenses	49	4:31:22	5:32	0

FP – P High, Tasmania

The school operates a high-level authentication environment: students need to type in a username/password for every new web-page they visit. Staff cannot use student computers and vice-versa.

FP found it very frustrating not to have designer access to the WebCT course containing the six learning objects. This is the way in which she normally scaffolds the learning of students – provides the introductory and reflective material they need.

EC – St. P's College, Tasmania

The students at SPC finished the project by writing reports on each of the objects they had used, and constructing some challenge questions for other students to respond to. These were posted on the bulletin board by the project team. All the online learning objects really needed an introduction for the students to really understand the potential for investigation. The students thought that overall there was too much repetition when using the objects (for instance, in most of the simulation they changed initial conditions and then re-ran exactly the same basic situation again). The Online learning objects were judged to be too shallow and not sufficiently challenging. Technical staff had to permit video content through the college firewall for us to access the objects.

SL – A College, Victoria

The loading time for the objects was sometimes too long (though we never figured out why it varied). This was a difficulty with 'The Robbery' since the video-files took a lot of bandwidth, and the learning experience was a very popular one. In retrospect this would have been better as a homework exercise – a whole class working on the same bandwidth-hungry object at the same time probably overloaded the college network. After some casual use both in and out of class, one student was heard asking if all lessons could be based upon online learning objects, because they made things easier to understand.

APPENDIX - A

Comments on particular online learning objects

Grade5/6

Grumpy in the desert: distinguishing compounds from chemical elements.

Accessed from	Home =17%		School =83%
Loading speed	Slowly (took more than 3 minutes) 0%	Moderately (took about one minute) 33%	Fast (took less than 30 seconds) 66%
Smooth running	Yes - it was very quick to respond 42%	OK - I could see it working 50%	No - it ran so slowly I kept getting mistakes 8%
What was learned	I learnt that you use a magnet to separate tea leaves and iron fillings and you use paper filters to separate water and sand.		
Recommend to a friend?	75%		
Recommendations	This object would be better if you make Bruce nota winner.		
Average rating	6.45/10		

Inter-Galactic Cook Off: reactions that cause a chemical change.

Good points:

- The graphics were animated and therefore much more interesting and colourful
- Alien creature was very entertaining
- Real life experiments – the children could actually do these themselves
- The video clips were realistic - actually combined the ingredients
- The ending was quite exciting

Recommendations for improvement:

- Fill the whole screen with the video clip
- Have the clip repeat without having to write the information again
- Provide multiple choice answers instead of repetitive writing
- Increase the speed for loading the video clip

As a teaching tool this was easier to manage than practical activities because there was no cleaning up. Also it was possible for students to test a much wider variety of combinations than if the experiments were all done 'for real'

Metal Munchers: Identification of metallic elements.

The videos were good, but needed to be bigger: for instance, the light bulb could not be seen to light up by many students.

Ecosystem Game: Construct a food web.

Good points:

- Information given about each animal, etc, was very informative
- A good range of animals was included, although some children would have preferred a few more

Recommendations for improvement:

- Provide a key or instructions as to what the “i”, -> , red and green images refer to
- Need to improve speed of graphics coming up
- Graphics could have been more interesting and perhaps animated
- Keep the animals in the same position (if they move) for each attempt
- Provide the option of switching between the animals, etc, instead of having to get them all correct at once before moving onto a new animal
- The ending was quite well done but a further explanation of how the whole ecosystem works with different producers, consumers and decomposers relying on each other would have been better

Rather than outline silhouettes, photographs of real animals should have been used.

Field Trip: Load a field pack for a scientific trip in Antarctica.

Good points:

- Good range of objects to select from to go in the backpack
- Details given on each item for the pack was very informative
- Details and reasons given for incorrect items was also informative

Recommendations for improvement:

- Include a video clip of a real life expedition using the equipment at the end
- Keep all the correct items in the pack when you make a mistake and just delete the wrong ones
- Better ending: “Congratulations!” and then ”Try again” is not motivating for this age group
- Include more follow up activities, eg a game based on a field trip

Gobbler: compare your diet with the Recommended Dietary Intakes.

This object was so popular students went into it every morning before class in one school. Good for comparison of the dietary differences between age groups.

APPENDIX - B

Examples of chat room use

Grade 5

Andrew Turnball [St. A]>>hi
Andrew Turnball>>how r ya
Henry Parsons [St. A]>>hi alex
Andrew Turnball>>hurry up
Henry Parsons>>good thanks
Andrew Turnball>>hurry up
Henry Parsons>>your stuped
...
Andrew Turnball>>dont swear ill tell mrs p...!!!!
...
Andrew Turnball>>arent we supposed 2 be talkin about webct
Henry Parsons>>no
Andrew Turnball>>u sure!!
...
Henry Parsons>>no
Andrew Turnball>>then we r supposed 2 be talkin about it
Henry Parsons>>no
Andrew Turnball>>wich one did u like
...
Henry Parsons>>the one with the goberlizers
Andrew Turnball>>i made my dude really fat!!!!!!
Henry Parsons>>ok
Andrew Turnball>>k
Andrew Turnball>>i like the gobilizer one the best
Andrew Turnball>>2
Henry Parsons>>m t
Andrew Turnball>>wat the hell does tat mean?????????
Andrew Turnball>>
Henry Parsons>>dont now
Andrew Turnball>>ur strange!
Henry Parsons>>y2
Andrew Turnball>>wat does dat meaan????????'
Henry Parsons>>dont now
Andrew Turnball>>i was hopin dat some punchbowl people were on!
...
Andrew Turnball>>cya
Andrew Turnball>>again
Andrew Turnball>>soon
Henry Parsons>>bye
Andrew Turnball>>bye

APPENDIX - C

Structure for Teacher interviews

Q1: Which objects have your students been directed to use?

Grade5/6	Grade 9
Grumpy in the desert: distinguishing compounds from chemical elements.	Give Me A Brake: predict the way different vehicles and weather conditions affect the length of a skid.
Inter-Galactic Cook Off: reactions that cause a chemical change.	Biology Food Web: Roll your mouse over each Antarctic creature to find what eats it, and what it eats.
Metal Munchers: Identification of metallic elements.	It's About Numbers: Find out how the numbers of one species affect the others in the ecosystem.
Ecosystem Game: Construct a food web.	It's Not Just Wind: Design a windmill to generate electricity throughout the year.
Field Trip: Load a field pack for a scientific trip in Antarctica.	Far Out Lenses: Simulation of building a telescope and discover the optical principles involved.
Gobliser: compare your diet with the Recommended Dietary Intakes.	The Robbery: solve the crime using forensic science.

Q2: What were the good things about each object your class used?

Q3: What were the bad things about each object your class used?

Q4: Would you like to comment more specifically about the characteristics of any object?

Q5: Tell me about the way you initially structured student learning based upon online learning objects?

Q6: And how did you modify this approach in the light of the initial experience?

Q7: What sort of changes to class organisation and learning approach would you make if you were to use online learning objects in the future?

Q8: Did your class collaborate with any other class in the project?

Q9: Would inter-class collaboration in your view make a useful impact on student learning?

Q10: What are the pains and gains of inter-class collaboration?

Q11: Did you direct your students to access the learning objects from outside school?

Q12: Do you think any of your students accessed the learning objects from outside school?

Q13: Did access to online learning objects from outside school have an effect upon student learning that you were able to see?

Q14: Can you please compare online learning objects generally with other teaching materials you use in the classroom?

THANK YOU FOR YOUR TIME!!!