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Education students use of The Le@rning Federation's digital curriculum resources

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The Le@rning Federation was created in order to assist educational facilities to provide 21st century education to school students. This study introduced and investigated the use of learning objects that were created by, and digital resources that were negotiated by The Le@rning Federation and their use in a technology unit in pre-service teacher education. This study involved 225 students from the Sydney campus of the University of Notre Dame Australia, with students signing up to The Le@rning Federation's e-content website. This gave them access to the content in the website for the entire year from any computer with Internet access. Use of learning objects was embedded into the unit with students given the opportunity to add them into an assignment as well as use them in class. A qualitative research methodology was used for this study, with students responding to an online questionnaire. Results indicate that pre-service teachers respond positively to having access to The Le@rning Federation's online content. They also indicate that they will access this digital content when on practicum and in their classes in the future.

Keywords: Learning objects, The Le@rning Federation, pre-service education, digital curriculum resources

It is important to prepare our pre-service education teachers for the classroom of tomorrow. One innovative way this can be done is by ensuring pre-service teachers have a good understanding of learning objects and the digital curriculum resources that are available for Australian teachers to access and use in their teaching. This research project explored the introduction of these learning objects to pre-service teachers on the Sydney campus of The University of Notre Dame Australia.

Learning objects have been used in schools for the past few years and are assisting in advancing education in the 21st Century. The IEEE Learning Technology Standards Committee (2005) takes a very broad view of a learning object and uses the definition of "any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning". Digital curriculum resources can be single item resources including items such as "speeches, songs, interviews, photos, artwork, posters, maps, documents and cartoon" (Education Services Australia, 2010a). They can be sound files that include speeches, radio broadcasts, songs and interviews. They can also be moving images from a variety of sources such as films, documentaries, and television (Education Services Australia, 2010a).

The Le@rning Federation is an Australian and New Zealand Federal and State governments' initiative that began in 2001 in order to assist educational facilities, and particularly schools, to be able to provide 21st century education to all students (Curriculum Corporation, 2009a). The Le@rning Federation makes and licenses two types of content, those being learning objects, or multimedia resources, and digital curriculum resources. The learning objects are generally created under license for The Learning Federation, while digital resources are items that have been sourced from cultural and scientific institutions and checked for quality prior to being placed into The Le@rning Federation's repository (Curriculum Corporation, 2009b). To date, The Le@rning Federation has developed approximately 9000 digital curriculum resources for use in schools (Curriculum Corporation, 2010). Prior to each learning object being released field trials have been conducted in classrooms and revisions then carried out on the learning objects in order for them to have a high quality (Freebody, Reimann, & Tiu, 2008b).

Much has been written in Australia about The Le@rning Federation and the digital content that has been developed (Baker, 2010; Clarke, 2004; Clarke & Gronn, 2004; Gaffney, 2010; Reimann, Freebody, Hornibrook, & Howard, 2009). Access to The Le@rning Federation learning objects has improved since 2006 and subsequently there has

been increased use of these learning objects (Curriculum Corporation, 2009c). Online curriculum content is becoming increasingly popular and is being used across a variety of educational sectors. All pre-service teachers have access to the repository through a yearly sign up process which all education students at The University of Notre Dame Australia are emailed about or are taught specifically about. The Le@rning Federation states that the learning objects repository allows pre-service teachers to:

- discover high-quality digital curriculum resources for teaching and learning;
- find interactive learning objects, audio files and moving and still images;
- explore units of work and teaching ideas related to the Australian Curriculum;
- make use of sophisticated browse, search and filter technology;
- create personal favourite lists of resources. (Education Services Australia, 2010b)

School use of The Learning Federation's digital curriculum content has been reported in various ways and in numerous studies. These include studies on this implementation process and the integration of learning objects into classrooms (See Clarke, 2004; Clarke & Gronn, 2004; Freebody, 2005, 2006; Freebody, Reimann, & Tiu, 2008a; Haughey & Muirhead, 2005). In schools, one study reports that teachers involved in the study liked to use The Le@rning Federation learning objects as they find them engaging and stimulating for the students they teach (Clarke, 2004). However, another research study suggests that The Le@rning Federation resources are under used and that teachers are not familiar with them (Reimann, et al., 2009). To date there has been very little research reported on pre-service teacher's actual use of learning objects and digital resources while on practicum, although pre-service teachers are signing up for The Le@rning Federation each year (Curriculum Corporation, 2009c). By using learning objects with pre-service teachers it is hoped that they will be increasingly used in schools, both when the students are on practicum and once they are teachers.

Although schools and universities have access to digital content through The Le@rning Federation it is not being implemented and used to its fullest extent. The Curriculum Corporation (2009c) suggests that common and consistent access is needed in order to assist in solving this problem. This national body is currently happy with the uptake of digital content at a tertiary level and is hoping that the uptake and usage of digital content will continue to improve.

The promise of easily accessible digital content, where teachers can rapidly develop and tailor content for their learners, is enticing. This is particularly prevalent in situations where learners may have different objectives and learning styles. Since the inception of The Le@rning Federation's learning objects, research has been conducted on their use in schools (Reimann, et al., 2009), with students to measure items such as engagement as well as with teacher use, and in higher education, particularly pre-service education (Kay & Knaack, 2009).

Teachers who use The Le@rning Federation materials report that students' are engaged and they value them for student learning including students' motivation to learn (Freebody, et al., 2008b). Teachers also use digital resources as they can increase their productivity while saving time as well as improving their teaching practice by better meeting the needs of their students (Recker, Dorward, & Nelson, 2004). With the increasing number of interactive whiteboards (IWBs) in schools it is important that pre-service teachers understand the pedagogy of using IWBs as well as how digital content can assist in digital resources being used well in schools. In a study on using digital contents with IWBs Hedberg and Freebody (2007) suggest that using these technologies they could better prepare interactive sequences in advance for lessons as well as better direct access to digital content. Students involved in this study also learnt pedagogies associated with IWBs as well as how to use digital content when teaching with an IWB. This may influence how they use IWBs and digital content when on practicum.

Methodology

This study was conducted at The University of Notre Dame Australia, at the Sydney campus. Students were enrolled in a core ICT unit which includes consideration of The Le@rning Federation's learning objects, including how they can be used in schools and while on teaching practicum during the year. In Sydney, the study involved 225 pre-service teacher education students who were mostly in the second year of their degree. These students studied the unit in either summer semester (January 2010) or first semester, 2010, and undertook a unit called 'Information

Technology for Learning and Teaching'. Students either completed this unit in a one week intensive period during January 2010 or in 6 weeks from February and April, 2010.

The aim of this study is to explore how students use learning objects within their pre-service teacher education courses and how they might apply this knowledge to their practicum context in schools. This paper focuses on the initial teaching of learning objects and how the students used them in the technology unit taught at the time. It is hoped that the results of this study will inform teaching at the university with regards to digital resources and how best students may implement them while on teaching rounds.

The following research questions have been developed for this study:

1. How are The Le@rning Federation digital resources implemented into pre-service teacher education courses?
2. What types of experiences do pre-service teachers have of The Le@rning Federation digital resources in teacher education units at Notre Dame University Australia?

This study used qualitative research methodology with students completing questionnaires that were placed online. This provided anonymity for the students and allowed easy access to the data by the researcher. Students were surveyed twice, with initially being during the teaching of the unit and then towards the end of their ten week practicum. Only the initial questionnaire data is reported here. Student participation was anonymous and students did not have to complete the questionnaire as per ethics guidelines. The questionnaire was not linked to any assessment for the unit.

Results

The results have been organised into three areas below. These include the university's previous use of learning objects, the background for this study and teaching with learning objects.

Previous use of learning objects

At The University of Notre Dame Australia, most students get access to The Le@rning Federation through the use of a log-in which is valid for the entire year. This means students can access this digital content any time they have access to the Internet. In 2008, only the Fremantle campus accessed The Le@rning Federation with 218 students signing up (Curriculum Corporation, 2009c). In 2009, from January to March, there were a total of 726 students who signed up, which includes students from both the Fremantle and Sydney campuses. At the time this represented the largest number of registered students for that year from any university in Australia (Curriculum Corporation, 2009c). Throughout the year more students then continued to sign up for access to The Le@rning Federation, although final data is currently unavailable. This current research is now attempting to gain more in-depth data from the students as to how they are using these digital curriculum resources, both in classes and while on practicum. It is important to note that in 2010, students on both campuses that are not undertaking the units involved in the study will be emailed access to The Le@rning Federation so that they also have access for the year. This will allow all students studying at the university to access this digital content.

Background for this study

This year, The University of Notre Dame Australia had 1125 student registrations across all campuses, these being Sydney, Fremantle and Broome. This is the most student registrations amongst the 45 teacher institutions that access The Learning Federation throughout Australia. There were also 35 staff registrations, which demonstrates that the academic staff from the university have also been accessing them.

From the 225 students who completed the questionnaire 61% (n=137) were enrolled to become primary teachers, 31% (n=69) were enrolled to become teachers who are qualified to teach birth to 12 years of age and 8% (n=19) of participants were enrolled to become secondary teachers. Students were asked if they owned a computer had home, with all students owning one except for one student. Only six students did not have Internet access at home.

Teaching with learning objects

Learning objects were taught as part of a compulsory second year technology education unit. Students were informed about learning objects and digital resources and shown examples. They were then given the opportunity to sign up for The Le@rning Federation's e-content section that allows all tertiary students access and after being shown several learning objects, how to search the website and the type of content available, students were given time to access the website. The class also discussed how they could use this in their teaching as well as for future university assignments including assignments for the technology unit they were undertaking as they were able to link to learning objects in their interactive whiteboard flipchart assignments. This assignment included students creating a flipchart and lesson plan for a class they might teach in the future. They then presented these flipcharts to the class on the assignment due date.

Students were asked what type of Learning Federation content they used doing their interactive whiteboard presentation. From the 213 students who answered this question responses included learning objects (64%), images (60%), audio (32%) and video (43%). Students were able to check more than one response as they often used more than one type of media.

Table 1: Student opinions about using learning objects to improve learning

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Response Count
It was easy to scaffold activities around the learning object before and after using it.	2.1% (3)	1.4% (2)	26.7% (39)	60.3% (88)	10.3% (15)	146
Using the learning object enhanced lesson planning and creation.	2.1% (3)	1.4% (2)	20.0% (29)	59.3% (86)	18.6% (27)	145
I feel the learning object would enable me to be more certain about my students' comprehension and skill levels.	0.7% (1)	2.8% (4)	24.5% (35)	58.0% (83)	14.0% (20)	143
The learning object/s will be appropriate for future curriculum needs.	0.7% (1)	1.4% (2)	18.2% (26)	62.9% (90)	17.5% (25)	143
I feel the learning object would meet the learning needs of my future students at the appropriate time in the unit of work.	1.4% (2)	2.1% (3)	16.2% (23)	63.4% (90)	16.9% (24)	142
The learning object fulfilled a pedagogical need that was difficult to meet.	1.4% (2)	6.2% (9)	32.4% (47)	52.4% (76)	9.7% (14)	145
The learning object facilitated student collaboration.	2.1% (3)	4.2% (6)	16.7% (24)	61.8% (89)	15.3% (22)	144
I would use a learning object again.	1.4% (2)	1.4% (2)	14.4% (21)	52.1% (76)	31.5% (46)	146

Results were positive as to the advantages of pre-service teachers using learning objects in their teaching. This is shown in Table 1 with students being very positive in the range of ways they feel learning objects will enhance student learning. This table shows 70.6% (n=103) of students checked either 'agreed' or 'strongly agreed' that it was easy to scaffold activities around the learning objects before or after using them. This suggests The Le@rning Federation's content embeds easily into the curriculum. 80% (n=113) of respondents thought the learning object would enhance the lesson creation and 72% (n=103) of respondents felt 'the learning object would enable me to be more certain about my students' comprehension and skill levels'. There were 62% (n=90) of responses that indicate that 'the learning object fulfilled a pedagogical need that was difficult to meet'. This shows that learning objects have an important and positive place in the classroom their use can improve teaching.

Students used the learning objects in their presentations in various ways. Over half the students indicated they would use them 'to help students develop new knowledge, a concept or skill' with 51.2% (n=85) of students indicating this. This is supported by student comments from when they were asked open ended questions. One student reported "I think the learning object is a great way of supporting the concepts that are trying to be taught and also a good way for reinforcing the key concepts that are trying to be taught".

Students felt it was important to be able to use learning objects in their interactive whiteboard flipcharts. This is indicated with 41.6% (n=69) of responses. 40.4% (n=67) of students also added learning objects to their assignment 'as a stimulus for discussion, developing higher order thinking skills or critical literacy'. One student recorded "students were actively engaged in the thought and learning processes promoting higher order thinking". Another student recorded "they allow students to be engaged and interacting. They use higher order thinking and require internal learning". While another simply reported that students would have "deeper knowledge gained".

Students were asked how helpful was the use of the learning object in supporting their teaching. The results of this question are very positive with 63.5% (n=120) of respondents stating they are 'very helpful' or 'extremely helpful'. No respondents felt they were 'not at all helpful', while 36.5% (n=69) felt they were 'somewhat helpful'. 66% (n=124) of students also indicated they feel that learning objects are either 'very helpful' or 'extremely helpful' in supporting student learning with another 33.5% (n=63) indicating they are 'somewhat helpful'. Students wrote:

- "the learning objects matched my lesson great, both learning objects were helpful in supporting student learning as they were interactive and would engage student learning".
- "learning objects help support content and often provide interactive, engaging ways to do this".

Students were asked an open ended question about what they think are the best things about using learning objects in their teaching. The main reasons students think are the best things are increased student engagement and improved learning outcomes. Other responses varied but included reasons such as:

- A "learning object was used as a tool for the lesson – not as a lesson based on the learning object, so it helped reach the lesson goal but was not the most important thing in the lesson".
- "Show students visually what was expected of them".
- "More engaging and interactive for students".
- "The learning object reinforced the lessons objectives [sic] in a practical, fun and stimulating manner".
- "It was visually appealing, engaging, interactive, provoked discussion, served as a consolidation of student knowledge, as well as acting as an informal assessment tool to gauge what student's had got out of the lesson. It also appealed to multiple learning styles, integrating visual, auditory, kinaesthetic components".

Finally students were asked if they think they will use learning objects and content from The Le@rning Federation while out in schools on practicum. An overwhelming 96% (n=188) of students indicated they would use them. This response is very encouraging and suggests students are keen to use them if they have access to them on practicum.

Conclusion

This study investigated the implementation and use of learning objects and digital curriculum content by pre-service teachers. This study suggests that student's value using learning objects and that they feel there are numerous advantages to including their use in their teaching. Recker et al. (2004) suggest that more research be conducted in-situ to see how digital resources are being used. This study is attempting to do this by focusing on pre-service teachers as they may be able to promote change when in schools so that other teachers are increasingly using them. Future studies will investigate how these students used learning objects from The Le@rning Federation while on practicum.

In a recent report written by Gaffney (2010) he suggested four principles for embedding digital curriculum resources into teaching practice. Pre-service teachers would benefit from being made aware of these in the future as it may assist them in their uptake of learning objects and digital curriculum resources. Unfortunately this report only became available after the pre-service teachers were taught this year, but it is hoped the principles will be embedded into teaching from next year.

There is currently a need to teach our pre-service teachers to be innovators in the adoption of technology as suggested by Freebody, Reimann and Tiu (Freebody, et al., 2008a). By teaching current pedagogy it is hoped that students will enter teaching with the skills to be innovators. The staff at The University of Notre Dame Australia are going a long way towards this by explicitly teaching learning objects and digital learning curriculum to pre-service teachers as well as through their encouragement of students using learning objects in their assignments.

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