Using The Le@rning Federation digital curriculum resources to enhance the education of Indigenous students

Report prepared by The Le@rning Federation

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The teachers whose contributions are included in this report are:

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There were other teachers and schools who were involved in the investigation. For various reasons, their projects did not fit into the time frame of this report. But we would, nonetheless, like to thank them for their contributions and interest.

The project team

The project team for the investigation included David McRae, Leanne Robertson, Sue Thomas, Margery Hornibrook, Margaret Wallace and Matt Skoss.

Warning: Please be aware that this report may contain references to Aboriginal and Torres Strait Islander people who may have passed away.
Summary

Since 2001, The Le@rning Federation (TLF) has produced digital curriculum resources, specifically to support students learning of key concepts and skills detailed in Australian and New Zealand curriculum documents.

In 2005, a The Le@rning Federation longitudinal research study found, among other things, that the use of digital curriculum resources supports improvements in student motivation and engagement.

In further research, The Le@rning Federation conducted a series of projects to identify the effectiveness of using digital curriculum resources with Indigenous students.

This current research investigation is built on these projects and is focused on the learning needs of Indigenous students in a variety of contexts, including remote, regional and urban settings.

The evidence suggests that use of TLF digital curriculum resources supports motivation and engagement in learning among Indigenous students.

There was positive response from both students and teachers in using the digital curriculum resources and embedding the materials into the teaching program.

As well, teachers observed an increase in on-task behaviour by students as well as improvements in their performance and understandings.

A substantial proportion of the teachers noted the value of learning objects as a diagnostic tool.

TLF digital curriculum resources can be used effectively with students in remote settings.

Use of digital curriculum resources can provide useful structural support in classes with a high degree of student transience.
1. THE PROJECT

1.1. The work of The Le@rning Federation

The Le@rning Federation (TLF) is a joint initiative of the state, territory and federal
governments of Australia and the New Zealand government. The Le@rning Federation is
responsible for developing digital curriculum resources for all Australian and New Zealand
schools. The initiative is project managed by the Curriculum Corporation.

Since 2001, The Le@rning Federation has produced more than 7,800 digital curriculum
resources. The content is developed specifically to support students learning of key concepts
and skills detailed in all Australian and New Zealand curriculum documents.

The Le@rning Federation digital curriculum resources comprise:
- interactive learning objects (multimedia resources that support learning of concepts and
  skills in a range of curriculum areas)
- digital images (historical and contemporary photographs, artworks, maps, posters and
documents), audio sound files (speeches, interviews and songs) and video (short clips from
documentaries, advertisements, newsreels, feature films and television programs).

The resources are available free of charge to all schools in Australia and New Zealand via their
education authorities.

1.2. Research context

This research investigation is a component of The Le@rning Federation's Indigenous Projects
Plan.

The plan has been influenced by a The Le@rning Federation longitudinal research study (led
by Professor Peter Freebody) which found, among other things, that the use of The Le@rning
Federation digital curriculum resources supports improvements in student motivation and
engagement.

The plan has also been informed by priorities outlined in other current education initiatives,
including the Ministerial Council on Education, Employment, Training and Youth Affairs
(MCEETYA) national agreement Australian Directions in Indigenous Education: 2005–2008 and
the Online Curriculum Content Investment Agreement.

The focus areas for the plan are:
- investigating the impact of the use of The Le@rning Federation digital curriculum resources
  on student learning
- researching the ways Indigenous students and their teachers use The Le@rning Federation
  content
- building communities of practice in the use of The Le@rning Federation digital curriculum
  resources with Indigenous students, and
- procuring content that expands the capacity of The Le@rning Federation to provide
culturally appropriate and effective materials for Indigenous students in a range of education
settings.

The Le@rning Federation’s overarching Phase Three Plan identifies the learning needs of
Indigenous students from remote, regional and urban communities as a priority area.

This current research investigation focuses on the learning needs of Indigenous students in a
variety of contexts and builds on research conducted in 2007 that identified the effects of using
The Le@rning Federation digital curriculum resources on Indigenous students’ motivation to
learn and their engagement in learning.

The findings from the reports described in this section are outlined in full at
www.thelearningfederation.edu.au.
1.3. Methodology

The investigation aimed to discover and document the effectiveness of using The Le@rning Federation’s digital curriculum resources with Indigenous students.

The primary research question for investigation was:

**How does The Le@rning Federation content, as part of a teaching program, meet the learning needs of Indigenous students?**

An advisory team was formed to establish the framework for the investigation and the scope of the research.

Conducting controlled research in remote, unpredictable and widely varying contexts is challenging, therefore the advisory team focused on building a flexible and open-ended project design that would broadly inform the primary research question and:

- enable participants to frame their own individual questions and conduct their own investigations
- enable teachers to choose and explore materials to suit the challenges of their specific circumstances
- elicit the professional judgements and observations of real teachers in real situations.

The investigation consisted of a series of small-scale, school-based research projects that took place between June and December 2008.

Thirty-three case studies were completed at 25 sites in widely varying contexts and geographical locations across the country (Attachment 1).

1.3.1. Procedural outline

**Selection of sites**
Schools were invited to participate because of their involvement in the 2007 study and their willingness to continue that involvement. Sites of mature practice were sought because of their familiarity with the materials and the greater scope they offered for data collection. Additional sites were also sought after consultation with The Le@rning Federation contact liaison officers, the MCEETYA reference group on Indigenous education, Aboriginal education units and existing networks.

Consideration was given to engaging schools geographically close to each other to facilitate building communities of practice and to ensure a spread of schools across jurisdictions and contexts (ie urban, rural/provincial and remote).

**Establishment phase**
Through workshops held at a range of locations, participants were introduced to the project and given opportunities to identify and explore The Le@rning Federation digital curriculum content they believed would enhance their teaching and learning programs.

Participants were encouraged to identify a priority learning area for their focus and frame a research question relevant to their specific student cohort. In addition, they were encouraged to explore topics that would provide them with professional learning opportunities and benefit the students and the school.

Participants were then asked to submit their project plans for review.

**Implementation phase**
During the establishment and implementation phase of the project, participants were provided with ongoing support.

Three members of the advisory team visited schools at the end of the project to interview teachers to collect data and information that would form the basis for the case study reports.
Teachers were also invited to complete a reflection sheet. This was not widely done, but where it occurred it was most helpful.

Participants were asked to complete an online survey used in previous The Le@rning Federation research. This enabled The Le@rning Federation to compare basic data about participants, their backgrounds and attitudes and the results of their work with the larger samples that have been collected during previous research.

Selected participants were invited to present and discuss their projects at a forum in Melbourne in March 2009, to an audience of members of state/territory Indigenous education units and contact liaison officers.
2. DESCRIPTION

2.1. Who was involved

Detailed information on the participating schools can be found in Attachment 1.

2.1.1. The school sites and their contexts

The table describes the range of school types participating in the research project. It is otherwise notable for the number of sub-school campuses which were sites, a matter of interest only. Of these, 23 were government schools, one was a Catholic school and one was an independent school.

<table>
<thead>
<tr>
<th>Year levels</th>
<th>Number of schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
</tr>
<tr>
<td>P/K/R–6/7</td>
<td>10</td>
</tr>
<tr>
<td>3–6 campus</td>
<td>1</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
</tr>
<tr>
<td>7–12</td>
<td>1</td>
</tr>
<tr>
<td>7–9 campus</td>
<td>1</td>
</tr>
<tr>
<td>8–9 campus</td>
<td>1</td>
</tr>
<tr>
<td>9–12 campus</td>
<td>1</td>
</tr>
<tr>
<td>10–12 campus</td>
<td>1</td>
</tr>
<tr>
<td>P/K/R–12</td>
<td>3</td>
</tr>
<tr>
<td>P/K/R–secondary</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

In the table below, schools are categorised according to their demographic. Schools in Weipa, Derby, Broome and Alice Springs are included as the ‘Remote town’ category, because they enrol a substantial proportion of students whose home is not in an urban (or town) centre. Here, a ‘Provincial town’ has a population of fewer than 10,000, and a ‘city’ has 10,000 or more.

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote community</td>
<td>6</td>
</tr>
<tr>
<td>Remote town</td>
<td>4</td>
</tr>
<tr>
<td>Provincial town</td>
<td>3</td>
</tr>
<tr>
<td>Provincial city</td>
<td>8</td>
</tr>
<tr>
<td>Capital city</td>
<td>4</td>
</tr>
</tbody>
</table>

The project sample is intentionally skewed towards more remote areas to adequately capture the experiences and challenges of supporting teachers in these environments.

2.1.2. The teacher participants

The teacher participants were spread in terms of levels of professional experience, but were on average less experienced than the teaching workforce as a whole.¹ There was also a mix of ICT skill levels among them, with almost a quarter describing themselves as having limited skills.

 Participating teachers who completed the online survey reported the following years of teaching experience. The individual project reports (see Attachment 4) contain more detail about their individual experiences and their capabilities with ICT.

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These figures indicate a wide spread in levels of experience, ranging in individual cases from first year out to more than 35 years of experience, vastly different from the general teaching population in Australia. Currently, just over 40 per cent of the teaching workforce has been teaching for more than 20 years. In this group, a little over 20 per cent of the teachers had more than 15 years’ experience.

The participation of Indigenous education workers, who play crucial roles in the education of Indigenous young people across the country, might also be noted. In three cases, these people were working in collaboration with a non-Indigenous colleague. At one site, two women worked together to support the tuition of students coming to a homework centre.

<table>
<thead>
<tr>
<th>Years of teaching experience</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5</td>
<td>12</td>
</tr>
<tr>
<td>6–15</td>
<td>13</td>
</tr>
<tr>
<td>15 plus</td>
<td>7</td>
</tr>
<tr>
<td>Teacher aides (mostly very experienced)</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICT skill levels</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>9</td>
</tr>
<tr>
<td>Capable</td>
<td>18</td>
</tr>
<tr>
<td>Skilled</td>
<td>10</td>
</tr>
</tbody>
</table>

These figures are the result of self-assessment and have been distributed to broad categories.

Beginner — ‘experience with computers extending over one or two years, working with them was likely to induce some anxiety, could perform basic functions but needed help with anything else’. Three of the five teacher aides who were in collaborative roles assessed themselves in this category.

Capable — ‘perfectly happy to be working with a computer, able to find what you need when you need it, been using computers for a considerable number of years’. No teacher in this group had had any formal training in the use of ICT.

Skilled — ‘able to perform a range of sophisticated computing functions, help with troubleshoot, often coupled with a high degree of enthusiasm about and interest in computing’. Most of this group was self-taught, and three had worked in roles in business/industry with a strong ICT focus. Several had experience in ICT consultancy. Only one had formal ICT education.
2.1.3. The student participants

An uncharacteristically high proportion of students involved in the projects were in classes where the students were all or predominantly Indigenous.

The table below describes the year levels, diversity and context in which these projects took place.

<table>
<thead>
<tr>
<th>Learning context</th>
<th>Number of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Whole school</strong></td>
<td>1 (seven Indigenous students of a total of 43)</td>
</tr>
<tr>
<td><strong>2. Teaching to the whole class, where the class was all or predominantly Indigenous</strong></td>
<td>18 projects</td>
</tr>
<tr>
<td>Junior primary (Years K–1)</td>
<td>2</td>
</tr>
<tr>
<td>Middle primary (Years 2–4)</td>
<td>5</td>
</tr>
<tr>
<td>Upper primary (Years 5–6/7)</td>
<td>2</td>
</tr>
<tr>
<td>Junior secondary (Years 7/8–8/9)</td>
<td>5</td>
</tr>
<tr>
<td>Middle secondary (Years 9–10)</td>
<td>3</td>
</tr>
<tr>
<td>Upper secondary (Years 11/12)</td>
<td>1</td>
</tr>
<tr>
<td><strong>3. Teaching to the whole class, where the class was predominantly non-Indigenous</strong></td>
<td>11 projects</td>
</tr>
<tr>
<td>Middle primary (Years 2–4)</td>
<td>1</td>
</tr>
<tr>
<td>Upper primary (Years 5–6/7)</td>
<td>8</td>
</tr>
<tr>
<td>Year 8</td>
<td>1</td>
</tr>
<tr>
<td>Year 9</td>
<td>1</td>
</tr>
<tr>
<td><strong>4. Other arrangements</strong></td>
<td>3 projects</td>
</tr>
<tr>
<td>Individual withdrawal (Years 5 and 3)</td>
<td>1 (two students)</td>
</tr>
<tr>
<td>Group withdrawal (Years 3, 4, 5)</td>
<td>1 (nominally six students)</td>
</tr>
<tr>
<td>Homework centre tuition (Years P–9)</td>
<td>1 (varied)</td>
</tr>
</tbody>
</table>

In this table, the ‘whole school’ is a small rural primary school, where ICT was an embedded element of the school’s program and a wide range of The Le@rning Federation digital curriculum resources were used.

In category two, all or almost all of the students were taught in a whole-group situation, with information reported on the group as a whole. There were two exceptions: one where a student with a range of disabilities was the focus of the project and another where selected students were identified as needing additional support.

The most common was to teach to the whole class (category three) and observe (including testing) the behaviour of the Indigenous students in the class (for example which might have been four of 25). In four cases, students were singled out on the basis that using the materials might provide them with additional support.

In category four, students were withdrawn from class in two cases, in one case for individual tuition and support and in the other for extension activities. The homework program was set up in a secondary school for students from a neighbouring primary school, with some attendance by students from the host school. All three were located in schools with predominantly non-Indigenous enrolments.

The vast majority of students included in this investigation had low levels of academic performance. There was some tendency to select students with the highest level of difficulties as the focus.

At least 20 of the 25 schools were located in socioeconomically disadvantaged communities.
High levels of socioeconomic disadvantage have a strong relationship with poor academic performance and, in general terms, most but not all of the schools averaged results below benchmarks from state and national testing. (The exceptions were schools in provincial centres with a heterogeneous group of students, and comparatively low Indigenous enrolments, with a correspondingly wide range of performance levels.) Several of the former group had results which were comparable with or better than 'like schools', but the vast majority of students in this study were not academically successful. The one exception was a group of three Year 8 students in a stream for ‘gifted’ students. Aside from this example, the students in the study were from the lowest stream.

In no fewer than 10 of the schools, all or most of the students were learning English as an additional language. A combination of traditional languages, Standard Australian English and Kriol make up the linguistic environment of the students.

About one-third of the projects have been deliberately directed to students whose academic performance and level of engagement were particularly low. They were chosen as a focal group, or as individuals for that very reason.

Two of the schools were specifically for students who had behavioural problems in conventional school settings and who, in the secondary school, had histories of exclusion, suspensions and/or time spent in juvenile justice institutions. The primary schools were implementing programs to avoid such events.

Attendance rates at the schools as a whole were variable, most between just a little lower and considerably lower than state averages. In almost every setting, there were students whose attendance was sporadic or who were absent for large periods of time (105 days of the last 200 in one case, for example). Students were also taken on in projects for this reason. In some cases, there were changes in their attendance patterns but in others there were not, which had an impact on the project’s effectiveness.

2.2. The projects in action

The primary question for investigation was:

How does The Le@rning Federation content, as part of a teaching program, meet the learning needs of Indigenous students?

While teacher participants could have chosen almost any topic to explore the primary research question as it applied to their specific circumstances, most directed their attention towards the acquisition of skills in literacy and numeracy.

2.2.1. The content choices for investigation

*In terms of learning area, the dominant choice was a wide range of topics related to numeracy/mathematics.*

The table below describes the teachers' nominated learning area. The integrated study included literacy, science, numeracy and design; both multiple studies included literacy, numeracy and science.

<table>
<thead>
<tr>
<th>Learning area</th>
<th>Number of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeracy/maths</td>
<td>21</td>
</tr>
<tr>
<td>Literacy</td>
<td>5</td>
</tr>
<tr>
<td>Science</td>
<td>2</td>
</tr>
<tr>
<td>Studies of society and environment</td>
<td>2</td>
</tr>
<tr>
<td>Integrated or multiple studies</td>
<td>3</td>
</tr>
</tbody>
</table>
The participants’ choice of learning areas are an important and interesting reflection of teachers’ concerns. Sixteen of the 21 numeracy/maths projects were conducted by generalist primary teachers who had many other options. It may suggest a belief in the suitability of digital curriculum resources for numeracy/maths learning or, perhaps, lower teacher confidence levels in those areas. Nevertheless, it is likely that these areas are seen as major concerns in the educational experience of Indigenous students.

The following information provides more detail about the teachers’ investigations.

**Numeracy/maths**  
Primary: counting systems and place value (11); fractions (4); general numeracy skills (3); space and geometry (3); pattern and measurement (3); chance and probability (3); multiplication (3)  
Secondary: trigonometry (2); fractions; volume; multiplication; chance and probability;

**Literacy**  
Primary: phonemic awareness, grammatical features, writing stimulus  
Secondary: stimulus for writing (2), nouns and adjectives, improving narrative richness

**Science**  
Primary: planetary objects and motion  
Secondary: friction, genetics and plant growth; atomic structure; managing waste

**SOSE**  
Secondary: harm from substance abuse; digital resources related to a range of topics

**Integrated studies**  
Secondary: ‘Waste as art’/trigonometry/physiology

**Multiple studies**  
Secondary: trigonometry/physiology/literacy

**The primary concern related to student engagement in classroom learning activity.**

There are 33 projects listed in the table above. The term ‘engagement’ features in no fewer than 17 of the 33 local questions for investigation. It was implicit in most of the other projects as they unfolded. In important respects, these projects could be seen as investigating ways of interesting and motivating students to learn, in keeping them on task and, thus, producing better mainstream outcomes. The teachers’ interest in engagement is also reflected in interview responses to enquiries about why the topic was chosen.

Teachers reported that after exploring the digital curriculum resources, they easily identified content they could use in their teaching programs. Nearly one-third (10) noted that they selected digital curriculum resources that were suitable for their current teaching program and were able to use immediately. In three cases, the teachers went looking for resources related to concepts they felt were hard to teach (probability for younger students, and aspects of trigonometry for secondary students, for example).

Ten respondents referred to particular skill or learning gaps evident in their students, to which they felt they needed to return. Four noted the particular needs of individual students who might benefit from trying something different because of challenges they face, due to a series of disabilities in one case and very poor attendance in the other.

But almost all of the teachers referred to the use of the materials in terms of helping to motivate and engage their students.
2.2.2. How The Le@rning Federation digital curriculum resources were used

As could be anticipated, diversity was the keynote to this process. The material which follows should be taken as generally indicative. More detail is contained in the individual project descriptions included in this report.

TLF curriculum resources were accessed and used in a wide variety of ways during the projects. IWBs were an important tool. Different settings influenced both the way in which they were used and the intensity of their use; but in most cases IWBs were used as a part of conventional classroom practice with whole classes and TLF digital curriculum resources were embedded in teaching and learning activities.

In most cases (75 per cent), project activity took place in whole class settings. In some cases, the work was conducted with small groups within the class. In two cases, students were withdrawn from the class for different sorts of activity, and one project was conducted via a specifically constructed program conducted in a homework centre.

<table>
<thead>
<tr>
<th>Setting of the project</th>
<th>Number of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole class</td>
<td>25</td>
</tr>
<tr>
<td>Separate activity within the class</td>
<td>5</td>
</tr>
<tr>
<td>Withdrawal from the class</td>
<td>2</td>
</tr>
<tr>
<td>Other setting</td>
<td>1 (homework centre)</td>
</tr>
</tbody>
</table>

Whole class activity

Access to The Le@rning Federation's digital curriculum resources via the use of interactive whiteboards (IWBs) was a common feature found in many of the projects. In five projects, this was the only point of access to the materials. It was more frequently found that the IWB was used for introductory activities and then students would use computers individually or in pairs/small groups in learning station rotations in the classroom (mostly found in primary schools), or individually via computers in a lab or in the classroom (more often found in secondary schools). Broadly speaking, the younger the students the more they worked together as a whole group, although this wasn’t always true.

The most common approach was for the teacher to introduce the materials and then encourage the students to work either independently or with some support. In one case, the digital curriculum resources were used as a ‘starter’ activity to focus students’ attention and to recapitulate previous learning.

In the whole class context, the digital curriculum resources were generally used as part of a program with a range of other activities, often with concrete materials, designed to support the same learning content with which the digital materials were concerned. In several cases, what was happening on the screen was reflected in the hands-on learning tasks. There was little or no use of the digital curriculum resources as stand-alone activities.

It was often the case that students would return to the same learning object/s, regularly of their own volition, to repeat activities they had previously engaged with. Some of the teachers strongly encouraged this process as useful reinforcement. About one-quarter of the teachers indicated that they believed this to be a strength of the digital curriculum resources.

There were four projects where digital resources, rather than learning objects, were used. Film clips were popular. Digital resources such as film clips are not interactive and thus were used differently by teachers, primarily to provide stimulus or discussion points. They were used to support work in studies of society and environment as well as literacy. Most, but not all, of those chosen had elements relating to Indigenous histories, biography, events or stories, and were spoken of very favourably.

Separate activity within the class

In five projects, a sub-group of the class made use of The Le@rning Federation digital curriculum resources. These were students with special needs, mostly of an academic nature, but sometimes combined with low levels of attendance and, in one case, a student had a hearing loss and a range of learning disabilities.
The materials they worked with (in all cases learning objects) were chosen quite specifically to respond to their individual needs while still being related to the topic/s being studied. In one case, the student worked with the rest of the class on individual computers but on differing material; in two others, a small group of students worked with an education worker at an IWB; and in the other two cases, two students worked with individual computers supported by the teacher while the rest of the class was engaged with other work.

In these cases, projects tended to run for shorter periods with less intensive exposure to the materials.

Withdrawal from the class
In two of the projects, students were withdrawn from the class for additional support. In one project, the use of The Le@rning Federation digital curriculum resources was incorporated into an accelerated learning project (Yachad), which involves one-to-one literacy and numeracy tuition. In the other project, six students, mostly poor attenders, were withdrawn to encourage their interest in school. It was intended that the students work in a small computer lab for one session a week on a range of selected numeracy content.

The homework centre
The general procedure was to offer support through participation in a homework club for Indigenous students twice a week for an hour for most of the two terms. Students could work on homework they needed to complete, but could also spend part of a session on selected digital content to improve their number skills. It was intended that students would work on their literacy skills through reading and other activities including The Le@rning Federation digital curriculum resources. Each student had their own individual support programs, along with their own folders containing a record of what they had completed. They were supported by two Koorie education workers.

Exposure and access to The Le@rning Federation content
The projects were conducted over two terms, but they varied in length and intensity. Most projects exposed students to the materials for between 10 and 20 hours.

<table>
<thead>
<tr>
<th>Degree of exposure to The Le@rning Federation content</th>
<th>Number of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 20 hours</td>
<td>7</td>
</tr>
<tr>
<td>10–20 hours</td>
<td>19</td>
</tr>
<tr>
<td>Less than 10 hours</td>
<td>7</td>
</tr>
</tbody>
</table>

A question of relevance to the investigation is nature and quality of the students’ exposure to The Le@rning Federation digital curriculum resources. Did they experience them in passing, or was use more concentrated?

The figures in the table, indicative rather than precise, suggest that most of the projects offered quite a protracted experience with The Le@rning Federation digital curriculum resources. Twenty classroom hours is a substantial period.

It was found that the longer programs had a commensurately greater number of learning objects and variety of materials used. Situations where exposure was more limited (for example, use of digital curriculum resources and small group work) have been noted elsewhere.

There were several comments about the medium of access that are worth mentioning. Three comments noted a preference for a higher level of individual or paired access to materials than the classroom/school set up provided for. These comments came from upper primary and secondary teachers. Logistical problems with accessing computer labs were not uncommon, and many of the primary teachers could access an IWB along with three to eight individual computers either in their rooms or were easily accessible. Access to these resources meant that a mix of collaborative and individual work was easier to incorporate into everyday practice.
3. STRENGTHS AND WEAKNESSES OF THE INVESTIGATION

Research conducted in schools is inevitably untidy to some degree. Schools are not laboratories, but very busy working environments that do not stop for the processes of research in clinical conditions. This is particularly true of the type of research undertaken during this project.

Schools conducted their project work at varied intensities and under different base conditions. In some cases, the activity formed part of a daily program for several months. In a small number of schools, use of digital curriculum resources was considerably more confined. Some operated with the whole class where the whole class was Indigenous, while others operated with the whole class with special attention paid to the response of the Indigenous students. Several operated on a withdrawal basis, and one consisted of tuition support via a homework centre.

Because of the open choice participants had in defining their area of interest, these appeared to vary quite considerably across learning areas and according to the year level/s being taught by the participants – although, as discussed below, they did not vary as much as first thought.

The projects also varied quite markedly in their construction and in the way that results were gained. This too will be discussed further below, but it would have been desirable from a research point of view to have been able to refer to more pre- and post-test quantitative data in order to comment on more specific results in educational outcomes. Some data of that nature was provided and has proved very helpful, but it is true to say that the majority of result data comes from teacher observation.

The students participating in the projects were not a stable population, either in research or conventional terms. Many of the individual school reports reveal difficulties in this regard (for example, only two of the six students being studied were available for all the tests, or four moved on and two new ones arrived during the four months of the project, or one student was away for 105 school days during which the project was conducted). The high level of absenteeism, particularly among the targeted students involved in this project, is an important consideration when conducting research with this focus.

Nevertheless, this type of research has some notable strengths. Interesting information can be gathered, for example, from the choices that teachers made in the focus of their work. The widely varying circumstances under which the projects were conducted makes consistent findings, where they emerge, significant and compelling. Careful observation by teachers – and there was a great deal of this across the projects, some quite meticulously recorded – can provide important insights into educational process and student reactions.

Above all the teachers involved in the project were working under the sorts of circumstances that many teachers in Australia can expect to confront in their working life.

The individual school reports reveal that the participants ranged from very new to very experienced teachers, that some were new to the use of ICT in the classroom and that some were highly competent in the area.

While some projects were only marginal or did not get off the ground in the time frame allocated, most were conducted with considerable care and efficiency, particularly as teachers discovered the potential of the resources.
4. RESULTS

The results from these projects are framed by the question being investigated. In many cases, the common theme across the projects was whether students could be engaged, or better engaged, in learning.

The evidence suggests that use of The Le@rning Federation digital curriculum resources supports engagement in learning among Indigenous students.

<table>
<thead>
<tr>
<th>Engagement</th>
<th>Number of projects (n=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant gains</td>
<td>24</td>
</tr>
<tr>
<td>Gains when scaffolded with other activities</td>
<td>6</td>
</tr>
<tr>
<td>Limited gains</td>
<td>2</td>
</tr>
<tr>
<td>Problematic access/attendance</td>
<td>1</td>
</tr>
</tbody>
</table>

In 24 of the 33 projects, significant gains in engagement were reported more or less without qualification. In six others, the qualification related to ways in which the use of the digital curriculum resources was scaffolded. One project could not be said to have been completed in a meaningful way. In two projects, limited evidence of student engagement was attributed to choice of materials, which students found ‘boring’, ‘done it before’ or ‘babyish’.

This finding is consistent with findings from The Le@rning Federation’s longitudinal research study, which indicates that from direct observation, case studies and extensive surveying of teachers and students, the use of The Le@rning Federation online curriculum content motivates students to attend to and engage with tasks. The chart below provides data, collected through the survey processes, illustrating the very high degree of agreement on this issue, with mainstream students including a more proportionately representative sample of the Indigenous students, who make up 4.4 per cent of the total school population.

This is the enthusiastic but considered view of one of the teacher participants in the investigation:

It’s quite clear that using ICT and their whole range of their capabilities, not just the straight up and down stuff, will do something for disengaged students, get them moving and keep them moving. Scootle and the digital curriculum content [from TLF] it provides access to are.

Freebody, P (2005). Does the use of online curriculum content enhance motivation, engagement and Learning? The Le@rning Federation Trial Review, p 12.
extremely practical ways of supporting disengaged learners. It’s exactly what we were looking for.

There are many ways in which the idea of engagement could be unpacked. For the purposes of reporting here, it will be convenient to think of it in three reasonably distinct ways: generating initial interest, attention and motivation to learn; keeping students’ interest, helping them stay on task and to complete learning activities; and assessing students’ learning outcomes, where these were effectively recorded and attributed to higher levels of engagement.

4.1. Generating motivation and interest

There was near-universal initial interest from students in using the materials. Teachers had a role to play in generating student interest.

There were very few cases across the whole range of projects where students were not enthusiastic about the prospect of using the digital materials. Various factors were noted, but pre-eminent among them were the interactivity and being able to make something happen (‘learner control’), the wider variety of sensory stimulus and their ‘game-likeness’. The following comment was typical:

He just loves working with TLF material, all the activities and the interaction. They get him right in.

This degree of initial interest was present in diverse classroom settings and geographical contexts including remote areas, with students whose first language was not English and among students who often face specific challenges related to isolation.

There were two instances where students were not enthusiastic about the content. In one of these, better results were obtained after the teacher accessed different materials. The cause of the absence of motivation appears to have been that the materials were deemed by the students to be unsuitable for their level of maturity. As a result, students displayed a level of disengagement by ‘clicking through’ without attention to detail and looking for ways to make the object/s operate in ways that were not intended.

In almost all cases, the materials students were working with were chosen by their teachers. In the instance mentioned above, where the teacher accessed different materials, students’ interest level picked up. In the other, an indication of low interest was the point at which the project stopped.

It can be easy to gloss over the role played by the teacher in this process, but this finding is suggestive of its importance. The teacher is making the judgement about what will be used based on a range of considerations about suitability: what will get the teaching point across; what will be suitable for students’ level of maturity and intellectual capacity; and what will interest them? The implication is that while many The Le@rning Federation digital curriculum resources have a strong degree of implicit attraction, the mediation of a teacher’s professional judgement will play an important role in influencing what immediately follows that initial attraction.

4.2. Staying on task

Many of the projects reported an increase in on-task behaviour by students. This took the form of increased levels of confidence and participation, related talk and collaborative assistance. In some cases, students were keen to repeat use of materials, which consolidated their learning. Teachers also reported instances where students transferred their understandings to other classroom activity.

Generating initial student interest is one thing; retaining their interest and involvement is another, and obviously a matter of concern to the teachers involved in this investigation. In a discussion of results, teachers’ commented more on this issue than any other, and generally they were very positive. The following four comments were characteristic.
The students, when using this and the other learning objects and film clips, would stay on task for longer and were self-starting. They would get into the work quickly and move forward with their work.

The learning objects made a significant difference to the time-on-task for students who are disengaged from their education, including the Indigenous students in these classes. This is a positive contribution to successful learning, in particular for the disengaged students, many of whom are also Indigenous.

I like the fact that [TLF learning objects] are so pointed and intensive. This is very important for kids who tend to drift off pretty easily. Using the objects holds their attention. [Using the materials] is something they would choose to do. They like the feedback they get and are quite happy to repeat examples and tasks in a way they wouldn’t if they were working with a pen and paper.

I had tried to get the idea two-digit multiplication across previously. The first time I used the learning object with the students, they did not get the concept. But on the second attempt, one got it and kept going. I also observed this student teaching another student how to use it. She can now apply the concept to other situations and this limited intervention has been seen to be very successful for her. The other student is now beginning to apply the concept in other situations.

On-task behaviour was monitored in a number of ways beyond silent attention to the task. In fact, the amount of ‘on-task’ talk was in important factor in many cases.

The students were talking all the time and were on task while they were doing this.

It was not just the amount of talk that mattered, but the type of talk. In five of the projects, the teachers noted the adoption by students of new and appropriate language related to numeracy/maths after using specific digital curriculum resources. Two teachers noted that teaching such language was often a difficult teaching task.

I like the way [the objects] encourage the use of mathematical language. That’s a definite plus, and the kids get more confident because they feel they’re doing things properly.

In one project, the teacher defined what she meant by ‘engaged’ learning behaviour. It is usefully comprehensive. She asked an in-class teachers’ aide to note the incidence of students volunteering to use the IWB, helping a person at the IWB, asking a question, answering a question correctly, explaining something to a classmate, applying effort to written work after the activity, and completing work on the newly introduced concept. Records from one session are as follows.

Of the 14 students present, six wanted to use the board, eight offered suggestions, nine answered questions correctly, six asked questions during the activity, and nine completed written work on the new concept. The five other students in the class did attempt the written work, but had some difficulty.

There were eight projects where an increase in collaborative learning activity was recorded. For example:

Using the learning object really engaged the students and encouraged collaboration and peer tutoring. These are valuable skills in the classroom.

It is obvious that the Indigenous (and non-Indigenous) students enjoy using the learning objects. They tend to interact positively with each other and are prepared to offer ideas and suggestions without fear of getting answers incorrect, which is a departure from their normal practice.
The teachers were interested in whether students would transfer their skills and knowledge to other classroom activities. Once the students had used the digital curriculum resources, would their degree of interest continue with other activities? In some cases, the answer was positive.

*Having the students engage in multi-sensory activities provided through the learning object increased these students’ application to their written tasks.*

*Students are more confident in tackling writing tasks since they have used TLF materials. I can see progress as the students are transferring skills in this area to other writing.*

And from a slightly different perspective:

*Students are prepared to attempt more difficult work than they would normally do when it is presented through a learning object.*

It is clear that increasing ‘engagement’ is a cumulative process. Five teachers reported the gains in confidence from using the materials impacting on other classroom behaviour. For example:

*As their confidence has increased, the students are more willing to collaborate with each other, in particular the other Indigenous students.*

One-quarter of the projects reported the value of using digital curriculum resources for consolidating learning. Some related comments include the following:

*I like the way they allow for repetition and reinforcement. The kids don’t mind that. Whereas if they were doing it with pen and paper, they might not be so interested.*

*The kids are quite happy to return to materials that they’ve used already, which is great for reinforcing what they’ve learnt.*

*In terms of effect, I find they (learning objects) produce a higher level of recall as long as there is something to prompt their thinking. This was the most significant change – the retention of knowledge in students’ memories.*

*Keeping students engaged is a precondition for improving understanding and skills. The learning objects were helpful in gaining their attention for ‘a game’ during the introduction to a new concept. From the pre-test and post-test results, it would seem that most of the Indigenous students picked up the required concepts to some degree after using the learning objects. Sometimes reminding them of a learning object after it was used could help with attempting an unfamiliar problem.*

This following is an appropriate summative comment.

*Learning objects, in the context of school readiness for Indigenous students, develop cooperative skills and language skills and provide opportunities to practise the protocols of classroom behaviour, because the students want to participate.*

### 4.3. Shifts in student performance

*Some projects achieved well-defined gains in learning for the student participants.*

This section began with the caveat that results from these projects are framed by the question being investigated. But in nine of the 33 projects, rather than investigating conditions that would engage students in their learning, the focus was more on learning outcomes, and there was pre- and post-testing or other evidence of the acquisition, or not, of new skills and knowledge. Some of the results from these projects are described here.

*Can TLF content assist in the development of understanding of number [fractions and decimals]?*
All four Year 5/6 Koorie students present during the project made significant gains. The class as a whole moved from a mean of 12 correct items to 19.8, a gain of nearly 80 per cent. The four Koorie students began from a mean of seven correct items and went to a mean of 16.6, a gain of just under 140 per cent, but also significantly closer to the performance of the class as a whole.

**Can the use of TLF content increase engagement of Indigenous students in lower-stream mathematics classes and thereby help improve learning outcomes?**

Weekly test results showed such marked improvement by one of the four Year 5/6 students that he was shifted to a higher stream. Two others made significant gains, and the fourth made some gains. The teacher participant noted the students’ new capacities to solve mathematical problems:

> [Use of digital curriculum resources] helps set them up to succeed. The sorts of skills I’m observing at the moment are application of what has been learnt to other situations in terms of things like breaking up numbers, doubling, making a ten, compensating, all steps on the path to becoming numerate.

**How suitable is the use of TLF learning objects for developing understanding of the concept of volume and units of measurement that relate to that concept?**

Each of the 10 Years 7–9 students [in a remote setting] who participated in the lessons now understands that volume is what is inside a three-dimensional object and that there are various ways of measuring this.

**What impact can the use of TLF learning objects have on the mathematical skills and understanding of Indigenous students with low levels of academic engagement and performance?**

The pre-test and post-test results indicate that most of the Indigenous students (13 of 17 in a Year 7 streamed class) picked up the required concepts after using the learning objects.

**Can TLF content help to develop students’ understanding of specific aspects of grammar and letter patterns?**

Both Year 5 students were notably more engaged in their learning while using the digital curriculum resources. One of these students, who has a hearing difficulty, benefited greatly from the audio instructions. These also supported the development of his literacy skills. When using the digital content, the other student was always engaged and interested. Both students appreciated and responded to the immediate feedback on their performance. They were able to display effectively the knowledge they had acquired related to the two target areas.

**Can the use of appropriate TLF content help Indigenous students with English as an additional language increase their acquisition of Standard Australian English and their level of engagement?**

Both [Kindergarten] students were able to show the benefits of being in control of their own learning, of being able to replay instructions when needed, and of not having to struggle with the code switching that listening to ‘Standard Australian English-speaking’ teachers demands of them.

**Can TLF learning objects improve Indigenous students’ engagement and confidence in mathematics, with a focus on those with English as an additional language?**

The digital curriculum resources provide another means of practice and reinforcement which caters for differing learning styles and stages. Ways in which you can use the materials (which were found to be multi-faceted and multi-dimensional) are so open-ended that everyone can get something out of their use. They proved to be effective with this group of Transition (P/K/R)
students in terms of improving their levels of engagement and involvement, although the students still have some distance to go with their skills with number and chance and data.

**Can TLF content help a student with an intellectual impairment and a hearing impairment recall basic multiplication facts related to 2s, 5s and 10s?**

There has been some improvement in this student’s understanding of ‘doubles’ and to a lesser extent in counting by fives, but without a high level of support he knows no more multiplication facts by heart. *With maths, unlike literacy, he doesn’t see the point of learning.*

**Can TLF content help improve the number skills of Indigenous students?**

Of the 16 Years 3–10 students who attended the homework centre, where attendance was sporadic, only five completed the pre- and post-test. Of these five, three made marginal gains, one achieved the same score and one score, from one of the students that we put the most time into, declined. Other indicators suggest that this last student had strengthened her skills in number and literacy, made good progress and has been working within the proximity level of a Year 3 (her grade level).

## 4.4. Other matters

### 4.4.1. Added value for teachers

*A substantial proportion of the teacher participants noted the value of learning objects to help diagnose students’ learning stages.*

In keeping with findings from the The Le@rning Federation longitudinal research study, especially from the case studies that were a component of this process, eight of the teacher participants noted the value of using the digital curriculum resources for diagnostic purposes. For example, one visiting consultant wrote:

The *Number trains* learning object was used to expand the students’ understanding of skip counting. They had done skip counting previously, but he teachers were surprised to find that the previous work was shown to have gaps, when the students used this learning object. They re-assessed their teaching of number patterns, provided more opportunities for students to use *Number trains* and developed ways of explicitly teaching number patterns beginning from a number other than 0 – twos, fives and tens.

### 4.4.2. Use of the digital curriculum resources in remote settings

*The Le@rning Federation digital curriculum resources can be used effectively with students in remote settings. Teachers suggest that it would be valuable if more audio material was included to aid Standard Australian English language learning.*

One of the issues which gave rise to this investigation was a question about the suitability of The Le@rning Federation digital curriculum resources for use with Indigenous students in remote settings.

There was no particular variation in the impact in very remote settings where students were English as an additional language learners and living in isolated communities, but there was some variation in the pattern of teacher practice. Scaffolding the nature of the learning through the use of concrete materials was very important at some locations. It might be noted that this form of scaffolding, if not ubiquitous, was widespread, but teacher participants consistently expressed its importance in very remote settings. (See the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands Schools reports.)

Two suggestions from teachers working in remote settings were as follows.

It would be valuable to have more audio material included in the learning objects to support the learning of Standard Australian English. This was a consistent suggestion from many
quarters. Several teachers suggested that this could be associated with a ‘bouncing ball’ or other highlighting process to link language look and sound.

While there is a degree of awareness about making the materials ‘culture friendly’, especially targeting ‘youthfulness’, in one instance with young children the inclusion of space travel/aliens as a context was mystifying. From the comfort of urban areas and, at the same time catering for the vast majority of students, it is easy to forget just how different the lives of some young Australians might be.

4.4.3. Attendance

Use of digital learning material can provide useful structural support in classes with a high degree of student transience.

Patterns of student attendance had an impact on most of these projects. As previously mentioned, students were targeted for involvement because of their poor attendance. One participant (who had made some solid academic gains during the project) had been absent for 105 of 200 school days. The project reported as ‘problematic access/attendance’ suffered from a range of operational challenges, including hardware breakdown, timetable clashes and student attendance. At no session was the full cohort of students in attendance. Records are available for the first eight of the planned 10 sessions. Of the six students included in the project, one did not attend at all, one attended four times, two five times and two six times. Therefore, results drawn from this project are inconclusive.

One teacher participant proposed that while The Le@rning Federation content would not bring the students to school, the materials would support their engagement and motivation once they were there. This may serve as a reminder that engagement is made up of a complex range of influences, but actually being at school to learn what it has to offer is an intransigent necessity.

The issue of student transience was mentioned in about 80 per cent of the projects. Student transience can take two forms – irregular patterns of attendance or regular patterns of non-attendance with students who nonetheless remain enrolled at the school. The second form is due to mobility, shifting schools, sometimes entailing missing a good deal of schooling.

For a teacher, both forms lead to the same result – a dislocated program. While allowances can be, and almost always are, made for some degree of individual difference, teaching a group that is constantly shifting is very challenging. It would probably be widely agreed that developing a trusting relationship, especially with the students targeted in this investigation, is the most important challenge to meet; the functional priority is finding material and a structure suitable for a floating population of students. This is not at all easy.

Several teachers expressed views such as the following.

Ease of access is the thing, and the fact that you can set something useful up quite quickly [digital curriculum resources] are very helpful working with classes that have floating populations. They can go back to where they got up to or find something useful to do without disrupting the progress of the rest of the class.
5. DISCUSSION

In terms of encouraging engagement, I would say five ticks out of five for that. In terms of improved outcomes, I would say use of the learning objects plays a part in that process along with many other things. But I’m very happy with the impact that use of the learning objects has had on the students.

— Jo Ellis, Narromine PS

This comment would seem to be a very good summary of what this investigation has found. A reading of the individual project reports will fill in some of the detail about ‘the many other things’. It is worth enumerating at least some of the projects here because they provide a validation of one of the most common findings in educational research: the importance of good teachers and what they do in the classroom as fundamental to effective learning. While the findings in this report relate specifically to Indigenous students, they more accurately relate to students who have disengaged from their learning. Thus, special effort must be made to provide these students with a foundation upon which to build their school success.

There are three recurrent themes in this regard that emerge from the individual project reports, in each case speculative but worthy of consideration:

- **Structure and stability, routine and consistency.** In the sometimes unstable and turbulent home lives of the students in this investigation, these factors are of great importance. It has been noted above that students who are absent cannot draw value from schooling. That use of digital materials would encourage higher levels of school attendance is questionable, although at one of the schools in the study they think it may do so. When students come to school regularly and participate in conventional classrooms where digital materials are embedded into practice, they are able to get value from the learning experiences.

- **Scaffolding.** The importance of scaffolding the use of the digital materials is a consistent theme highlighted by teachers. Many of these projects included some very inventive teaching, but almost all of them included carefully programmed structure integrating many complementary elements with the digital content as a part of something larger and more comprehensive. In discussing the significance of learner control, individuality, choice and so on, this is a matter which should be borne in mind.

- **Skilled support.** Disengaged young people require a carefully structured program and a working environment that offers a lot of patient support and thoughtful attention. Contrary to ideas which are sometimes mooted, there is nothing in this investigation that says it’s a good idea to put young people in a room with even very good learning materials and computers and assume they will learn well. In fact, it appears in some projects that the more the digital content was ‘taught’, the more effective they were; and, perhaps more powerfully from the evidence, vice versa. ‘Skilled support’ does not thwart the process of developing independence. It recognises, values and makes use of the sort of complexity and flexibility of response that only another human being can provide.

A great deal of work goes into reclaiming young people who are disengaged from schooling.

‘Five ticks out of five’ for engagement. Is that enough to support a claim that The Le@rning Federation digital curriculum resources are valuable for Indigenous students? Or is it just entertainment? Game-playing?

The current national policy with relation to the education of Indigenous young people, *Australian directions in Indigenous education 2005–2008* (MCEETYA, 2006), would suggest that it is a key issue. In fact the idea of engagement has been used as a fulcrum for the whole policy. Its introduction notes that ‘The recommendations seek to accelerate the pace of change by *engaging* Indigenous children and young people in learning’, and ‘The recommendations align with five domains in which *engagement* is critical …’ (p4: emphases in the original).
It quotes Lounsbury approvingly:

As we consider the plight of those students usually assumed to be ‘at risk’, we might well begin by recognising that what puts many of them in jeopardy are not just circumstances of birth or environment, but the school itself. They are at risk of failing not because they can’t learn but because the school has not adequately engaged them ... when we make needed improvements in the way we educate all students, we won’t need special programs for some students.  

It also frames its recommendations with a discussion which begins:

Engagement in learning is critical to academic achievement and providing students with the understandings, knowledge, skills and confidence to move on into training, employment and higher education (ibid.: p17).

The way the discussion of the results of the investigation has been couched above intimates the place of engagement in the learning process. It is not the whole story; but it is an essential part of it. Students must be physically present to learn in the classroom, but they must also be mentally ‘present’, thinking in a focused way, concentrating, exercising their thought processes to leave some lasting new neural pathways.

The sorts of issues these projects were dealing with are often not highly sophisticated: building some basic understanding of number is a good, and typical, example. One sort of reaction might be: that probably doesn’t matter much ... that can always be picked up. In response to that reaction – that mightn’t be the case. The student could be assigned to a lifetime struggling with change and bank accounts which remain a mystery, for example. But as these projects indicate, building basic skills is part of something larger – feeling confident in a particular environment, feeling part of a group that is capable, having the sense that there may be things of value in a formal education, and being interested in further exploration of intellectual issues.

This set of comments from a teacher participant takes up this theme.

I know it works. I’ve seen the switch countless times. Can’t read, won’t read. Get on the laptop, and they’re up and going. I’ve heard teachers worrying. ‘This won’t be the student’s own work. They’re just playing games.’ All that. But I think these sorts of comments need to be seen for what they are, deeply unconvincing. It may seem to the students that the work might be easier and more accessible, but I think that’s what we would want, isn’t it? I have followed the thinking of quite a few students of the sort we find challenging and it’s almost as though they are saying, ‘I don’t have to write it down but at least I can participate in what’s going on.’ Straight away you have developed an avenue for some new learning to occur.

What is a disengaged student like?

The source of the comment which begins this section also defined the symptoms of ‘disengagement’ in the classroom as many other teachers would: starting tasks reluctantly (‘Can’t do this Miss. Too hard.’), poor task completion, low levels of concentration, easily distracted and prone to time-wasting, with consequent behaviour disrupting other students and their work. Physically not there, mentally not there, actively working against the run of the class or some combination of the three are issues commonly reported by teachers.

There are a wide range of background factors that might be producing and compounding disengagement: diet, fatigue, emotional upset, inability to communicate easily or at all, being treated badly by other students and/or the teacher, and so on. These issues are not resolved by the use of digital curriculum resources.

But in listening to teacher participants in the project talk about these students, there were two themes which recur. First, conventional pedagogy often remains passive, predictable and recursive. If students are not tuned into the conventional classroom routines, the result is likely to be

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boredom. Second, when confronted with text, many of these students are at sea and entering an arena where they have already had many experiences of failure, which they don’t want to repeat. In circumstances such as these, and it is suggested that they are very common, what might the use of digital curriculum resources have to offer?

The teacher in the school that had taken on the use of The Le@rning Federation digital curriculum resources across the whole school believed the following reasons explained the attractions of learning with digital materials for disengaged students.

- **Variation.** The use of ICT and appropriate digital curriculum resources increases the variety of teaching and learning procedures in which students can engage. In many cases, it is still out of the norm of classroom pedagogy.
- **It has the capacity to engage a wider range of sensory stimuli than just working with pen and paper.**
- **Individuals who have trouble focusing in group activity can take control of their own work at their own pace when working individually on a computer.**
- **The degree of interactivity and game-likeness is important to maintain interest and engagement.** Some versions of digital content have the right sort and degree of interactivity, others do not. The Le@rning Federation content is generally good in this regard.
- **Digital content that incorporates immediate feedback is good.** That aids interactivity but connects action with response so that you know how well you are doing and if you are getting things right.
- **It allows students with problematically low self-esteem, among other challenges, to become ‘experts’, and to feel confident and capable.** It changes the conventional hierarchy of expertise in the classroom, and you can move out of the place to which this hierarchy has assigned you.

These ideas can be tested more specifically, but it will be in other investigations. This one has been concerned with the ‘whether or not’ question: Can The Le@rning Federation digital curriculum resources assist in engaging Indigenous students in formal learning? The answer is yes.
## ATTACHMENTS

### Attachment 1 - List of schools involved with additional project information

<table>
<thead>
<tr>
<th>Name and location</th>
<th>State</th>
<th>Sector</th>
<th>Urban Rural Remote</th>
<th>Primary/secondary</th>
<th>Enrolment</th>
<th>Indigenous enrolment</th>
<th>Number students involved in project: year level*</th>
<th>Learning area: issue</th>
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</thead>
<tbody>
<tr>
<td>APY Lands schools</td>
<td>SA</td>
<td>G</td>
<td>All remote</td>
<td>All R–secondary</td>
<td>99</td>
<td>All</td>
<td>- Years 2/3/4 &amp; Years 5/6/7 classes</td>
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<td></td>
<td></td>
<td>- Years 2/3 class</td>
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<tr>
<td>- Ernabella Agangu School</td>
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<td></td>
<td></td>
<td></td>
<td>- Years 3/4/5 class</td>
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<tr>
<td>- Fregon Agangu School</td>
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<td>126</td>
<td></td>
<td>- Age 12–15 class</td>
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<td></td>
</tr>
<tr>
<td>- Mimili Agangu School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mimili Agangu School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ardmona Primary School, Ardmona</td>
<td>VIC</td>
<td>G</td>
<td>Rural</td>
<td>Primary</td>
<td>43</td>
<td>7</td>
<td>All</td>
<td>Across the board: engagement</td>
</tr>
<tr>
<td>Derby District High School, Derby</td>
<td>WA</td>
<td>G</td>
<td>Remote</td>
<td>K–12</td>
<td>524</td>
<td>456</td>
<td>- The majority of a Year 4/5 class of 20 students</td>
<td>Numeracy: developing understanding of three-dimensionality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(secondary 170)</td>
<td></td>
<td></td>
<td>- All of a Year 2/3/4 class</td>
<td>Numeracy: motivation and understanding of number sequences</td>
</tr>
<tr>
<td>Dubbo Secondary College (Delroy Campus), Dubbo</td>
<td>NSW</td>
<td>G</td>
<td>Rural</td>
<td>Yrs 7–9</td>
<td>487</td>
<td>220</td>
<td>- Thirteen Year 7 students in a lowest stream class of 17</td>
<td>Maths: impact on students with low-ability levels and limited engagement</td>
</tr>
<tr>
<td>Gillen Primary School, Alice Springs</td>
<td>NT</td>
<td>G</td>
<td>Remote</td>
<td>Primary</td>
<td>225</td>
<td>c. 160</td>
<td>- Twenty students in a transition class of 24</td>
<td>Numeracy: confidence and engagement, especially for EAL learners</td>
</tr>
<tr>
<td>John Willcock College,</td>
<td>WA</td>
<td>G</td>
<td>Rural</td>
<td>Yrs 8–9</td>
<td>650</td>
<td>150</td>
<td>- Seven students</td>
<td>Science: motivation and</td>
</tr>
</tbody>
</table>

*Note: The number students involved in project: year level refers to the number of students involved in the project for specific year levels.*
<table>
<thead>
<tr>
<th>School Name</th>
<th>State</th>
<th>Type</th>
<th>Location</th>
<th>Level</th>
<th>Students</th>
<th>Activity Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geraldton</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In three Year 8 classes - Twelve students in two Year 9 classes</td>
</tr>
<tr>
<td>Macleay Vocational College, Kempsey</td>
<td>NSW</td>
<td>I</td>
<td>Rural</td>
<td>Yrs 9–12</td>
<td>72</td>
<td>c. 60 - 15–20 Years 9–11 students</td>
</tr>
<tr>
<td>Middle Swan Primary School, Stratton (Perth)</td>
<td>WA</td>
<td>G</td>
<td>Urban</td>
<td>Primary</td>
<td>610</td>
<td>c. 120 - Four students in a Years 6/7 class</td>
</tr>
<tr>
<td>Mooroopna Park Primary School, Mooroopna</td>
<td>VIC</td>
<td>G</td>
<td>Rural</td>
<td>Primary</td>
<td>135</td>
<td>35 - Focus on four Year 5/6 students</td>
</tr>
<tr>
<td>Narromine Primary School, Narromine</td>
<td>NSW</td>
<td>G</td>
<td>Rural</td>
<td>Primary</td>
<td>400</td>
<td>c. 160 - Focus on 4 of a Years 5/6 lower stream maths class</td>
</tr>
<tr>
<td>Northfield Primary School, Adelaide</td>
<td>SA</td>
<td>G</td>
<td>Urban</td>
<td>Primary</td>
<td>300+</td>
<td>30-45 - Five students across two Years 2/3 classes</td>
</tr>
<tr>
<td>Papunya School, Papunya</td>
<td>NT</td>
<td>G</td>
<td>Remote</td>
<td>K–9</td>
<td>86</td>
<td>83 - All Years 6–9 students</td>
</tr>
<tr>
<td>Port Augusta Secondary College (Stirling Campus), Port Augusta</td>
<td>SA</td>
<td>G</td>
<td>Rural</td>
<td>Yrs 10–12</td>
<td>450</td>
<td>167 - In one class, 11 of 20 Year 10 students; the other, three of 15 Year 10 students</td>
</tr>
<tr>
<td>St George's Rd Primary School,</td>
<td>VIC</td>
<td>G</td>
<td>Rural</td>
<td>Primary</td>
<td>430</td>
<td>68 - One Year 5 and one Year 2</td>
</tr>
</tbody>
</table>

Using The Le@rning Federation digital curriculum resources to enhance the education of Indigenous students
<table>
<thead>
<tr>
<th>School Name</th>
<th>State</th>
<th>Type</th>
<th>Location</th>
<th>Year Group(s)</th>
<th>Student Numbers</th>
<th>Resources Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shepparton</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St Mary’s College, Broome</td>
<td>WA</td>
<td>C</td>
<td>Remote</td>
<td>P−12</td>
<td>580 (secondary 180)</td>
<td>Eleven Year 10 students - Fifteen Years 8/9 students - English: basic narrative skills</td>
</tr>
<tr>
<td>Spearwood Primary School, Spearwood (Perth)</td>
<td>WA</td>
<td>G</td>
<td>Urban</td>
<td>Primary</td>
<td>280</td>
<td>Five Years 4/5 students - Numeracy: basic number facts</td>
</tr>
<tr>
<td>Warmambool Secondary College, Warmambool (with Warmambool East Primary School)</td>
<td>VIC</td>
<td>G</td>
<td>Rural</td>
<td>Secondary</td>
<td>c. 1000</td>
<td>Thirteen from Years P−10 - Numeracy: basic number facts and engagement</td>
</tr>
<tr>
<td>Warmambool West Primary School, Warmambool</td>
<td>VIC</td>
<td>G</td>
<td>Rural</td>
<td>Primary</td>
<td>260</td>
<td>Six students from Years 3, 4 and 5 classes - Numeracy: basic number facts and engagement</td>
</tr>
<tr>
<td>Table Cape Primary School (Gibbons Street campus), Wynyard</td>
<td>TAS</td>
<td>G</td>
<td>Rural</td>
<td>Primary (this campus 3–6)</td>
<td>238 (this campus)</td>
<td>Focus on two Year 5 students - Literacy: aspects of letter patterns and grammar</td>
</tr>
<tr>
<td>Westminster Primary School, Westminster (Perth)</td>
<td>WA</td>
<td>G</td>
<td>Urban</td>
<td>Primary</td>
<td>370</td>
<td>Four Years 5/6 students, focus on two - Five Year 5 students, focus on two - Numeracy: basic number facts - Numeracy: basic number facts</td>
</tr>
<tr>
<td>Western Cape College (Weipa campus), Weipa</td>
<td>QLD</td>
<td>G</td>
<td>Remote</td>
<td>P−12</td>
<td>1000+ Weipa K−12 campus 980</td>
<td>One Year 7 student - Two Prep students - Maths: student with a range of disabilities requiring specialised support - Literacy: phoneme recognition</td>
</tr>
</tbody>
</table>
The Le@rning Federation Indigenous Project 2008

Participating teachers’ project brief

The Le@rning Federation’s (TLF) Indigenous Project is a national project and is based on Professor Freebody’s longitudinal study and the recently published report *Effects of The Le@rning Federation’s curriculum content on Indigenous students’ motivation to learn and their engagement in learning.*

What is The Le@rning Federation?

Since 2001, The Le@rning Federation’s high-quality, innovative content has seeded and supported schools’ move into 21st-century education. The Le@rning Federation has now produced more than 6,000 items of digital curriculum content that is available free of charge to all schools in Australia and New Zealand via their education authorities.

The Le@rning Federation digital content is available in two forms:

- **Learning objects** are stand-alone, interactive learning activities, and are often multimedia, integrating sound, animation, text and audio. They are developed using educational design principles.

- **Digital resources** are objects in digital format, for example a photograph, painting, film image or sound file (such as a speech). These have been sourced largely from cultural and scientific institutions in Australia and New Zealand. Digital resources provide students and teachers with access to materials that are otherwise not readily available.

Visit TLF website> For teachers >Sample learning materials>Indigenous content and perspectives to sample some learning objects and digital resources that include Indigenous perspectives or have Indigenous content. The website also includes catalogues of all the other content published to date in key curriculum areas.

www.thelearningfederation.edu.au

What is the Le@rning Federation’s Indigenous Project?

You, your principal and your school have been invited, and in turn have accepted, to participate in this The Le@rning Federation study. The study has been developed to further improve the up-take of TLF content for use with Indigenous students. It will also be used to shape further development of TLF content.

The main research question for this study is:

How does TLF content, as part of a teaching program, meet the learning needs of Indigenous students?

As a participant in the study, you will decide on how best to explore this question in your school context.

You may choose to set up an exploration in the areas of literacy or numeracy, or in relation to a specific learning area, such as mathematics, or to address a learning issue you have identified as relevant to your students, such as developing English language skills. The Le@rning Federation will provide support and professional development opportunities on an ongoing basis.

Here are some examples for the possible focal points of your research:

- How does The Le@rning Federation content’s learning design support Indigenous students?
• Does some The Le@rning Federation content work better in some learning areas than others for Indigenous students?
• How can The Le@rning Federation content support assessment practices for Indigenous students?
• Does scaffolding in The Le@rning Federation content provide the sorts of learning advantage that Indigenous students find helpful?

The focus of this project is on the students and their practice when using The Le@rning Federation content, as part of the learning program you have established.

What will you contribute to the project?

The project will run from the second term in 2008 to the end of the first term in 2009.

Your first action is to attend a workshop. Casual relief is available for your participation and/or for any other activity that you engage in to support the outcomes of the project. The workshop will focus on how you can set up a process to answer the research question – How does The Le@rning Federation content, as part of a teaching program, meet the learning needs of Indigenous students? You will bring your knowledge of your students and their learning needs, and your thinking about the program planning you have already done (bring any documentation that you think will support this). This will enable you to use the time there to apply the research questions to your own context. You will also have time to explore and find suitable content that will suit your students’ learning needs and complement your program. You will have time to design and negotiate your research process, and you can incorporate it into your work plan.

Once you have used The Le@rning Federation content in your classroom, you will complete an online teacher survey that takes a maximum of 10 minutes.

During the fourth term, the project evaluators will visit your school, interview you and, where possible, observe you working with The Le@rning Federation content in your classrooms. TLF evaluators will also gather observational data, focusing on student practice and any additional data that you have collected during the process.

Selected teachers will have an opportunity to showcase their findings at the end of the process to a national forum, to be conducted in Melbourne and attended by colleagues from other schools and education authorities in all states and territories. The Le@rning Federation will meet all expenses associated with the forum.

What will The Le@rning Federation do to support my part in this project?

The Le@rning Federation will provide support through the work of our Indigenous projects officer – Sue Thomas. She will give you information and advice about embedding The Le@rning Federation content into your teaching and learning program and share experiences of other teachers of Indigenous students in similar contexts. If you have any technical difficulties, she will arrange for support to be provided. The Le@rning Federation will distribute appropriate resources to support your research.

The Le@rning Federation will also gather information at the forum which will contribute valuable information to the project report about your Indigenous students and their responses to the use of digital content in a variety of contexts.

Timeline

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project workshop</td>
<td>May–August 2008</td>
</tr>
<tr>
<td>Teacher project plan finalised</td>
<td>June/August 2008</td>
</tr>
<tr>
<td>Survey completed</td>
<td>September 2008</td>
</tr>
<tr>
<td>Interviews and observations</td>
<td>Terms 3–4 2008</td>
</tr>
<tr>
<td>Forum</td>
<td>Term 1 2009</td>
</tr>
</tbody>
</table>
Attachment 3

The Learning Federation Indigenous Project 2008
Planning document

‘Indigenous Australians are yet to achieve equitable outcomes [in school education]. … Most Indigenous students, regardless of their completion year, leave school poorly prepared relative to their non-Indigenous counterparts. These outcomes limit the post-school options and life choices of Indigenous students, perpetuating intergenerational cycles of social and economic disadvantage.’


The Learning Federation (TLF) has endeavoured to:

- provide educational materials which support improvements in mainstream outcomes for Aboriginal and Torres Strait Islander students, and
- ensure that the collection of materials being developed reflects the realities of this country’s history, and accords a proper place to the range and depth of cultures and contemporary life experiences of Australia’s Indigenous peoples.

We are seeking your help in this regard.

We have some evidence that the use of The Learning Federation learning objects and digital resources can provide highly effective learning experiences for Indigenous students. We want to test that idea further.

Research suggests the most important things that can make a difference to student outcomes are strong developments in basic skills, motivation and engagement. Effective engagement not only includes consistent attendance but also enjoyment of, and interest in, learning resulting in competent learners. These factors are underpinned by knowledge of and respect for students’ cultural background.

In your project work, you might like to consider the way in which The Learning Federation materials can support improved learning outcomes for your Indigenous students.

We would like to know how the use of The Learning Federation content

- helps engage Indigenous students in learning. If so, just what is it about the content and its medium that does that?
- works better in some learning areas than others. If so, what are they, and why do you think that is the case?
- helps with assessment processes.

We would also like to know more about the most effective ways of using The Learning Federation content in your teaching and learning programs.

The following outline plan is intended to help you with your work. It will also be very useful for us in our collation and reporting of the results of your projects.

We don’t want filling it out to be an onerous task. The amount of space that has been left suggests the level of detail we would like at this stage.

Please complete the outline plan as soon as possible and send a copy to sue.thomas@thelearningfederation.edu.au.
These are the guiding questions for all projects
Does TLF content meet the learning needs of Indigenous students? If so, how?

1a. What are you going to investigate?
Try to make this as specific as possible. For example, ‘Can TLF content help develop an understanding of how to calculate area or working with fractions?’ or ‘Can TLF help develop the idea of scientific method?’ or ‘Does the use of particular TLF content provide effective motivation for your Indigenous students?’

________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________

1b. With who?
Write in the year level/s of the students involved in the project and, if relevant, the key learning/subject areas you will be focusing on.

________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________

1c. What TLF content are you going to use?
You might not know at this stage. You might want a chance to explore what is there. If so, please write here the general learning area.

________________________________________________________________________________________________________________________________________

To help us, as your work proceeds, please keep a record of TLF materials you use. Please include correct name and content ID (e.g. Making a difference: David Unaipon TLF ID: L5211).

Learning objects
________________________________________________________________________________________________________________________________________

Digital resources
________________________________________________________________________________________________________________________________________

2. Where are you starting from? What is the nature of the ‘test’ situation where you are looking for change? What is your baseline information?
This can take the form of individual or group test data, observations, your professional judgements.
________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________
3. **How are you going to assess what has happened? What data are you going to use?**

   *How have you expressed the baseline situation? It is a good idea to use the same sort of data to describe any change. Your own observations of what has happened will be valuable.*


4. **In practical terms, what are you going to do?**

   *How will you use TLF material in your program and how will you assess its impact?*

5. **What data are you going to collect on an ongoing basis to inform the evaluator when they come to interview you later in the year during a follow-up visit?**
The Learning Federation Indigenous Project 2008
Case study reports of individual schools

The case study reports included in this section have been compiled by advisory team members David McRae, Matt Scoss and Margaret Wallace, who visited schools towards the end of the project to interview teachers, collect information and gain insights into their progress.

Anangu Pitjantjatjara Yankunytjatjara (APY) Lands Schools, South Australia

Context
The first European visitation into the Pitjantjatjara Yankunytjatjara Lands occurred in 1873 with the expeditions of William Gosse and Ernest Giles who were seeking a route for the Overland Telegraph Line to the west coast of the continent. Pastoral leases were granted for areas to the east, in Yankunytjatjara country. The North-West Aboriginal Reserve (56,721 km²) was proclaimed in 1921, providing some ‘protection’ for the lands and people in the Pitjantjatjara area. In 1936, the then South Australian government offered a 1,000 pound establishment grant if matched by public subscription. Later in the year, the proposal was ratified by the General Assembly of the Presbyterian Church in Sydney. In 1937, the Ernabella Mission was established.

In the 1960s, a movement began to establish outstations. The first outstation was set up at Fregon in 1961 to provide employment in cattle work. A government reserve was also established at Musgrave Park, and was later given its traditional name, Amata. Indulkana was established in 1963 on part of the Granite Downs Station, and Mimili was established in 1972 at Everard Park. Kenmore Park was acquired in 1976 for the Pitjantjatjara people.

In March 1981, the first draft of the Pitjantjatjara Lands Rights Bill was passed. In November 1981, the inalienable freehold title to 102,360 km² of their land was handed over to the Pitjantjatjara and Yankunytjatjara people. This is viewed by Indigenous people as one of the most important events in the history of South Australia.

Pitjantjatjara people traditionally occupied an area of range and sandhill country in the far north-west of South Australia and neighbouring areas of Western Australia and the Northern Territory. They had close cultural ties with their neighbours, the Yankunytjatjara to the east and the Ngaatjatjara to the west. People envisage themselves as related to the land and other species, and each group has special rights and obligations in relation to the land, stories, rituals and resources of their region. Typically, the community sees the school as a bridge between Anangu and non-Anangu culture, with a very important role in empowering young Anangu with the ‘skills for determination’ through literacy development. Anangu are involved in school decision making through the school and community councils. Pitjantjatjara is the first language of all Anangu, with English as their second language.

<table>
<thead>
<tr>
<th>School</th>
<th>2008 total enrolments</th>
<th>2008 male enrolments</th>
<th>2008 female enrolments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amata</td>
<td>99</td>
<td>50</td>
<td>49</td>
</tr>
<tr>
<td>Ernabella</td>
<td>126</td>
<td>57</td>
<td>69</td>
</tr>
<tr>
<td>Fregon</td>
<td>49</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>Kenmore Park</td>
<td>23</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Mimili</td>
<td>57</td>
<td>26</td>
<td>31</td>
</tr>
</tbody>
</table>

Schools and students: Common to all are the following points:
- All students are Indigenous, speaking Pitjantjatjara as a first language, and English as a second or third language.
Students may not necessarily be directly cared for by their mother or father, living with grandparents or aunts/uncles. Income for families of some students is from paid work in the community, but income for many would be from social security. Very few students would have access to computers and the internet at home, with a DVD and TV combination being the dominant media technology present.

Staff and ICT: Common to all are the following points:
- Staff are largely self-supporting in terms of resolving ICT issues, drawing on technical expertise from Kathy Smerdon and periodic on-site support from an itinerant ICT specialist.
- ‘Mixed bag’ of ICT infrastructure, with some schools having very modern PCs installed, while others having fairly dated equipment. SA DECS does not have a standardised roll-out of infrastructure with centralised support structures.
- All teachers reported issues with intermittent access to the internet, bandwidth, stability of mail and file servers.
- Some staff have access to broadband internet at home, many don’t.
- Many new staff to the region are starting their teaching careers.
- Most teachers have been trained via South Australian tertiary institutions. Many have completed a teaching practice round at a school on the Pitjantjatjara Lands during their pre-service course.
- All participating teachers identified the concept of ‘place value’ as an area in need of support, making Wishball variants the learning object to be focused upon.

General comments:
NAPLAN data was not available to give an indication of students’ performance in systemic testing regimes. Bob Lines (Adelaide-based equivalent to Superintendent to the region) mentioned that at each school all age groups (for the purposes of NAPLAN testing) had between one and six students in that particular cohort. Interpretation of data from official NAPLAN sources explicitly raised an aberration in the data, whereby students performed higher in the numeracy testing compared to the reading, writing and spelling. Mention was made that this may have been a function of the numeracy test being read to students, as permitted in NAPLAN guidelines.

All teacher participants chose to trial the Wishball series of learning objects, supported by Kathy Smerdon working across the schools with site visits. With place value identified intuitively as a mathematical concept that is difficult to teach and confirmed by students’ performance in systemic testing, Wishball was a logical and natural place to start. Kathy organised for schools to access Wishball via a Moodle interface, to make it easier for student access when required. All teachers reported the value of Kathy’s role in her ICT-focused role across the region in the project. Of note was Kathy’s support in helping them devise sequences of learning experiences to scaffold students up to the point of being able to engage meaningfully with the Wishball learning objects.

All teachers reported the value in constructing IWB artefacts that mirror what students were doing with concrete manipulatives. A strong imperative was to make it possible for students to demonstrate their understanding by physically using the concrete materials. One example of this was bundling matchsticks or popsticks into lots of ten. Until students did this themselves repeatedly, they would not make the connection about the representation of ‘ten-ness’, which is vital when seeing the virtual representation on an IWB flipchart or learning object.

A theme of ‘user-interface friction’ with respect to TLF digital curriculum resources became apparent when interviewing each of the teachers. Even though no interviewee used this particular term, the metaphor of friction captures what the teachers struggled with in terms of helping students in:
- getting to the point of having sufficient conceptual mathematical knowledge
- being able to interact with the chosen learning object(s)
- being able to articulate their mathematical thinking with respect to decisions they made in the course of using the chosen learning object(s).

What is immediately apparent to an accomplished learner in terms of the user interface is not necessarily obvious to an English as an additional language learner. Often, they don’t have the ability to screen out visual and auditory information, which serves to distract their attention.
Amata Anangu School

Context
Amata is somewhat isolated, being further west of other schools involved in this project. It is about 280 kilometres from the Stuart Highway. As the school was not visited, no comment can be made about school buildings.

The school
The school is organised along stages of schooling lines, with multi-age classes. The staff includes a principal and nine staff, with Aboriginal education workers working in most classrooms. Most teaching staff are in the early stages of their careers.

The students
Refer to generic comments made above. Attendance is patchy; a core group stays for the full day, and a range of students are present in the morning, but not in the afternoon, and vice-versa.

ICT at the school
The school has a computer lab with 20 computers. Students from Reception upwards have a log in. A large commitment has been made to provide a critical mass of computers in a central place (library), along with networked computers in each classroom (teacher laptop and several desktop computers). Each classroom has a data projector and a Promethean IWB.

Staff are typically ICT-savvy and willing to explore new ways of using different resources. Staff support each other in devising flipcharts (IWB resources specific to Promethean boards).

Teachers are positive about ICT, if it works and doesn’t take too much effort to integrate into classroom teaching. Not much professional or collegial support is available, with teacher participant Leanne Stephens observing that teachers have a low threshold before giving up, in relation to the use of ICT. She felt it was important to have someone who is able to ‘filter’ learning objects and other ICT-based resources and make suggestions to teachers at the local level.

Teacher participant: Leanne Stephens
Leanne is in her second year of teaching, having come to teaching after other employment opportunities. In the phone interview, she expressed confidence in using ICT in her instructional practice, but acknowledged the need for further opportunities to develop her skills. She appeared to be enjoying the variety that ICT affords in terms of teaching methodology, as well as seeing how well her students responded to multimedia content.

The class
Leanne worked with students across the school, in a teacher release role. For this project, Leanne trialled Wishball with a Year 2–3–4 class and a Year 5–6–7 class. Her role of releasing the teacher meant that she was adding to their mathematics learning, without providing the regular mathematics program to students. In her role, she did not have access to an Aboriginal education worker to support her in the classroom with the students.

For various reasons, Leanne did not have regular access to either cohort of students to be able to develop their conceptual thinking in place value to use Wishball tens (younger group) and Wishball hundreds (older group). Other school events and roles competed directly with her access to the two classes for the purposes of this project. When she did have regular access to the class with this investigation as the focus, Leanne reported an increased capacity of the students to engage with TLF content day to day.
The project

Plan
Leanne invested a lot of preparatory lessons in building up student understanding of place value via hands using concrete manipulatives to model numbers using a Hundreds-Tens-Units frame, and building up numbers via exchanging. Before this, students had to have multiple experiences in using bundled popsticks and practice in exchanging them (ie swapping ten individual ones for a bundle of ten).

Activity
Leanne used Wishball tens (L8458) with the Year 2–3–4 class and Wishball hundreds (L8456) with the Year 5–6–7 class. Wishball was demonstrated to both classes.

A ‘tension’ that Leanne felt was balancing student expectations that she would ‘do computers’ with them when she needed to go back to building up students’ conceptual knowledge of the mathematical ideas using concrete manipulatives. This was challenging when her efforts weren’t necessarily articulating with the regular lessons in mathematics, coupled with the intermittent access to the student group.

Leanne scaffolded students' understanding of place value by the use of bundling popsticks and exchange activities, using MAB materials to replicate the same idea of exchanging and building different place value amounts.

Results
With students holding the view of the computer room as the ‘holy grail’, the behaviour in this environment tended to be without focus, with students typically exhibiting a tendency to click the computer mouse frenetically. Leanne found students to be more responsive when using Wishball as a whole class and a projected image on the IWB. They remained engaged for longer, but at times didn’t know how to finish off the game, not understanding the choices they could make.

When trying different versions of Wishball, students would say, ‘we’ve done that one,’ without beginning to engage in the challenge. It was suggested that perhaps the background of Wishball could be colour-coded, to imply a different learning object.

Leanne reported that the students liked the visual cues and sound effects of Wishball. She felt that Amata students needed constant exposure to Standard Australian English, responding to a stimulus with the focus limited to just one thing at a time.

For her own professional growth, Leanne expressed a desire to view teachers in classrooms using TLF content, both with an IWB and in a computer lab setting.

Implications for consideration
Leanne identified the notion of using learning objects such as Wishball as a ‘culminating task,’ supported by lots of prior teaching. She didn’t elicit much useful data from a diagnostic test administered before and after.


Ernabella Anangu School

Context
Ernabella, about 150 kilometres from the Stuart Highway, is the largest community on the Pitjantjatjara Lands. Historically, the community has been strongly supported by missionaries.

The school
The school has a principal, 12 class teachers, 12 Aboriginal education workers and an Anangu coordinator. Classes are organised along stages of school lines, with some overlap of year levels, so that more confident students can be placed with an older cohort of students.

The staff profile ranged from young teachers through to very experienced teachers. Some of the experienced teachers were new to teaching in the region.

The students
Attendance is a high priority for the school, and both students and their families receive constant reinforcement about the importance of regular attendance. The mix of students and their background is typical of most communities, outlined earlier in the report.

ICT at the school
Most classrooms have been fitted out with a projector and an IWB. Each teacher has a laptop, but the degree of integration into their instructional practice varies. Some teachers are very confident using IWBs, while others need considerable support.

Teacher participant: Erin Sells
Erin is in her third year of teaching and is a passionate and competent teacher. She makes a big effort to create an environment that is conducive to learning and works closely with her Aboriginal education worker.

At the start of the project, she said she was ‘terrified of using her IWB’, but has persisted in developing her skills, with significant support from Kathy Smerdon and another teacher.

She says she has noticed the students’ level of engagement has increased considerably, since making the use of flipcharts on the IWB a regular part of her teaching practice.

An important part of Erin’s development has been learning along with her Aboriginal education worker. She reported that her Aboriginal education worker has developed the confidence to start the class off in her absence (Erin had responsibility for covering some school-wide roles while the deputy principal position was vacant) and make effective use of the flipcharts they’d developed together. A key part of Erin’s Aboriginal education worker being able to do this was having had the usage modelled earlier by Erin with the class.

Erin reported that she had become more relaxed about using the Wishball learning objects on the IWB and was willing to take more risks and extend her skills and experience.

The class
The class was a Year 2–3 group with a well-developed sense of school and the rituals and routines expected in the classroom. This is due to strong expectations developed by Erin and her Aboriginal education worker. While Erin was being interviewed, the students came into the classroom quietly and selected literacy and numeracy tasks from a range of games and resources. All students were on task, and remained so for a substantial time.

The project
Erin worked closely with Kathy Smerdon and liaised with other teachers in developing kinaesthetic and hands-on tasks that involved students learning to make ten and trading games using bundles of popsticks and MAB blocks. This scaffolded the students’ learning up to the point where they could interact with Wishball ten as a whole class using the IWB.
Activity
Erin worked closely with other teachers involved in the project in trialling the mathematics activities. Like in other schools, students had to practise ‘making ten,’ ‘making 100’ using a range of concrete manipulatives including bundles of popsticks and MAB blocks, along with purpose-designed IWB flipcharts.

Results
Erin commented on an increased level of engagement in the learning tasks, brought on by the regular, consistent usage of the IWB with the Wishball content. She implied that the students were ‘in the game’, having had the benefit of the scaffolding tasks with concrete manipulatives that equipped them with the essential ‘pre-concepts’ before using Wishball.

She noticed that her Aboriginal education worker ‘had a voice’ in the classes’ learning, because they had learnt together. Erin reported an increased awareness among students in terms of their ‘meta-self talk’, drawing links with their previous activities when making decisions while playing Wishball. For example, students made reference to ‘making 10’ when deciding what to add on with Wishball tens.

Implications for consideration
Who commented? Teachers identified the importance of investing time in scaffolding student learning using both concrete manipulatives and IWB flipchart representations of the same or similar concepts. An essential aspect was regular and constant repetition throughout the school day, especially when not all students were present all the time.
Fregon Anangu School

Context
Fregon Anangu School is part of the Kaltjiti community, and associated with Irirrata and Watinuma Homelands. It is situated between the Everard and Musgrave Ranges and has a population of about 250 Anangu and 30 non-Anangu, who reside in town or on the associated homelands.

The school
The school has one class in each level ranging from CPC to secondary class (five classes in total), 14 staff members that include teachers, Aboriginal education workers and administration school support officers. The staff includes teachers with a range of ages and levels of experience.

The students
The school has 50 to 60 student enrolments:
- All students are Indigenous.
- All students come from a low socioeconomic background.
- All students are English as an additional language learners.
- Health and family issues affect students’ attendance and academic levels.

ICT at the school
Each classroom has newly installed IWBs. The library is equipped with an IWB, a media centre PC and plasma screen TV. The secondary and upper primary classes have computers in the classrooms. Most teachers enjoy using ICT and seek support from both the ICT coordinators at school from the Anangu Education Services office in Ernabella.

Teacher participant: Suria Amir-Lang
Suria Amir-Lang has been teaching for two years full-time and has had experience using IWBs, incorporating the use of the IWB in numeracy and literacy lessons. She has had considerable experience with digital photography and digital video (including editing and producing photo stories and DVDs) to enhance learning experiences. She uses both PC and Mac computers daily and has attended and given sessions at the Mimili ICT Expo as well as attended other ICT workshops relating to software such as Clicker 5. She enjoys using ICT to enhance students’ learning experiences and motivate and engage them in their learning.

The class
Suria teaches a Middle primary class (Years 3, 4, 5). There are 14 students on the roll, with nine attending regularly. Students’ abilities range from very low literacy and numeracy levels to intermediate (ie the lowest level would be reception and the highest level would be Year 3 or 4). Attendance of some students is erratic, and a few students present with very challenging behaviours. Students have no ICT experiences at home and use the IWB in the classroom and programs such as PowerPoint and digital photography to present some of their work. The classroom has a newly installed IWB/projector and laptop. There are no computers in the classroom.

The project
TLF digital curriculum resource used
Wishball Tens

Activity
The Wishball tens activity involves learning in the areas of place value, addition, subtraction, counting on, patterning and grouping. Before attempting the Wishball tens activity, the students practised their skills in the areas mentioned above. This was done through giving the students concrete materials such as counters, tens and units and incorporating the activities with an IWB activity. For example, while working with computers and number lines on the floor, students would take turns to do the same activity using the IWB.

The students required a lot of support and help when completing the tasks, especially due to the range of their abilities. Photos were taken of the students working, and the teacher made a book for
them to read, including representations they had made of numbers using the concrete materials. This helped in recapping concepts at various times throughout the day.

When working with the class without an Aboriginal education worker, Suria tended not to use the IWB, as it was very difficult to keep all the students engaged and involved in the activity. Instead they practised skills already gained using concrete materials and worksheets such as addition and subtraction, counting on and patterning. Games were played both inside and outside the classroom, working in teams to get the right answers for counting on problems and using number lines drawn in chalk on the ground and various other games such as relays and so on.

Once the students became confident with skills in the areas mentioned above, the class started using the Wishball tens activity. At first, the students needed a lot of support and used concrete materials to help them problem solve. Some still needed support in deciding whether to subtract or add, whereas others mainly needed support with the actual addition or subtraction sum. After performing the activity several times, two students were able to work out the 'Wishball number' quite quickly and managed to get the target number in less than eight attempts. Students also experimented with calculators to problem solve, which they enjoyed.

**Results**

Overall, the Wishball activity was motivating and engaging. It was important for the students to have some materials to work with on the floor to maintain their interest and to support them to problem-solve the answer. The students worked well together, helping each other and working as a team. To cater for the range of abilities, splitting the class into two groups (if two teachers were available) meant that support materials could be differentiated for each group, which helped the students successfully participate in the activity.

Students enjoyed the activity and using the IWB, and often requested to play Wishball. Suria thought all students would be able to access and use the learning object, provided they learnt the skills needed before the game was played, otherwise it would be too daunting and students would not want to try it out. Support materials (when using the learning object activity) and leading-up activities were vital throughout the process. These contributed to success of the project, as did having two teachers working on the project together.

Suria expressed her willingness to use TLF content in the future. She believes it fits well into the curriculum, enhances student learning and helps identify students’ strengths and weaknesses.

Suria says that being involved in the project helped her reflect on her own teaching practice and helped her understand what knowledge and skills the students needed to acquire to be able to use the learning object. She felt it was important to identify the skills and understandings required to access, enjoy and complete the learning object.

Suria mentioned the importance of giving students explicit, regular experience in counting forwards and backwards, both in-decade/off-decade (10, 20, 30 ... and 26, 36, 46 ...) and century/off-century (100, 200, 300 ... and 146, 246, 346 ...). She found the students needed encouragement and to 'trust their head' when they were using Wishball as they got close to the target.

**Implications for consideration**

The students were successfully able to access the learning object and participate in the activity after careful planning and building up their skills in all the necessary areas.

Without this process, the students would not have felt confident attempting the task. Team teaching also helped manage the range of abilities. Suria emphasised the need to 'backwards plan' before using learning objects, as it is fundamental to understand what the students need to learn first to be able to access, participate in and enjoy the activity.

(Suria commented that her Aboriginal education worker did not feel confident using the Wishball learning object, because her own sense of number was not strong.)

Suria found that student engagement increased over the life of the project, with the stronger students taking on a peer tutoring role with less confident students.
Suria made effective use of her IWB, especially in conjunction with TLF digital curriculum resources, as a tool to present information, teach concepts and motivate students. She also found the combination of ‘ever-present’ hardware (IWB) along with digital content such as TLF to be a useful tool for probing and analysing students’ understanding of fundamental mathematical concepts and then responding to their needs.
Kenmore Park Anangu School

Context
Kenmore Park Community was established in 1975 when the South Australian Government bought the pastoral lease. In 1982, the community was incorporated in the Pitjantjatjara/Yankuytjatjara Land Rights Act. Kenmore is about 30 kilometres from the bigger centre of Ernabella, about 150 kilometres from the Stuart Highway.

The school
The school is located in attractive and well-established grounds. There is a main building comprising classroom and office space. The school is well-equipped with administrative and teaching resources. Staffing levels are a principal, two teachers, two Aboriginal education workers and an Anangu coordinator.

The students
Refer to general comments from start of the APY Lands schools section.

ICT at the school
The school has a well-equipped computer lab, with eight modern PC computers and a projector. There is no data projector in the project classroom, but all classrooms have an IWB. Support for computing resources is provided by a roving ICT support role.

Teacher participant: Sue Johnstone
Sue Johnstone, who has been teaching for more than 10 years, has been at Kenmore Park for three years. She has undertaken external postgraduate study in computer education through the University of South Australia.

Sue has an expectation that students will be able to work independently using the computers, with her role being to provide support when needed. Her approach values the opportunities afforded by whole-class explicit teaching, with a single computer connected to a projector and IWB, as well as use of a computer lab setting with a 1:1 ratio of computers to students.

Sue used a variety of teaching approaches, making use of the computer lab setting, as well as explicit classroom teaching using an IWB, addressing key mathematical concepts.

At the start of the project, Sue used explicit classroom teaching to introduce the students to key concepts of place value, with a lot of time spent explaining the task to the students and teaching them about the learning objects they would be working with.

Through verbal feedback arising from classroom discussion, Sue then gave the students opportunities to have a go at the process by themselves, in a supportive environment. She provided further explicit instruction to develop students’ understanding of key concepts, as required. Use of appropriate concrete manipulatives to model the concepts was a feature of this process.

The class
Sue’s current class at Kenmore Park is a primary/secondary class, ranging in ages 10–17 years (Years 5–11).

The project
Area of investigation
Sue trialled the use of Wishball tens and Wishball hundreds with her primary/secondary class. With students of a wide range of ages, Sue invested significant time and effort in scaffolding students’ development and acquisition of mathematical concepts that were fundamental to their meaningful participation in using Wishball tens and Wishball hundreds as a whole class, working in pairs and working independently.
During the scaffolding process, Sue allowed students to build up their conceptual knowledge of place value and trading between different place values using kinaesthetic experiences with concrete manipulatives, including popstick bundles, MAB blocks and place value cards. Reinforcing this approach was the development of interactive resources used on the IWB in the classroom.

Activity
Students were observed using *Wishball hundreds* in a computer lab/pod situation, with a high degree of independence. Even though the computers were only installed the day before, most students were confident navigating a new desktop interface and loading up the *Wishball* learning objects via the Moodle website. Sue has engendered a high degree of independence among students in using computing resources. Students were familiar with how to use the *Wishball* learning objects and were very quick to make decisions that were invariably the most strategic and efficient choices. To a visitor, the students were quite shy and not comfortable in explaining their strategy. With more time, the students would have been confident articulating the mathematical decisions they were making to complete the *Wishball* challenges so successfully.

A feature of Sue’s teaching methodology during the project was to craft whole-group interactions and shared understanding via oral discussion, with explicit teaching of key concepts at planned stages through the project.

Results
A range of digital photos of students using *Wishball* on individual computers was shown, along with annotated comments from interviews with students. A feature of the student comments was the gradual increase in a more sophisticated use of language, with more complex mathematical language being used later in the life of the project. With the development of an explicit shared language by Sue, comments from students indicated they were ‘in the game’ in terms of being able to talk about their mathematical thinking.

Student comments from July 2008
- it’s easy; a bit tricky;
- it’s annoying how the numbers go up and down as you are trying to get to the right number.
- it’s a little bit alright
- it is tricky

Student comments from September 2008
- with the 100s; it is easy for learning to see the target going up and down until it matches the same number
- it is good to get the column numbers matching with the target numbers
- it is good to see how the numbers go up and down to match for the target number
- it is easy with the column moving to see how it matches with the target number
- the challenge is tricky to get exactly the right number

During the project, Sue elicited verbal feedback from students, documenting how her students engaged with increasingly complex learning objects from the *Wishball* series. A key observation Sue made was how all students progressed from being unsure in using a computer and the learning objects to being quite independent and accomplished in using the interactive software. Sue said she noticed that once one or two students had figured out a strategy for finishing a game of *Wishball*, students would share the strategy by coaching each other.

A significant outcome of Sue’s project was demonstrating the engagement in students in their learning using exemplary content such as TLF’s *Wishball* series of learning objects. This affirmed the importance of students learning through the regular use of ICT resources, affirming her knowledge acquired from postgraduate study in this field.

Implications for consideration
The interface for students to access the learning object via Scootle is intuitive for remote Indigenous students. How to access tagged resources from the TLF repository via the Moodle was explicitly
taught to this group of students. The Scootle interface became available after the project had started, so a decision was made to continue access via the Moodle interface. The approach at Kenmore Park was to have a link from inside a Moodle environment, which made the authentication more manageable.

Primary/secondary-aged Kenmore Park students were observed using *Wishball hundreds* successfully. The students demonstrated significant intuition about what the next strategic action would be. When questioned about how they knew that their action was the right choice to make, students were shy about explaining their reasons. With their regular classroom teachers, students were more articulate in explaining their mathematical choices, and using more sophisticated mathematical language.
Mimili Anangu School

Context
Mimili is about 90 kilometres west of the Stuart Highway. The school is located centrally in a low-lying area of Mimili. The grounds are subject to flooding during extreme rain. A community swimming pool is sited next door. The school, with support from the community, enforce a strict ‘no school – no pool’ policy.

The school
The school is organised by typical stages of schooling, with multi-age classes – R–1, 2–3, 3–4–5–6, 7–8, 9–12, with each class having their own classroom, with access to the library.

Some of the staff are fairly young, in their first year of teaching, but there are also experienced, older teachers at the school who provide a good balance. A very committed and engaged staff support each other and work well as a team.

Staff include a principal, six teachers and six Aboriginal education workers.

The students
Refer to table of enrolment data at the beginning of the APY Lands schools section, along with general comments.

ICT at the school
A commitment has been made to provide a critical mass of computers in a central place (library), along with networked computers in each classroom (teacher laptop and several desktop computers). Each classroom has a data projector and a Promethean IWB.

Staff are typically ICT-savvy and willing to explore new ways of using different resources. The school has excellent ICT resources, such as Ideal Resources CDs of mathematics and literacy flash objects, which work well in an IWB setting. Staff support each other in devising flipcharts (IWB resources specific to Promethean boards).

Teacher participant: Corinne Pobke
Corinne Pobke, in her first year of teaching, is a confident ICT user, and is willing to adapt and develop IWB content to help her students make conceptual connections. During this project, Corinne drilled back to the basic conceptual building blocks to scaffold students’ understandings of place value.

Corinne participated in all professional learning opportunities available in the region, and took part in local training in the use of IWBs.

The class
The class was a large cross-aged group, from Years 3 to 6 with up to 22 students in the class. Students had a large range of abilities, with some students able to work independently and others requiring constant supervision and support to participate in daily tasks.

Peer support would be a useful strategy in the classroom, allowing older more confident students to assist others to complete tasks.
**The project**

**Area of investigation**

The key objective was to challenge students to explore the concept of place value through addition and subtraction. Using *Wishball*, students were challenged to reach the target number in 20 turns or fewer. The task is supported by visual cues, such as a number line, and a ‘tens and ones’ counting frame, which provide animations of the students’ choice.

Place value is an abstract Western concept that many Indigenous students struggle to grasp.

**TLF digital curriculum resources used**

*Wishball tens* (L8458) and *Number trains* (L2317), together with print resources and concrete manipulatives developed by Corinne including:

- number values (ie breaking 42 up into 40 + 2)
- rainbow facts (ie students colour in number facts that add to 10 – 1 + 10, 1 + 9, 2 + 8 … )
- number lines
- trading games with bundled popsticks and toothpicks,
- MAB blocks.

Corinne also developed flipcharts for each of these to reinforce essential maths skills for use on the IWB.

**Activity**

Corinne showed students the spinner and led them through the *Wishball* game process. She commented that she had to explain everything on the screen of the *Wishball* game interface (an example of user-interface friction).

Knowing that her students weren’t ‘in the game’ of being able to add numbers as required for the *Wishball* game, she invested time scaffolding students’ skills in naming of numbers and being able to ‘decompose and recombine numbers’ into tens and ones.

Along with class activities that required students to build to ten, she introduced trading games involving bundles of popsticks and finally MAB blocks. A key component of this was the developing of IWB flipcharts, so that the ideas could be reinforced incidentally throughout the school day. The fact that the flipcharts mirrored what was being done by students with the concrete manipulatives helped this reinforcement.

With students becoming more familiar with the notion of being able to trade in ten ones for a ten, ten tens for a hundred, students were able to play *Wishball* in a highly structured classroom.

**Results**

With a big class, and the ensuing diversity in abilities, Corinne said she found it challenging to engage the full range of students for an extended time. Small groups of two to three students would remain engaged when working with her Aboriginal education worker in a small group setting. She said *Wishball* was not as ‘graphically stimulating’ as other TLF digital curriculum resources she had seen.

Being an adept user of IWB software and having the confidence of creating her own content, Corinne would naturally fill any gaps she felt she would need to enable students to use TLF learning objects. She said that being involved in the project helped motivate her to constantly reflect on how she was using digital content, and what she could do to improve the accessibility for particular students in her class. She felt motivated to have a more detailed look through the TLF catalogue to harvest content she felt would suit her context, when time allowed.
Implications for consideration

With English as an additional language learners in mind, Corinne suggested including a simple vertical number line in Wishball, without showing students the different place value columns. The Wishball is spun, and students can see the number moving towards the target number.

Corinne observed that the number lines on Wishball were vertical, while most of the students' experiences involved horizontal number lines. She said some students had difficulty making the connection that they were representations of the same thing.

Other considerations include developing supporting content for mathematical concepts that the TLF learning object pre-supposed mastery of. Learning objects that replicated bundles and MAB blocks being exchanged would be useful.

She found that creating competition in the class was the 'hook' to get her students engaged. It was also important to invest in the 'pluralism' of concrete representations of mathematical ideas. Some students took considerable time and repeated experiences to make the connection that exchanging bundles was the same as exchanging MAB blocks.

Other recommendations included:
- using a character or theme to motivate students
- having an object such as a key for students that opens a door where a virtual prize can be won
- having an 'affirmation loop', where students receive some on-screen confirmation that they are correct, along with the capacity to graph their performance (either time taken or number of attempts needed) over time.
Derby District High School, Western Australia

Context
Derby is in the Kimberley region of Western Australia, 2,354 kilometres north of Perth and 260 kilometres north of Broome. It is located on the King Sound and has a population of about 4,000. Derby is famous for its high tides, which can reach over 11 metres. The area was settled from 1879 and became a centre for the pastoral industry. Its port was important for transporting sheep and cattle. Today, it has become a major centre for tourism, the third largest industry in the Kimberley region. Several mines closed in 2004 and this led to a reduction in Derby's non-Aboriginal population. Near Derby is Windjana Gorge, the place where Jandamarra and the Derby police played out a lengthy part of the frontier wars. Over 60 per cent of the population in the shire identifies as Indigenous. The greatest growth in age groups is that of young Indigenous people.

The school
Derby District High School caters for students from Kindergarten to Year 12. Students come from the town and from Aboriginal communities including Mowanjum and Pandanus Park. The senior school includes both VET (with the Kimberley TAFE College in Derby) and West Australian Certificate of Education courses. A number of subjects are taught through the School of Isolated and Distance Education. The school has developed ‘re-engagement’ programs, centred on sport. The school leadership places a high priority on a teacher taking a class for many subjects to develop stronger student–teacher relationships.

The school’s recently appointed principal is Indigenous. There are 42 teaching staff and 30 support staff. The administration team includes the principal and four deputy principals. Seven of the support staff and four of the teaching staff are Indigenous. The staff has a stable core group and a fairly regular turnover of young members: recent graduates who stay for two or three years. The principal thinks it is a ‘nice mix’ where the longer-term staff provide mentoring to the recent graduates, while giving stability to the school. One of the Aboriginal education officers is training to be a teacher through Curtin University.

The school is in the category that receives the highest level of supplementary resourcing, based on complexity.

The students
There are about 350 students in the Kindergarten and primary years and 170 students in the secondary years. The senior secondary school had 44 students in 2008.

Although, overall, there is a fairly stable population of students, there is a significant group whose members are ‘very transient’ and another group made up of ‘truant’. An Indigenous attendance officer has been working with the school for the last three years and there is ‘good inter-agency’ work in this area. Despite some recent increases in the attendance level, attendance is about 20 per cent below the state average. Attendance levels at Derby District High School are comparable with similar schools in the region.

A proportion of the students come some distance by bus from communities. The school runs a breakfast and an emergency lunch program. The students have among them those who ‘are traumatised’ and therefore behaviour management is a high priority. Fifty per cent or less of the students achieved at the appropriate benchmark in 2007 at the Western Australian Literacy and Numeracy Assessment (reading, writing, spelling and numeracy). Those students who exceed the benchmarks do so by a large margin. Student absenteeism affected the school’s overall results. The school's results are comparable with similar schools in the region.

There are no boarding facilities in Derby, so there is a ‘steady exodus’ from the school from Year 7 on, especially for the ‘more capable students’. This is described as particularly true for Indigenous girls and young women.
ICT at the school

Derby was a member of the 100 schools project and most classes have two or three desktop computers. The higher the year level, the lower the ratio per student. There are two secondary computer labs and one primary. There is also a computer pod in the library. The aim is to develop a 2:1 student computer ratio in the secondary school, 5:1 in the primary schools and 15:1 in the early years. All classrooms have access to the internet, while some of the classrooms are configured as a wireless network. Each room has five or six data points for both student and teacher use. IWBs are being introduced across the school, and there are digital cameras for each class. The school also has some multimedia equipment for the media programs taught in the school.

Most teachers have a notebook or laptop, and the use of ICT is actively promoted. A professional development program is ongoing.

ICT is described as being ‘for the long term in this school’. The staff reportedly range from ‘very capable’ to ‘very nervous’ ICT users. There will be renewed focus on building teacher capacity in 2009, along with making ‘sure the infrastructure is right’. Computer resources and internet access are more reliable than in recent years, which means the school is well placed to provide the professional development required to sustain teacher capability.

The school leadership believes ICT is good for Indigenous students’ learning because the students ‘love doing it’. It is also described as a way of ‘re-engaging them’. The ‘conventional teaching styles of the 50s don’t work’. ICT is ‘more child centred and motivates [the students]’. The school’s leadership believes that the students have more control when using ICT and that it also offers opportunities for peer tutoring.

Teacher participant: Rebecca McFayden

Rebecca began teaching in 1994 after three years of training. She has been teaching in Derby for eight years and before that taught in the wheat belt and the south of Western Australia. She usually teaches in the primary years but has some secondary experience. She completed a curriculum and ICT course as part of the 100 schools project and has a graduate certificate in ICT and teaching. Rebecca has always used ICT at Derby. She remembers using floppy discs and digital cameras to record student activities. She learned to use ICT while she was studying and has always had an interest in it. She believes that she uses ICT more than most other staff at the school. She has also attended TAFE courses to learn particular skills (for example, hyperlinks) and for her own productivity, for example to develop her planning documents. She has uploaded the content from the TLF DVD on the school intranet so that all teachers can access the materials. Rebecca uses the descriptors in the materials as part of her planning documentation.

Rebecca won a Highly Commended Teachers’ Innovative Online Learning Award in 2007, and examples of her programs can be accessed through Google. Her class also won a prize at the Mandurah Short Film Festival in 2008.

The project

Area of investigation

How effective is the learning object Building site in achieving its stated learning objectives when used by Indigenous students at Derby District High School in 2008?

Rebecca is an experienced user of digital materials from a number of sources, including TLF. She wanted to focus on consolidating her understanding of their usefulness with her Indigenous students. In particular, she wanted to find out if the learning object was sufficient on its own, or whether concrete activities were needed to support the learning. She believed that the students would enjoy the experience, as they have always enjoyed working with TLF digital curriculum resources.

The research focused closely on the students’ responses to the learning object and on recording evidence of the development of their capabilities to use the learning object.
TLF digital curriculum resource used
L7547 Building site

Activity
Rebecca's class is a mixed Year 4/5 with 20 students. Most of the students are Indigenous. Some have a diagnosed disability. The students have access to their class intranet page. Rebecca worked with the Year 4 teacher, who recorded observations of the students’ engagement and progress through the learning object. Rebecca created the observation sheet.

This program ran for eight weeks, for half-an-hour twice a week. Rebecca decided to run a pre- and post-test as part of the activity. The pre-test revealed problems in the students’ understanding of how to represent the shape of objects from different observation points. Rebecca took screen shots to assess the students’ progress on the computer, which had not been marked at the time of the consultant’s visit.

Rebecca assessed the students’ progress on three indicators:
- identifies objects from different views
- represents 3D objects on isometric dot paper, and
- constructs a 3D model from sketches of different views.

The learning object was introduced and demonstrated to the students on the IWB. It was introduced in as ‘non-threatening a manner as possible’: ‘don’t worry, you will learn how to use it’. The students then worked on the learning objects individually, and all the students’ observations were recorded.

The four levels in the learning object were suitable for the range of skill development in the class. Students worked at their own level.

The initial observations over two lessons showed a range of student responses. Some students worked quickly through the levels, while one student was observed re-doing level one several times. All the students demonstrated enthusiasm for the task, and some shared their discoveries with other class members. While some students were slow to engage initially, all of them showed concentrated effort. As an example, one Indigenous student voluntarily sought out the learning object before school, and then was observed demonstrating the learning object to her younger sister before school started for the day.

Rebecca’s observations of the students included:
- one student working persistently until the learning object showed the answer and then moving forward, and
- requests from students to go on using the learning object in their free time.

The interim assessment against the indicators showed that many of the students needed further opportunity to develop their understanding. Rebecca used the digital camera to record students building in real space using blocks on grids. She developed this activity to support the students’ understanding. The students’ enthusiasm was maintained during the period of the project.

Results
Rebecca believes that using the learning object engaged the students and encouraged collaboration and peer tutoring. She also believes that these are valuable skills in the classroom. Rebecca observed that the ‘students were talking all the time’ and were on task while they were doing this, another positive result of using the learning object.

Rebecca also found that the learning object on its own was not necessarily sufficient for students to be able to demonstrate the learning outcomes: ‘It’s how you use it’. She thinks there should be a lot of time devoted to introducing the topics when she is working with Indigenous students on new concepts. Rebecca has observed that the students ‘remember, enjoy and want to do more’ and thinks the learning objects are ‘great’. She believes that they are useful for consolidating learning, particularly when other activities are included in the learning program. She believes that for her students, they are not sufficient on their own.
Rebecca has observed that managing student behaviour is less necessary when they are working in the digital environment and sees this as a sign of real engagement in learning. She is convinced that the learning objects are a powerful source of engagement for her students, and has many examples of their benefit in other subject areas, for example studies of society and environment. She uses TLF learning objects and digital resources, as well as materials from other sources, and has found that her Indigenous students respond well to materials that include Indigenous content, ie ‘[when they see] their own culture reflected back’, although she says she has difficulty finding relevant resources that routinely meet this criteria.

**Teacher participant: Tracey Smith**

Tracey has been teaching at Derby for seven years. This school was her first appointment. It is her first year teaching a combined class of Year 2, 3 and 4 students. She has previously taught Year 3 and pre-primary and Year 1.

Tracey’s Year 2, 3 and 4 class is made up of students who have scored at a lower level using the school’s internal testing, or who are not yet regular school attendees, or who have not yet developed ‘school readiness behaviours’. Her class includes students with diagnosed disabilities. Twenty-one students were enrolled at the beginning of Term 1 in 2008. All of the students in this class are Indigenous. Between 14 and 16 students attend regularly, although sometimes it is less than this number. She works with two education support assistants in her class. The students have generally low levels of literacy, and she says they often come to school ‘tired and hungry’.

Tracey used an IWB in her classroom routinely in 2008; for example, all students mark their names on the roll using the IWB. Tracey says she has learned her skills on the job. She introduces all lessons with time on the IWB and works frequently with the class as a whole group, so the students can benefit from their peers and from teacher input. She believes that this approach has increased her students’ confidence and skill. She thinks that this approach also underpins the students’ development of ‘school readiness behaviours’. Generally, her class requires a ‘lot of repetition’ because they are not yet ‘retaining information well’. She also believes that she has observed real progress this year with some students, two of whom have moved into mainstream classes and two others who have improved two to three levels in reading skills. She views ICT as part of her wider teaching repertoire.

**The project**

**Area of investigation**

*Does using Number trains increase students’ motivation as well as increasing their understanding of number sequences?*

**TLF digital curriculum resources used**

L2318 Number trains

**Activity**

The pre-test showed that two of the 12 students present could recognise the number words.

Tracey used *Number trains* to begin each numeracy lesson for two weeks. With this exposure, the higher-ability children began to understand the concept, while the lower-ability students were not very interested in the learning object. Tracey developed other activities to help the students learn the names for numbers and the order of numbers.

After two weeks, the students ‘were sick of it’, so Tracey continued with the other number activities she had developed. She reintroduced *Number trains* after a further two weeks and worked with the students in pairs directly on the IWB. During the next two weeks, two students achieved level three using this process.

The students all returned to *Number trains* after the term break, and the students appeared happy to use the learning object again. Tracey could see progress in the students’ learning: the higher-ability students were beginning to read the words for most of the numbers, and the middle-to-higher-ability groups were able to complete the learning object with ‘minimal assistance’. It was at this point that
Tracey decided to introduce *Counting bugs* to the students, as an extension activity. She later returned to using *Number trains* and found that the students were happy to re-engage with the learning object.

Tracey kept anecdotal records for some of the students, which identified their strengths and weaknesses. Examples include:

- ‘has problems with before and after but can correctly place 8 before 9’
- ‘difficulty in reading words for numbers’
- ‘reached level 3’, and
- ‘works out where the number should go by counting blank spaces’.

Tracey also developed a number recognition test, which identified individual student skills in ordering and recognising numbers and in recognising the number of dots. A number of the children had to count dots after the numbers one to six while others counted some of the dots incorrectly. Some of the students could order the numbers between 10 and 20. Screen shots of students using the learning object showed the order of the moves the students made and showed that they could move the carriages backwards appropriately.

The final post-test was not completed at the time of the consultant’s visit in late Term 4, 2008.

**Results**

Tracey and her teacher assistants recorded the students using *Number trains* with a digital camera. The photographs show the students working directly on the IWB and the other class members generally paying attention. Apart from the students with a diagnosed disability, who have ‘a short attention span’, the students participated in the activity. Tracey could see progress and believes it was the higher-ability students who showed the most improvement. She thinks it is a good idea to start using TLF digital curriculum resources with the students early in their schooling.

The learning object is ‘colourful’ and ‘interactive’ and the students can ‘do it well’. Tracey observed students ‘gently correcting’ each other when using the learning object and thinks the materials support the students working together: ‘It is good to see the students helping each other and explaining to others how to do it’. The students use the Standard Australian English from the learning object, as they help each other ‘move the train along’. Tracey believes this is another benefit of using learning objects.

Using the learning object also helped Tracey identify the skills and concepts that needed to be taught in other ways so that the students could complete the learning object, for example using blocks to consolidate number.

Tracey will start using the learning object earlier in the 2009 teaching year and, in time, expects to see her students achieve at level five. She also expects to use more learning objects, ‘more often’.

**Implications for consideration**

The learning objects support student engagement.

The learning objects develop conceptual understanding, identify areas of weakness/misunderstanding and lead to more focused teaching, including the development of activities for specific learning purposes.

The activity supported tracking individual student progress.

Interactive learning is well received by Indigenous students.

Indigenous students respond well to content that reflects their culture and experience.

Learning objects develop students’ cooperative and language skills and provide them with opportunities to practise the protocols of classroom behaviour. And because the students are willing participants, these activities enhance their readiness for school.
Delroy Campus, Dubbo College, New South Wales

Context
Delroy is situated in Dubbo (population about 40,000) in central New South Wales. It is one product of an amalgamation of the three former government secondary schools in Dubbo in 2001. The school as a whole, Dubbo College, has a total enrolment of about 2,000 over three campuses: the senior campus (Years 10–12), and Dubbo South and Delroy, which both have Years 7–9 students.

Delroy is in the western part of the town, close to Dubbo West Public School and substantial areas of government housing. There are more affluent pockets nearby, but most of the school’s students are drawn from homes where unemployment and poverty are common.

The school
A secondary school has been on Delroy’s current site for 26 years. It has a Special Education Unit and is home base for the Regional Visiting Teacher Service for students with visual disabilities. It has 35 teaching staff with a non-teaching executive of three, 10 Indigenous support staff and four other professional support staff. The staff has been reasonably stable for some time with what is described as ‘a good mix’ of younger and more experienced teachers.

The students
It has a current (late 2008) enrolment of 487, down from around 650 in 2002. This decline in numbers reflects some demographic shift, but also additional competition from the three non-government schools in Dubbo. About half its enrolment (220) are Indigenous students. There is a fairly high degree of mobility (not the province of Indigenous students exclusively, but long associated with poverty). In the first two terms of 2008, 30 students left and 50 new ones arrived. Around 20 of the Indigenous students live, during term time, in a hostel nearby. Their homes are in more remote western NSW communities and they come to Dubbo for a secondary education.

Over the past few years, the school has made an effort to improve attendance, which is yielding results. At about 85 per cent, the average is only a few percentile points below the average for state government schools. Levels of transition from Year 9 (at Delroy) to Year 10 (at the senior campus) have also improved significantly in recent years. The senior campus has 35 Indigenous Year 12 students, up from 22 three years ago, making it unusually successful in national terms.

Literacy and numeracy test results are described as ‘going up and down’. The performance curve of the school’s students is more skewed towards the bottom end than state averages, with similar proportions in the middle groupings of ‘elementary’ and ‘proficient’, but lower levels of high performers and larger proportions in the ‘low’ category.

ICT at the school
The installation of IWBs in NSW Western Region schools has been a priority for some years and each classroom at Delroy has one. The school also has two computer labs along with 10 to 15 computers in the library. The principal said these were seen as another teaching tool to help engage students: ‘a great help with stimulus and engagement … the kids enjoy working with them very much’. There has been considerable training in the use of the whiteboards, along with intra-school mentoring processes. The numeracy and literacy support areas in the school have additional computers.

Teacher participant: Jacqueline Woodley
Jacquie has been teaching for just under 20 years. She is a teacher of mathematics, with several classes of lowest stream students as part of her teaching allotment.

She is very positive about the impact and educational value of using ICT in her classroom. She plays a key role in training of staff to use IWBs, at which she herself is extremely adept. She has intensive rather than long-term experience in teaching with ICT but, as she says, ‘teaching in Dubbo now means learning to use IWBs’. All her classes have one session scheduled in the computer lab each fortnight. She has made extensive use of the application Notebook, which she describes as ‘very versatile’ and into which she has embedded TLF digital curriculum resources. Most of her lessons, which often commence with maths games on the IWB, are built around this process. After spending a
good deal of her own time on research, she now has a substantial bank of resources that includes, for example, links to 16 different websites for her unit on angles. She accesses TLF materials from the NSW Department of Education and Training’s Teaching and Learning Exchange (TaLe) website, but she is familiar with a wide range of digital teaching resources.

The class with which she conducted this project was the bottom stream Year 7 group (7–6). They are aged between 12 and 13 but have limited abilities (assessed at stages one and two, somewhere around averaged Year 2–4 levels). Of the 17 students in the class initially, 13 are Indigenous. Four left the school during the year while others arrived, making mobility a significant factor in the operation of the class. It was unlikely that any of the students would have access to a computer anywhere but at school.

Attendance is variable, with a core of very good attenders and a number who attend only sporadically. Jacquie describes them as generally cooperative and mostly well behaved. ‘The issue is that they can’t, and don’t like to, write. They have long histories of not succeeding and have become used to it. They have the idea that they can’t and won’t be able to do things. So we generally start with things that they like doing: a game or two [focused on things like remembering numbers and number puzzles], and often TLF learning objects.’ She says this happens, like much else in the classroom, on the IWB. ‘Just about everything we do is done on the whiteboard.’

The IWB has pride of place in the front centre of the classroom. The computer, from which it is operated, is the only computer in the room. As noted above, this class has one session per fortnight in one of the school’s two computer labs.

The project

Area of investigation

What impact can the use of TLF learning objects have on the mathematical skills and understanding of Indigenous students with low levels of academic engagement and performance?

This topic was chosen because both the literacy and numeracy levels of students in this class were comparatively very low, and yet they had shown considerable interest in use of an IWB. A number of learning objects had been used with this class, and these had been received favourably.

TLF digital curriculum resources used

 Fraction fiddle series:
Shading parts of a fraction
Comparing parts of a fraction
Hit the apple, shoot the hoop
Balance the cups
Circus towers
Building bridges

Activity

The students were provided with six learning objects during single lessons over a period of about four months. In each case, there was a short but central pre-test to determine the state of their understanding of the content in the learning object. They were not provided with any support or instruction. Subsequently, an identical post-test was conducted to identify changes that might have occurred. Students were told that these tests were not related to their ‘normal’ assessment processes.

The tutor who often works in the class alongside Jacquie was assigned to observe student behaviour indicative of interest and engagement: volunteering to use the board, helping the person at the board, asking a question, answering a question correctly, explaining something to a classmate, applying effort to written work after the activity, and completing work on the new concept.

In addition, students completed a modified version of the TLF student survey after each activity to record how much they had enjoyed using the learning object and what else they felt about the experience and its results.
Results

*Fraction fiddle series*

*Shading parts of a fraction*

Eight Indigenous students in a class of 12 were present. The task was to indicate fractions by shading in the appropriate amount of various polygons, ranging from half a rectangle to three-fifths of a circle. ‘5’ indicates all correct, ‘0’ equals none correct.

Pre-test and post-test scores for the same individuals were as follows.

<table>
<thead>
<tr>
<th>Pre-test</th>
<th>Post-test</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>Five students improved their scores, one substantially. Self-assessed levels of confidence with the topic improved markedly for three students.</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
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<td>2</td>
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<td>4</td>
<td>5</td>
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<tr>
<td>0</td>
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</tbody>
</table>

Tutor’s written comment: ‘The Indigenous students absolutely loved the interactive activities. … They were able to stay engaged for a period of time into the written work which followed.’

The completed student surveys indicate a very high level of enjoyment and appreciation of the support that came from the object to help them learn when they were stuck or had made a mistake. On ‘good for learning’ and ‘made me want to learn’ questions, all students gave positive ratings and half gave the highest rating available.

*Fraction fiddle series*

*Comparing parts of a fraction*

Ten Indigenous students in a class of 14 were present. A student was leaving that day and it was an unsettled class. The task was to determine which of two fractions was larger. ‘4’ indicates all correct, ‘0’ equals none correct.

From the pre-test to the post-test, eight of the students improved (seven of these significantly) and two already knew how to compare fractions before the lesson. No student scored less on the post-test. Two of the students who showed improvement also reported more confidence in comparing fractions, both given a diagram and without a diagram and also in their understanding of the new concept.

Of the 14 students present, six wanted to use the board, eight offered suggestions, nine answered questions correctly, six asked questions during the activity, and nine completed written work on the new concept. The five other students in the class did attempt the written work, but had some difficulty.

The students reported that they found the learning object interesting and fun (10 out of 14 giving it the highest or second highest rating), easy to work through (7 of 14 gave it the highest rating) and really liked the animation, colour, pictures and sound (8 of 12). They also felt that this learning object was good for learning (8 of 13) and made them want to learn (7 out of 13).

Jacquie: ‘Both John (who recorded the data) and I felt that this learning object was not as successful as the first, but that the students enjoyed using it and learned the basic concepts from it.’

*Fraction fiddle series*

*Hit the apple, shoot the hoop*

Ten Indigenous students in a class of 14 were present. The task was to add fractions. ‘5’ indicates all correct, ‘0’ equals none correct.

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<thead>
<tr>
<th>Pre-test</th>
<th>Post-test</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Five students improved their scores. Self-assessed levels of confidence with</td>
</tr>
</tbody>
</table>
The observer noted that there were a high proportion of volunteers to use the whiteboard and all but two of the Indigenous students offered ideas to help the student at the IWB. Two actively helped a classmate get correct answers. All but one applied effort to subsequent written work. The observer’s summary comment: ‘The Indigenous students performed extremely well when asked for interaction and involvement.’

**Fraction fiddle series:**

**Balance the cups**

Levels 2 and 3 of the object would not load and thus the activity was not completed.

**Circus towers**

Four Indigenous students in a class of 8 were present. The task was to complete a number series with missing elements. A ‘hard’ question requiring a differing strategy was included in the tests. ‘5’ indicates all correct, ‘0’ equals none correct.

<table>
<thead>
<tr>
<th>Pre-test</th>
<th>Post-test</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0</td>
<td>0 4 4 0</td>
<td>Two students improved their scores, both substantially.</td>
</tr>
</tbody>
</table>

The pre-test indicated that none of the students, Indigenous or non-Indigenous, had any idea about how to answer questions related to tables of values. The students liked the graphics and sound effects, and the Indigenous students worked together to work out the answers. Between them they were able to get at least one correct answer to the material contained in the learning object. As the results indicate, two of the students got the underlying idea. There was less follow-up activity when the work became book-based. (‘It was the first day back after the holidays and quite difficult to convince the students to do written work.’)

Jacquie noted that: ‘This learning object is good, but for these lower-ability students it needs to have more intermediate steps (maybe going up to 15 levels?) rather than starting to skip steps quite as early.’
Building bridges

Eight Indigenous students in a class of 11 were present. The task was similar to those contained in Circus towers.

Each student completed the first (‘triangles’) task with minimal help, and several students worked on subsequent tasks (‘the squares and pentagons’), completing those tasks too.

Jacquie’s summary observations

- ‘It is obvious that the Indigenous (and non-Indigenous) students enjoy using the learning objects. They tend to interact positively with each other and are prepared to offer ideas and suggestions without fear of getting answers incorrect, which is a departure from their normal practice.’

- ‘When it came to completing a written follow-up work to consolidate their learning, the successful completion of the tasks in a learning object did not guarantee a reasonable effort.’

- ‘Despite that, using the objects in the computer lab with an opportunity for students to work individually proved to be the most successful form of delivery in that every student completes the whole task. In the classroom, the most keen and cooperative students are the ones most heavily involved in answering the bulk of the questions. Being in the lab helps keep students on track more.’

- ‘These students are prepared to attempt more difficult work than they would normally do when it is presented through a learning object. This was most evident when they were working on Building Bridges, which has some quite difficult concepts in its final section. Students discussed possible answers together.’

- ‘Keeping students engaged is a precondition for improving understanding and skills. The learning objects were helpful in gaining their attention for a game during the introduction to a new concept. It would seem that most of the Indigenous students picked up the required concepts to some degree after using the learning objects. Sometimes reminding them of a learning object after it was used could help with attempting an unfamiliar problem.’

Implications for consideration

These students and their life and school circumstances are typical of a significant proportion of Indigenous young people in Australia. It seems clear from this project that secondary students who need considerable help in accessing the content of secondary education given their literacy and numeracy skills can be supported in this regard by the use of learning objects.

As noted above, maintaining engagement is a precondition for improving understanding and skills. ‘Turning off’ because of a long history of failure and apparent incompetence will render acquiring new knowledge related to areas of previous failure unlikely. In this instance, the learning objects used have generally been able to overcome this problem and to engage young people who are otherwise quite disengaged from academic work.

IWBs are a comparatively cost-effective way of introducing digital learning to a classroom. Jacquie’s observation that they are possibly second best to use of individual computers conforms to the desire of software designers and others to enable learning to be self-paced.
Gillen Primary School, Northern Territory

The context
The location of Alice Springs in central Australia is well known. The town has a population of about 24,000, of whom about 15 per cent are Indigenous. In addition, there are 19 ‘town camps’, small communities made up of family members or members of the same language groups, primarily Arrernte, but at least five others as well, located on the fringes of the town. The camps have a very fluid population (30+ per cent highly mobile) but at any one time may have around 2,000 residents and visitors. One of the larger camps, Yarrenyty-Arltere or Larapinta, is located reasonably close to Gillen Primary School.

The school
Gillen Primary School is located in the south-western suburbs of Alice Springs. It is now almost 40 years old.

It has classes from Transition to Year 6 with a Pre-school close by. It also has a satellite school with a small enrolment in one of Alice Springs’ town camps and another campus servicing a community just out of town, along with an Indigenous Bridging Unit for up to 15 older students who come to the school with limited experience of schooling. This unit has Indigenous staff and is designed to assist students to settle into school and school processes.

Most of the school’s nine classes are composites, not as a matter of principle but because of the student numbers. There are 20 teaching staff across the whole school and its campuses, two of whom are Indigenous, and a large range of support staff including an accelerated literacy coordinator. The staff has been stable over several years with some, but limited, turnover. There is a wide mix of experience.

The students
Seventy per cent of the school’s 225 students are Indigenous. They are drawn mainly from the local area in the southern suburbs, but other students are enrolled because of the school’s reputation for catering well for Indigenous students. There is a comparatively low level of mobility, with about 10 per cent of students affected in this way. A high proportion of the students have Standard Australian English as a second dialect and somewhat fewer are learning English as an additional language. It also has 24 non-Indigenous students, who are learning English as an additional language. A large proportion of the students come from families whose income is largely derived from government welfare payments. Perhaps 30 per cent may have home access to computers.

ICT at the school
The school has a strong commitment to the educational use of ICT and at the time of the visit was engaged in a substantial upgrade of hardware, supported by a program of professional development and ‘a couple of real enthusiasts on the staff’. There are 20 new data projectors, along with two new IWBs. Each classroom has a varied number of computers and all networked. There are seven computers in a lab associated with the library. A part-time instructor working three half-days each week provides specific ICT lessons to Years 5 and 6 students.

Teacher participant: Mandy Thompson
Mandy completed her training in Queensland and is in her second year of teaching, both of them completed at Gillen. She is a ‘native user’ of ICT with considerable background experience. She finds that the ICT equipment she has in her classroom (a data projector and three computers) provides ‘a different way of looking at content’. ‘It’s very engaging for the kids, just something different, that offers a wider range of a sensory stimulus.’

Mandy’s class this year is the transition class, a group of 24 of whom 20 are Indigenous. There has been a turnover of five or six students during the year. About half have Standard Australian English as their first language. The rest are speakers of Aboriginal English, one or more Aboriginal languages, and some are speakers of Chinese and Indian languages. ‘English as an additional language learners need lots of visual stimulus, lots of demonstration and modelling and play-based activities.’ Most of the students have had a year of pre-school, although a couple from ‘out bush’ have
not. Attendance is an issue. About 10 students are very regular attenders, while others tend to come three or four times a week. She has several students from town camps who are not very enthusiastic about attending school; others get picked up by the school bus service.

In terms of skill levels, four are doing quite well, 10 are mid-range and the others are below average. In terms of literacy, mid-range indicates some management of phonics and an ability to copy writing. With numeracy, mid-range indicates an ability to count to 20 along with some very basic addition and subtraction. All the students have basic ICT skills and can use a range of standard applications. During the year, they had been involved in making a movie with a soundtrack. At home, if there are any kinds of interactive technologies, the children’s interests lie in the sorts of activities provided by PlayStation and Xbox.

**The project**

**Area of investigation**

*Can TLF learning objects improve Indigenous students’ engagement and confidence in mathematics, with a focus on those with English as a second language?*

Mandy has seven Indigenous English as an additional language students in her class. ‘They find listening hard, understandably, and they tend to just disengage. With literacy, they’re good and seem able to work and get benefit from what is happening. SOSE and science are okay too. But with maths, they wander from group to group and find it difficult to work cooperatively. During whole group maths sessions, their focus does not stay on task for very long. Therefore, they do not have a good understanding of these concepts. Because of this, they lack confidence in maths areas and look to the teacher for confirmation when counting and so on. They are hesitant in answering questions in whole group situations.’

‘I have found quite a lot of benefit from using *Count me in too*, but I’d like them to become more confident with maths. To be engaged. By the end of the year, I’d like them to be able to count effectively and accurately and to be able to identify number patterns. TLF materials provide another way to teach these concepts.’

**TLF digital curriculum resources used**

- L2378 Spinners: predict and test
- L2318 Number trains: 1–10
- L2003 Scale matters: ones
- L3511 Attribute blocks
- L3456 Spinners
- L1056 Monster choir: making patterns

**Activity**

Over a period of three months, one of the learning objects noted above was used as part of one maths session per week. The lessons began with a whole class introduction to the concept to be learnt. It also included some hands-on activities related to the learning object.

The learning objects were reviewed and chosen, with support from a colleague, for their suitability for the project. Mandy found that there were not a great many options pitched at the requisite very basic level, but sufficient for the purposes of the project.

**Results**

The target students were initially reticent to participate very actively. It took them three sessions to really understand what was going on. The ability to repeat usage was important. What follows are excerpts from Mandy’s lesson notes and observations and her assessments of the target students’ behaviour: a five-point engagement scale, a three-point question-asking frequency scale and a three-point understanding scale.

**Spinners**

A ‘race track’ was created on the carpet. Cars could move according to the fall of a dice, which was variously coloured so that the chances would be zero or equal. Students were asked to predict which
car had the greatest chance of winning. (This is the way in which the learning object being used in this class operates as well.) They readily understood ‘no chance of winning’, ‘a greater likelihood of winning’ (when the balance strongly favoured one colour) but had some difficulty with ‘equal chance’.

Three of the seven students were present. All were engaged, two asked questions and two understood the concept being communicated. ‘K still hasn’t got the concept of “more likely”, “less likely”.’

**Number trains**

1) Playing the card game ‘Concentration’ with the numbers 1 to 9 on cards, with other cards with matching words.

All those students were restless and ratty all morning. They found the concepts of ‘before’ and ‘after’ difficult when applied to numbers. But as a whole, the learning object was great for assessing students’ understanding of number words.

Four of the target students were present. They ‘seemed uninterested in the lesson’. Three asked questions sometimes; none demonstrated an understanding of the concept.

2) ‘The students displayed an excellent improvement in their understanding and participation compared with the last time we used this learning object. We talked about ‘before’ and ‘after’ and sorted numbers on our magnetic number board. If a student had trouble working out where a number would go, other students were encouraged to help. This worked well and was a great introduction to the learning object. As we used it, the students continued helping each other using these words.

Five of the students were present. All remained mostly focused and engaged for the entire activity. Three often asked questions and two sometimes asked questions; three demonstrated an understanding of the concept, and two did not.

3) We used a sequencing activity from *Count me in too* in the session immediately the day after, referring to what had been learnt via the learning object. The students enjoyed the activity and most were able to put numbers before or after a given number, so they were in order.

**Spinners**

We used a spinner with two colours on the faces and coin flipping. ‘A few students were able to tell me that both colours and sides of the coin had the same chance of winning because there was one of each of them. However, none of the target students were able to grasp this concept today. They remained focused during the activities but didn’t engage actively.

**Scale matters**

We made and played with ‘flip strips’, ordering single digit numbers.

The flip strips provided a strong support and easy access, and the students were able to see the ‘distance’ between numbers. However, because the *Scale matters* learning object went up to 20, it was too hard for most of the students, who couldn’t recognise numbers past 10. For these problems, we counted with the students as a whole class, pointing along the ruler with a laser pointer. This worked well.

Although the students remained focused and on task for most of the lesson, the target students had lost interest by the end because everyone was having a go at the learning object.

Six of the students were present, with five asking questions sometimes but only one coming to grips with the concept being taught.

**Attribute blocks**

Shapes: sorting similar and different.

Today’s lesson went very well. All of the students were engaged and participated throughout the entire lesson. By the end of the lesson, many were able to describe why the shapes in the hoop were...
the same and why a different shape didn't belong. The students did have a bit of trouble with size. While using the learning object, I did not pass the mouse around the circle as I had done previously with everyone having a go. I picked students who had been listening well. This worked much better, and the children stayed engaged and helped each other much more.

Six students were present, with four often asking questions and two sometimes asking questions. ‘Understanding’ was deemed to be satisfactory for all of them.

**Spinners**
Making and using a ‘spinner’ with two colours on the faces.

This lesson was great. The students were able to show me that they understood the element of chance in this situation. During the use of the learning object, I got the students to get a pencil of the colour that they thought would have most chance of winning. As I changed the spinner, they changed their pencils accordingly. In the end only a couple of students had the wrong colour, and that was because they liked that colour, nothing to do with chance.

Five students were present, and all were engaged, with two often asking questions and three sometimes asking questions. Four showed they understood what was going on, including K, who was able to articulate what he couldn’t before. The student who did not understand was attending only her second of these sessions.

**Monster choir**
Three-part number patterns. Firstly, head, nose, clap. Then the learning object, selecting three monsters. Then making a bracelet with three colours.

The students were able to apply the idea of a three-part pattern from the learning object to their bracelets. Some students needed a lot of teacher support. Some made two-part patterns and some made four or five-part patterns. I thought that E had missed the concept because he had orange followed by three pinks, but then when he brought it to me, I could see that he had repeated the pattern, which surprised me.

Five students were present, and all remained focused and engaged for the whole lesson. One asked a great many questions, three sometimes asked questions and one did not ask questions at all. Two developed a good level of understanding, one could create a two-part pattern and the others needed a good deal of help.

Following this experience, Mandy’s summary views of the impact of the use of the learning objects are as follows.

They provide another means of practice and reinforcement that caters for differing learning styles and stages. Ways in which you can use the materials (which she found to be multifaceted and multidimensional) are so open-ended that everyone can get something out of their use. They proved to be effective with this group of students in terms of improving their levels of engagement and involvement, although the students still have some distance to go with their skills with number and chance and data.

**Implications for consideration**
This project suggests the value of thoughtful and inventive scaffolding (prompted perhaps by the teaching ideas contained in the learning objects used) to develop comparatively high levels of engagement in otherwise difficult-to-engage students.
Goulburn Valley schools, Victoria

Several of the schools in this project are located in the Goulburn Valley in central Victoria, in or near its main city, Shepparton, about 190 kilometres north of Melbourne.

The population of the city at the last census was 44,600 but the surrounding area is closely settled, with another 25,000 residents in the municipality. Mooroopna, a few kilometres from Shepparton on the other, western, side of the Goulburn River has a population of more than 7,000. This density reflects the sorts of commercial activities in the area, with irrigation servicing what is sometimes referred to as Australia’s food bowl. The region is famous for its fresh and canned fruit, and dairying, vegetable growing and vineyards are other important rural activities.

Over the years, these agricultural enterprises have drawn a substantial multicultural population, with many people of southern European background settling there in the 1960s. More lately, there has been a substantial influx of immigrants from middle eastern and African countries.

This area has the largest Aboriginal population in Victoria outside the Melbourne metropolitan area. It was the site of one of the recent Council of Australian Government trials that focused on improving social, education and economic development for Indigenous communities.

The traditional owners of this country are the Yorta Yorta people, whose distinguished members include Sir Douglas Nicholls, Burnum Burnum, Eric Onus and Margaret Tucker. The Rumbulara Aboriginal Cooperative remains active in providing social and sporting services, but unemployment among the Aboriginal population remains significantly higher than that of the rest of the population.
Ardmona Primary School

Context
Ardmona is a closely settled rural area rather than a town, 14 kilometres west of Shepparton. The school, Preparatory to Year 6, is set among extensive orchards and an elegant series of buildings, some of which are as old as the school – 125 years. It is a small school currently with 43 students, seven of whom are Indigenous (one is a Torres Strait Islander). About 50 per cent of its students are supported by the Education Maintenance Allowance, indicating parents with low income, but the school serves students from a wide range of backgrounds – orchardists’ and orchard workers’ children and children of seasonal workers, but some students also come from Mooroopna (seven kilometres away) on a daily bus. In most cases, these are students who have been having difficulties in their previous schools. Ardmona provides an alternative setting that is able to provide more individually focused programs. All students have individual learning improvement programs.

The school
In 2008, the school had three classes: the largest, P–2 with 22 students (which usually has two teachers); the others, Years 3/4 and Years 5/6, both with 11 students. There is a good deal of cooperative interaction between the classes. ‘In a school this size and of this nature, it makes sense to share ownership and responsibility for the kids.’ One distinctive feature of the school is that all the teaching staff at the time of the visit were male – two recently graduated and one with seven years’ experience. The principal, who teaches during RFT time, is female. The school is provided with a staffing allocation for welfare support.

All three classrooms have IWBs. There are 11 computers in the 5/6 room and three in each of the others, as well as a set of 10 laptops, which are in regular use. ‘Everyone uses ICT a lot in their teaching. It’s become second nature really, embedded in all our work – an automatic consideration when we’re doing our planning.’

The students
About 50 per cent of the students have computers at home, probably used mainly for the internet and games. The site Bebo is popular. It was suggested that students make quite sophisticated use of this and other social networking sites as well as being ‘fairly competent users of ICT’.

Teacher participant: Adam Torney
Adam has been teaching for seven years, five of them at Ardmona. He has had long experience with ICT, getting his first computer in Year 10, which was about the same time that his school, also in rural Victoria, got its first bank of computers. He saw immediate personal value in computer use, noting that his marks for English went from a general ‘D’ standard to a ‘B’ or better during that year. In Years 11 and 12, he did specialised study in information processing and programming by correspondence. In his first year of tertiary study, he said, information technology was the only subject he passed. ‘I thought it was the only subject that truly made sense.’ Adam took a year off before returning to teacher training, when he took a particular interest in multimedia in the classroom. Like many other teachers interviewed for this project, despite his high level of involvement, he had a colleague from whom he claims to have learnt a lot.

During 2008, Adam was teaching the Prep–2 group, with some other particular responsibilities for student welfare.

The project
Area of investigation
Does the use of particular TLF content provide effective engagement for Indigenous students?

In terms of skills in literacy and numeracy, 2008 NAPLAN testing at Year 3 indicated that the proportion of students reaching the benchmark was around average while Year 5 results were less satisfactory. According to Adam, ‘engagement is the real issue.’ ‘Some of our students come to us with quite severe behavioural disorders, and we need to think really hard about suitable educational
programs that will interest and engage them. Attendance can be an issue, but productive engagement is more important to us.'

**TLF digital curriculum resources used**
A very wide variety of content was used consistently in each of the three grades.

**Activity**
The plan was to use relevant TLF content in Years 1–6 literacy and numeracy classes once per week, making relevant observations of the engagement levels of the school’s Indigenous students and documenting students’ response via a video production. The video was not completed at the time of the visit, although some footage that was viewed indicated very positive student response.

Two things happened at Ardmona, however. First, Samantha Fleming, the teacher primarily involved in the project, took maternity leave. Adam Torney took over, but there was some inevitable disjunction. Second, the school staff appreciated Scootle and TLF content to such a degree that the use of the material was taken up widely and not in the controlled way that might have been of more value to the project.

However, given the extensive role of ICT in the school’s program and the particular nature of the clientele, Adam’s reflections are of considerable value.

**Results**
'It’s quite clear that using ICT and the whole range of their capabilities, not just the straight up and down stuff, will do something for disengaged students, get them moving and keep them moving. Scootle and the digital curriculum content it provides access to [from TLF] are extremely practical ways of supporting disengaged learners. It’s exactly what we were looking for.

'I know it works. I’ve seen the switch countless times. Can’t read, won’t read. Get on the laptop, and they’re up and going. I’ve heard teachers worrying, “This won’t be the student’s own work. They’re just playing games.” But I think these sorts of comments need to be seen for what they are – deeply unconvincing. It may seem to the students that the work might be easier and more accessible, but I think that’s what we would want, isn’t it? I have followed the thinking of quite a few students of the sort we find challenging and it’s almost as though they are saying, “I don’t have to write it down but at least I can participate in what’s going on.” Straight away you have developed an avenue for some new learning to occur.’

Adam suggested these as the factors that were involved:

- The use of ICT and appropriate digital curriculum content increases the variety of teaching and learning procedures in which students can engage. In many cases, it is still out of the norm of classroom pedagogy.
- ICT and appropriate digital curriculum content have the capacity to engage a wider range of sensory stimuli than just working with pen and paper.
- Individuals who have trouble focusing in group activity can take control of their own work at their own pace when working individually on a computer.
- The degree of interactivity is important to maintain interest and engagement. Some digital content has the right sort and degree of interactivity, others do not. TLF content is generally good in this regard.
- Digital content that incorporates immediate feedback is good. This aids interactivity, but also connects action with response so that you know how well you are doing and if you are getting things right.
- ICT and appropriate digital curriculum content allows students with low self-esteem, among others, to become ‘experts’, and to feel confident and capable.
Mooroopna Park Primary School

Context
Mooroopna, as mentioned previously in this document, is a separate town, but a satellite nonetheless of Shepparton, offering cheaper housing and thus providing more consistently for a low socioeconomic group. It has grown very rapidly in the past two decades and is still doing so with the infusion of government housing and the ready availability of new areas for development.

The school
Mooroopna Park PS (Years P–6) is about 30 years old and one of three government primary schools in Mooroopna. It was built to serve a large government housing estate nearby and has had as many as 450 students. About 65 per cent of its students are eligible for the Education Maintenance Allowance. A substantial group of families have parents who are seasonal workers or unemployed in a time of rural downturn. There are a number of recent immigrant families as well. The core group of parents are very enthusiastic and supportive.

The school runs five classes, most of which in 2008 were composites. The P/1 group has two teachers. Among the staff are a 0.6 Koorie educator (the only male on staff) and a full-time welfare officer. The staff are an experienced group, and most teachers have been at the school for some time.

The students
Its current enrolment is 135, of whom 35 are Indigenous. Most students ‘struggle to beat the benchmark’ in NAPLAN testing, but the students are of a wide range of ability levels and some very capable students attend Mooroopna Park. Additional literacy and numeracy support is provided through a number of programs at the school. The Australian Government's Parents School Partnership Initiative (PSPI) provides some of these funds, indicative of at least some highly engaged Indigenous families.

There are some large attendance issues among the student group. Mobility rates are about 10–15 per cent per annum. Classroom behaviour is described as generally good, although there is sometimes considerable friction in the yard. Consistent engagement is the main concern. How is this described here? ‘Not wanting to come to school; not ready, willing and able to do school work; distracted; interfering with other kids.’

All the Koorie students have Individual Learning Plans.

ICT at the school
The school has a lab with 25 computers, and three IWBs, which are used extensively by teachers in those classrooms. In addition, each class can access four to five computers consistently. While there is a wide variety of skill and usage levels among the staff, as in all Victorian Government schools all teachers have laptops. The development and implementation of an ‘e-plan’ relating to the use of ICT in the school is matter of current priority.

Teacher participant: Christine James
Christine has been teaching for nine years, all at Mooroopna Park. She has had a longstanding interest in computers and the use of computers in the classroom. Her main uses are the standard ones: word processing, email, internet use and research. She is strongly supportive of the use of a wide range of ICT in the classroom. ‘ICT and TLF digital curriculum resources seem to be more intuitive and certainly engaging, and there's such a wide range of uses that we can put them to.‘ Few literacy sessions go by when Christine hasn't used ICT in one way or another. She gets ‘enormous value’ from the IWB in her classroom. ‘It has really lifted what we can do together. TLF materials come in very handy in that regard.'

Christine teaches a Year 5/6 group of around 30 students ‘with some real challenges' along with a wide ability range. Five students are commonly poor attenders. At the beginning of the year, she had seven Koorie students. Two left during the course of the project, and one new student arrived.
As mentioned, Christine has an IWB in her classroom and has recently had access to a set of 16 iPods, which students use for podcasting as part of a literacy support program. The classroom has two computers consistently available for student use, and access to six others shared with another class. As well, her class has timetabled use of the computer lab two or three times a week. This facility can be booked and used at other times.

**The project**

**Area of investigation**
Can TLF content assist in the development of mathematical understanding of number?

This topic was chosen because fractions were next in the class’s standard curricular sequence, and suitable digital content was available. The development of numeracy skills is also an area of general and consistent concern. Investigating and locating ways of effecting improvement are very valuable.

**TLF digital curriculum resources used**
Fraction Fiddle series
School Canteen series
Wishball series
(Digital materials from Nelson Education were also used.)

**Activity**
The project ran over a term. Digital curriculum content was used in most sessions to varying degrees. Detailed testing occurred at the beginning and at the end of the period. The results appear below.

Initially, the whole class was introduced to the concept of using the IWB. Students then worked in groups, with one group using the whiteboard, one using the computers (each group using the digital curriculum content), and one group working with concrete materials. Another group of more independent learners might be working on a range of other related activities.

Christine noted that she felt more computers were needed in the classroom for full effectiveness. ‘It is better to work individually or in pairs on materials like these. More actively engaged time.’
## Results

### Grade 6 Fractions screening test data Term 3 2008

| Identifies $\frac{1}{4}$ square | Identifies $\frac{1}{8}$ diamond | Whole fram half | Identifies $\frac{1}{3}$ of chocolate bar | Identifies $\frac{1}{6}$ of chocolate bar | Identifies $\frac{1}{2}$ of chocolate bar | Identifies $\frac{1}{2} + \frac{1}{3}$ of chocolate bar | Fractions between 4 & 5 | Stays cut pieces of ribbon | Match fraction wall in films | Mark fraction wall in tens | Marks 5/5 on number line | Marks 1 given 1/3 | Order fractions | Choose equivalent fraction | Simplify fractions | Choose 2 decimal & fraction | Matches 3 decimal & fraction | Choose 2 fraction | Matches 3 decimal & fraction | Matches 2 decimal & fraction | Matches 1 decimal | Matches 5 decimal | Matches 4 decimal | Matches 3 decimal | Matches 2 decimal | Matches 1 decimal | Choose 2 out of 3 | Total Achievement |
|-------------------------------|-------------------------------|----------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------|----------------|-------------------|-----------------|----------------|-------------------|-----------------|-----------------|---------------------|-----------------|-------------------|--------------------|-----------------|-------------------|-------------------|-----------------|-------------------|-------------------|-----------------|-------------------|
| Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | Rookie Student | 8 | 21 | 14 | 25 | 15 | 5 | 12 | 9 | 14 | 6 | 19 | 1 | 3 | 13 | 8 |
Grade 6 Fractions screening test data Term 4 2008

|                      | Identifies 1/4 square | Identifies 3/4 circle | Identifies 1/2 of chocolate bar | Identifies 1/3 + 1/4 of chocolate bar | Identifies fractional piece | Identifies 1/3 + 1/4 of ribbon | Mark fraction wall in tenths | Mark fraction wall in hundredths | Marks 2/3 of a number line accurately | Marks number between 0 & 1/3 | Marks 1 given 1/3 | Marks decimal & fraction 1/2 | Complete equivalent fraction | Simplifies fractions | Matches decimal & fraction 1/4 | Matches decimal & fraction 1/3 | Matches decimal & fraction 1/10 | Matches decimal & fraction 3/5 | Matches decimal & fraction 2/5 | Matches odd one out | Addition of fractions | Total Achievement |
|----------------------|-----------------------|-----------------------|---------------------------------|----------------------------------------|-------------------------------|-------------------------------|--------------------------------|----------------------------------|---------------------------------|-------------------------|----------------|-------------------------|------------------|-------------------|------------------|------------------------|------------------|-----------------------|----------------|---------------------|-----------------
| Koorie Student       | 14                    | 20                    | 3                               | 4                                      | 5                             | 6                             | 7                              | 8                                | 9                               | 10a                    | 10b                   | 11                           | 12a              | 12b              | 13                           | 14                      | 15                | 16                           | 17                      | 18                | 19                           | 20                      | 21                | 22                           | 23                      | 24                |
| Koorie Student       | 14                    | 20                    | 3                               | 4                                      | 5                             | 6                             | 7                              | 8                                | 9                               | 10a                    | 10b                   | 11                           | 12a              | 12b              | 13                           | 14                      | 15                | 16                           | 17                      | 18                | 19                           | 20                      | 21                | 22                           | 23                      | 24                |
| Koorie Student       | 14                    | 20                    | 3                               | 4                                      | 5                             | 6                             | 7                              | 8                                | 9                               | 10a                    | 10b                   | 11                           | 12a              | 12b              | 13                           | 14                      | 15                | 16                           | 17                      | 18                | 19                           | 20                      | 21                | 22                           | 23                      | 24                |
| Koorie Student       | 14                    | 20                    | 3                               | 4                                      | 5                             | 6                             | 7                              | 8                                | 9                               | 10a                    | 10b                   | 11                           | 12a              | 12b              | 13                           | 14                      | 15                | 16                           | 17                      | 18                | 19                           | 20                      | 21                | 22                           | 23                      | 24                |
| Koorie Student       | 14                    | 20                    | 3                               | 4                                      | 5                             | 6                             | 7                              | 8                                | 9                               | 10a                    | 10b                   | 11                           | 12a              | 12b              | 13                           | 14                      | 15                | 16                           | 17                      | 18                | 19                           | 20                      | 21                | 22                           | 23                      | 24                |

Using The Le@rning Federation digital curriculum resources to enhance the education of Indigenous students 66
These test results reveal very good gains across the board. The Koorie students are identified. As noted above, during the project period, two students left and a new student arrived. As a result, pre and post results are available for only four of the students. All four students made significant gains. During the project, the class as a whole moved from a mean of 12 correct items to 19.8, a gain of nearly 80 per cent. The four Koorie students began from a mean of seven correct items and moved to a mean of 16.6, a gain of just under 140 per cent, but significantly closer to the performance of the class as a whole.

These results didn’t surprise Christine. ‘They were pretty much what I would expect, although I couldn’t have got those results without the use of those materials. Working with digital content is such a powerful thing, especially for kids like ours. The strengths, I think, are the visual aspects and the way you can manipulate and control the content. That’s for students and teachers as well. You can often get at the same concept five or six different ways.’

‘The feedback is good too, and I like the way they allow for repetition and reinforcement. The kids don’t mind that. Whereas if they were doing it with pen and paper, they might not be so interested. I like the way [the objects] encourage the use of mathematical language – that’s a definite plus, and the kids get more confident because they feel they’re doing things well.

‘There’s a place in the classroom for all sorts of materials and teaching practice. You use what works. But I think, for today, digital materials are an important part of any teacher’s tool kit.’
St George's Road Primary School, Shepparton

Context
St George’s Road Primary School began its life as South Shepparton PS, but as Shepparton extended south, it was renamed. It services an area that includes a good deal of government housing. Members of Arabic-speaking communities have been recent arrivals in significant numbers to this area.

The school
This P–6 school has 20 classes, one of which is a composite. There are 20 classroom teachers, with a wide range in experience, and six teacher aides to support students with special needs and students of non-English-speaking background. It also has a student welfare position currently occupied by the deputy principal (Carmen Farrer), who teaches but doesn’t have a class. The school also has a Koorie educator.

The students
In 2008, the school had an enrolment of 430 students, with 68 Koorie students and 68 Arabic-speaking students, the latter group being predominantly Afghani or Iraqi. As suggested by the number of aides, the school has a significant number of students with various forms of disadvantage. About half of the students are eligible for the Education Maintenance Allowance, and many of the children are from single-parent families.

In terms of performance, student averages tend to be just under benchmark level, although the averaging process disguises considerable diversity in performance. Absenteeism is a problem, especially ‘long weekends’ with students being absent on Fridays.

ICT at the school
St George’s Road has a computer room with about 30 computers. Classes are timetabled for this room 45 minutes each week. In addition, there are two to four computers in each classroom and four IWBs. Educational use of ICT is encouraged through various programs of professional learning.

Teacher participants: Carmen Farrar/Marlene Charles
Carmen and Marlene worked together on this project.

Carmen has been teaching for about 30 years, mainly in the Shepparton area. She is currently in the position described above. She describes herself as a ‘normal’ user of ICT rather than an enthusiast. This means she has been using ICT for some time for both personal and professional purposes, and her skills have grown through interaction with more skilled staff members. This is the model of professional learning that has been adopted at St George’s Road.

Marlene is the Koorie educator at the school and has been working there for many years. She notes that St George’s Road has had a significant Koorie enrolment for many years and that it has a reputation in the community for ‘supporting our kids’. Her ICT skills are developing, and she sees it as the way of the future. ‘You’ve got to have those skills now, and most of our kids don’t have computers at home. So school’s the place it all has to happen.’

The students
The project has been adapted as a part of the Australian Government-funded Yachad Accelerated Learning Project (YALP), which operates at the school.

YALP is an ‘educational intervention pilot program aimed at raising the scholastic achievements of students in remote and rural locations in Australia, particularly those with a high proportion of academically low-achieving Indigenous students. It is based on whole of community educational approaches developed by the Hebrew University of Jerusalem. YALP has shown success and enthusiasm where its practices have been adopted by the schools. YALP is coordinated by an independent non-profit organisation, Yachad Accelerated Learning Project Ltd, based in Australia’ (www.yalp.org.au/whatisyalp.php).
Marlene and Carmen each withdraw a student with particular problems from class for half-an-hour for each of four days each week. The period of this project was two terms. Marlene’s student was from a Year 1/2 class and Carmen’s from a Year 5 class.

**The project**

**Area of investigation**

*Can the use of TLF materials help motivate Koorie students to improve their reading skills?*

This topic was chosen because of its congruence to the purposes of the Yachad project and its particular relevance to the issues of engagement and reading levels. Marlene’s student, in particular, had been traumatised by a series of personal tragedies, including the death of his mother and, despite the best efforts of his father, had remained withdrawn and detached socially and academically. Carmen’s student had missed a good deal of school through absenteeism.

**TLF digital curriculum resources used**

- Dragon’s jumble series
- Letter planet series
- My design series

**Activity**

As noted above, TLF digital curriculum resources were used as a component of a withdrawal program involving intensive tuition and support. In both cases, the program began with a reading process modelled on Reading Recovery processes and book levelling.

Following the reading period, TLF digital curriculum resources were used by the students working at a computer largely on their own. Various materials were trialled. The materials focused on literacy acquisition for students at risk and were chosen for their appropriateness to the students’ skill level. These students saw working with the digital curriculum resources as a reward.

**Results**

Carmen’s comments: ‘He just loves working with TLF material, all the activities and the interaction. They get him right in. I think it’s great because it makes learning possible for him and produces opportunities that don’t seem available otherwise. He gets his reading done and can’t wait to get to work on the computer. It is probably the game-likeness that he’s responding to, and I know it’s not quite correct to say that, but I think it’s true nonetheless. And if he’s learning, I’m just as pleased. I have seen a big shift in his motivation and his confidence levels have just shot up.’

Marlene’s experience: To the point of the visit, Marlene said she had seen little change in her student’s attitude or demeanour. During the visit, however, he sparked up for the first time and became interested and enthusiastic while using TLF digital curriculum resources. It is not known how long this change lasted for.
John Willcock College, Geraldton, Western Australia

Context
John Willcock College is in the regional city of Geraldton, in the mid-west region of Western Australia. The population of the city and its surrounding communities is about 35,000. About 4 per cent is made up of young Indigenous people. The Geraldton economy relies on fishing, farming, mining, transport, tourism and the services associated with these industries. Over three million tons of grain and ore are shipped annually from its port. Geraldton is located in Anangu country.

The school
John Willcock College caters for students in Years 8 and 9 in a middle school setting. The college was established in 2003 from the former middle school of Geraldton Secondary College. The college operates a sub-school structure. The site was redeveloped in 2003.

The college has a principal, three deputy principals and seven heads of learning areas, who are also sub-school leaders. The college has 40 classroom teachers (36.4 FTE) and 36 (26.0) school support staff. There are five Aboriginal and Islander education officers and two Indigenous Netball Academy development officers. There are 20 assistants or technicians on staff and a business manager. The college is also allied to the Clontarf Football Academy, and one Indigenous staff member works in this area. An Aboriginal worker from the District Office is based at the college. Twenty-two per cent of the teaching staff changed in 2007. The college runs a Family Links Program, with a school-based community liaison officer, as well as a Commonwealth literacy and numeracy program.

The school runs a number of programs designed to support student engagement, including the Follow the Dream program and the Tournament of Minds. Wajarri is one of the three languages taught at the college and is taught by an Indigenous teacher.

Selected Year 8 and 9 students work across the sub-schools and learning areas to assist in the implementation of the Notebook for Students project. The college was involved in the Schools Learning With ICT Project, which grew out of the original 100 schools project, and one of the statewide senior curriculum officers is now one of the deputies at the school.

The students
The college has about 620 students in any year. The students come from Geraldton, as well as from smaller towns in the locality. Some students come from the north of the state, up to and including the Kimberley. Some students board at the Geraldton Residential College, which caters for up to 120 students. Twenty-three per cent of the students are Indigenous. The student population has 54 different national backgrounds. There is a small Asian population at the school. Students with a disability are integrated into classes. Students from the full range of socioeconomic circumstances attend the college. However, about 51 per cent of young people from Geraldton are educated in local private schools.

Attendance is regular for most students at John Willcock College (82.5 per cent). Indigenous students have lower attendance rates at both Year 8 and Year 9, than non-Indigenous students (80.6 per cent: 86.97 per cent at Year 8 and 69.97 per cent: 81.90 per cent at Year 9). Unauthorised non-attendance is higher for Indigenous students than for non-Indigenous students. Transience among students has not been identified as a significant problem at the college, although a small number of new admission and school leavers occur each term. The rate of suspension is considerably higher for Indigenous students compared with non-Indigenous students.

ICT at the school
All students are provided with a Mac laptop as part of a Notebook project in WA state schools, and each sub-school has wireless connectivity. The deputy principal responsible for ICT in the school estimates that 95 per cent of staff can use ICT as part of their teaching program and believes that laptops are used at least 50 per cent of the time. In 2009, each teacher will further develop their own ICT action plan, intended to increase their capacity and use of ICT in their teaching. Staff will also use a DETWA self-evaluation guide, which will be integrated into performance management processes within the college. The deputy principal also runs sessions before, during and after school to support
The emphasis on cross-curriculum programming is supported by integrating ICT into teachers’ programs.

The college manages the lease of 700 student Macs and 35 staff loaned notebooks. The college also has 103 PC machines and 14 other Macintosh computers for use in multimedia. Staff and students access the intranet using Studywiz. The ICT committee would like to roll out IWBs into each of the sub-schools during 2008-09 if funding can be sourced. The independent evaluation of the Notebooks for Students project funded by DETWA found that computers play an important role in learning for most students, and that the use of laptops supports more student-centred approaches to learning. The evaluation also showed that the college ICT infrastructure operates well and that the professional development program has contributed significantly to teachers working with computers with their students.

The deputy principal established a group of volunteers to participate in this project, as part of the college’s priority to increase teacher capacity in the use of ICT in teaching and learning. The college signed on to the project, and the teachers had a day to access the range of learning objects and digital resources and to develop a plan for their action research project. A detailed project plan was submitted by two teachers, who planned to work together in their science classes, with a focus on understanding the impact of TLF digital curriculum resources on students motivation. Another teacher submitted a project plan, focused on whether TLF materials increased the level of classroom engagement and completed work. Another plan focused on whether TLF digital curriculum resources could assist in retaining students and increasing work output and attendance.

The deputy principal believes that there was an unforeseen barrier to the project operating as planned at the college: namely, the project content could not be time-matched with the mandated Schedule A requirements for curriculum delivery. The teachers found materials relevant to their course of study, but could not include them in their current delivery schedule as readily as they had hoped.

**Teacher participant: Kristi-Lee Bejah**

Kristi-Lee has taught at John Willcock for seven years and in Japan for two years before coming to Geraldton. Her background is in environmental science and biology and she has an honours degree in behavioural ecology. When training, she completed one unit on computing functions. She is undertaking her doctorate with a focus on ICT and science teaching. She believes that students learn through and with ICT. She was the first in the school to build web pages and work online with her students and believes she is now highly computer literate. She likes the way that ICT allows students to be self-paced and self-regulated, and uses ICT along with different approaches.

Kristi-Lee teaches three science classes. One is an extension class for Year 8 students identified as gifted and talented. Three of the 30 students identify as Indigenous. One of her Year 9 classes has one recent enrolment who is Indigenous. The other has four Indigenous students in a class of 25. Two of these students take part in the netball academy and another two take part in the football academy.

**The project**

**Area of investigation**

*How do learning objects impact on student motivation?*

**TLF digital curriculum resources used**

- L477 Wild ride: grip
- L481 Wild ride: gears
- Light and reflection series
Activity 1
Kristi-Lee used two learning objects as part of her study of friction with her Year 8 class. She chose the learning objects to fit with her existing teaching program. She also took into account the benchmark information she had about the students’ skills and achievement. The learning objects were included in the work program for the unit. Kristi-Lee’s main focus was to observe the students as they worked on the learning objects. She introduced the learning objects on the IWB, and then the students used them on their personal computers.

Results
In this class, Kristi-Lee had a student complete a sheet identifying positive and negative aspects of using Wild ride 1, 2 and 3. The student could describe what he had learned and thought that a positive was being able to experiment in Wild ride 3. The negative comments relate to his view that the instructions were not clear enough and that the animations were ‘a bit slow’ in Wild ride 3. Kristi-Lee observed two students in her Year 8 class using Wild ride: grip. She thought they were bored and ‘didn’t try to finish it’. The learning object was reinforcing a concept they said they already knew.

Kristi-Lee kept a running log when using Wild ride: gears with one of her Year 9 classes. She observed that all the students were engaged and were working silently. She also thought ‘they [didn’t] seem too excited by it’. The content on gears was new to the students, and Kristi-Lee observed that the students drew on their own bike-riding experiences when responding to the learning object. She thought the learning object was a useful reinforcement of ideas the students had already developed experientially.

The other Year 9 class responded to a questionnaire. The comments showed a range of responses, from ‘I liked it because I did not have to learn’ to ‘too much reading’ to ‘girls liked it because they didn’t know about bikes’.

Kristi-Lee observed that the students skimmed through the learning object. She thought the students engaged superficially with the learning object and approached working with it ‘as if it was a game’. She also thought the students did not connect the work they had done in class with the content of the learning object. Kristi-Lee believes that one of the barriers is that the students do not have the necessary scientific language, and while they could manipulate the learning object, they were not able to explain or describe the concepts.

Activity 2
Kristi-Lee used the Light and reflection series as an extension, following work on the topic that had already been done in class. Kristi-Lee took the same approach as previously: that is, she presented the learning object on the IWB and modelled its use, before the students worked with it on their laptops. Again, she relied on observation and teacher judgement in her assessment of their effectiveness.

Results
Kristi-Lee thought the students enjoyed working with the learning object, particularly as the students worked through until it was completed.

At the time of the consultant’s visit, Kristi-Lee was continuing to use learning objects in her teaching about friction. She was sure the students were engaging with the materials as they were ‘very verbal’ and appeared comfortable, but she had not yet formed a view about the extent to which the students were enquiring and engaging in the content.

In 2009, Kristi-Lee plans to use the learning objects when she is teaching Earth and Beyond. She thinks that TLF digital curriculum resources, from her existing experience, do support student engagement and that they help with student behaviour. She believes that the materials ‘calm down’ and ‘pacify’ the students; ‘keep them quiet’. Kristi-Lee said her involvement in the program made her think about her work and how to assess the benefit of using one thing (ie a learning object) to improve scientific literacy. She says she likes to place concepts in a historical and social context and is not yet sure how to use learning objects in this way.
**Teacher participant: Lauren Spedding**

Lauren has been teaching at John Willcock College for two years. This was her first teaching appointment, following her graduation. She completed a Bachelor in Business and completed one ICT unit as part of her Diploma in Education. Lauren worked in computer sales while she was training. She describes herself as a competent user of ICT and plans to use it more in the future.

**The project**

**Area of investigation**

*Do TLF materials increase students’ levels of classroom engagement and level of completed work?*

**TLF digital curriculum resources used**

- L4111 Mervyn Bishop: mission life
- L2712 Going to school: two regions of the world
- L683 The first golden age of cricket
- R8107 Footy legends: 2006 (film clip)

**Activity**

Lauren teaches studies of society and environment, and she and two colleagues planned to work together. Lauren placed the learning objects and other digital materials on Studywiz, so the students could access them on their laptops. She chose the materials on the basis of their relevance to her existing teaching program and was mindful of the benchmarks she had about their achievement in literacy. Lauren also wanted to use materials that would reflect the interests and experience of the Indigenous students in her classes. Lauren’s project was based on introducing, as part of her normal teaching, TLF content to the students. In the main, Lauren placed TLF digital curriculum resources on the class intranet and the students worked on them using their laptops. Lauren assessed the effectiveness of the learning objects by observation and teacher judgement.

Lauren chose digital learning materials on the basis of their relationship to the program and to the connection they could make to her students. She had no hesitation in looking beyond the age range of her students if she thought the materials were appropriate to their interests. She has used materials without audio, but prefers using learning objects with audio, as she thinks they support the students to engage, understand and complete their work.

**Results**

Lauren used the digital resource Mission Life with both of her Year 9 classes (which have 25 per cent of students from an Indigenous background) and thought the students were engaged and interested. She observed higher levels of class discussion and noticed in particular that one Indigenous student, ‘who loves the computers [and who has] very low levels of literacy’, participated and ‘did really well’. Lauren observed that the students, when using this and the other learning objects and film clips, would stay on task for longer and were self-starting: ‘they would get into the work quickly and move forward with their work’.

In the section of her program on present culture: sporting culture, Lauren decided to base her work on the digital resource *The first golden age of cricket*. She thought it ‘was excellent’ and the level of the object was appropriate for her class. She observed that the students stayed on task for whole lessons in this section of the course. She observed that female and male students were equally engaged in the work. She thinks the combination of audio and video, as well as the other components of the learning objects, kept the Indigenous students’ interest. Lauren developed work sheets as part of this section of her teaching program and found that the students made connections between the learning object and the other requirements of the program. She thought the students were able to relate to the content well and observed that the Indigenous students were taking a leadership role in the class, sharing their knowledge of skin groups with their classmates.
Macleay Vocational College, Kempsey South, New South Wales

Context
Macleay Vocational College takes its name from the river that runs through Kempsey and its district. Kempsey is a town of about 11,000, set in a rapidly growing district on the NSW coast 430 kilometres north of Sydney. For many reasons, some distressing, it is a significant site in Australia’s Indigenous history. The area recorded the highest ‘no’ vote in Australia on the item in the 1967 referendum regarding Indigenous peoples’ rights as citizens. It is also the site of the first successful land claim made under Native Title (the Dunghutti people at Crescent Head). About one-third of the population in the area is Indigenous.

The school
The college evolved out of a project sponsored by the Dusseldorp Corporation called TRAC, (Training in Retail and Commerce), which was focused on increasing the number and proportion of young Indigenous people engaged in those activities. As the name suggests, the program had a strong focus on vocational education and training (VET). In 1999, the NSW Department of Education made a decision to incorporate VET within conventional secondary schooling. Locally, there was some community opposition to this change in arrangements. A group wanted to support the existence of an independent institution to continue the work which had commenced through TRAC. An incorporated association, the Macleay Valley Workplace Learning Centre Inc., was established as a registered training organisation to supervise and support the completion of work begun under the project. In 2000, this group registered a senior college following pressure to set up programs suitable for Years 11 and 12 equivalent ‘at risk’ adolescents. In 2001, Stage 5 students (Years 9 and 10) were also enrolled. Funding for the college comes primarily from the Australian Government as a ‘Special Assistance School’, reflecting the highly disadvantaged nature of its clients. There are nine staff, four of whom are full-time.

No class has more than 15 students. There are two of these at Year 9 and one at Year 10. This is one Year 11 class which has two elective lines. A core of subjects is taught: English, Maths, Science, Geography/History, Design and Technology, Visual Arts, PDHPE and Computers. Aboriginal Studies and Legal Studies are among the electives offered. A vocational HSC is offered which includes regular time spent in various workplaces. This may be linked to part-time traineeships. It is the proud boast of the school that everyone who completes their HSC there has gone on to a job or further training.

The students
At the time of the visit (November 2008), the enrolment was 72, a figure which fluctuates considerably. Eighty per cent of the students were Indigenous, and more than one-quarter were in their first year at the school. These are students who have had high levels of difficulty in other settings, in some cases leading to expulsion or long-term suspensions. There are a number also returning to some sort of formal learning after being involved with the juvenile justice system, or using enrolment at the school as ‘a last chance’.

ICT at the school
The school buildings are demountable classrooms and offices but very well kept and maintained. There are 22 desktop computers in the classrooms (all of which have data points); another three ‘computer’ rooms have 8–10 machines in them, and the library has eight. There is one IWB which was not in use at the time of the visit. Some of the staff are experienced computer users; all are sympathetic to the educational uses of ICT. The staff as a group spends regular weekly time upgrading skills.

Teacher participant: Tom Degens
Tom has taught for more than 20 years in wide range of settings. He bought his first computer not long after he began teaching and has used ICT extensively ever since. At the time of the visit, he was at work on a five-year ICT plan for the school. This plan will see more extensive access available to students than at present. Networking arrangements during 2008 had been problematic at times, along with some hardware issues and slow internet speed.
Tom teaches Maths, Science, Design and Technology and Work Studies across the school. He thought that attendance was around 30 each day, with regular attendance from 15–20 of the students. Perhaps 30–40 per cent would have access to a computer at home. Most, but not all, have low to very low basic skill levels. He suggested that as a rule the attention spans of the students he taught were quite short, necessitating regular shifts of activity and focus.

The project

Area of investigation
Can the use of TLF content increase engagement and produce higher levels of understanding with disengaged secondary-aged Indigenous students?

This topic was chosen because of the nature of the students that Tom was working with. He was looking for greater variety among learning activities and differing sorts of stimulus for students whose past school experience had not been successful and whose attitudes to schooling were generally negative.

TLF digital curriculum resources used
A wide range of TLF material was used across the subjects Tom was teaching.

Year 10 Cross-curricular project: ‘Waste as art’ (maths, science, literacy, numeracy and design)
L927 Down to earth metals: investigating the properties and uses of metals
Your rubbish pile: reduce your rubbish
L1031 Area studies: SOSE

Digital resources: examples of sculptures using unusual source materials
R4502  Metal sculpture
R6470  Pisupo lua afe (corned beef)
R6466  Asiasi II

Year 9 Maths: trigonometry
L55  River currents
L79  Speed and direction
L6561  Exploring trigonometry
L2326ff  Trigonometry series

Year 9 Science: the body
L717ff  Body parts series
L732ff  Aches and pains series
L2852  Character maker: movement

Year 9 Work education: issues in the workplace
Digital curriculum resources on bullying and first aid were chosen. Film clips found among the latter were particularly useful.

Activity
Tom reviewed the range of TLF digital curriculum resources available for these purposes and made choices according to the nature of the topic, his understanding of the skill levels of his students and the perceived attractiveness and relevance of the material.

The general pattern of the classes was to provide an activity to introduce the topic and the key ideas, followed by working through and learning useful vocabulary which might be encountered along with any relevant numeracy content. Commonly, guided class discussion would follow to help build some sense of engagement with the content. TLF digital curriculum resources would then be used with students working individually at computers guided by the teacher and worksheets. The cross-
curricular project also involved considerable hands-on work with materials as the students created their own sculptures out of waste materials.

**Results**
The students completed a survey after about two months of working with TLF digital curriculum resources. Eleven Indigenous students provided responses. Nine thought it was a good way to learn, the same number preferring it to using work sheets. Five thought they would use them at home given the resources to do so. Ten thought the materials were easily understood and helpful to their learning.

Tom was very positive about the use of TLF digital curriculum resources in this situation. 'It suits us down to the ground. The kids just ate it up.' Ease of access to a wide range of suitable material was important to him, and TLF material was excellent in this regard. 'I also like the fact that they are so pointed and intensive. This is very important for kids who tend to drift off pretty easily. Using the objects holds their attention.'

'It’s something they would choose to do. The kids love being on the computers. They like Bebo and chat rooms and games, but this is a chance to really get something out of it that is effective for their learning. The trigonometry, for example, is something I would have had trouble interesting them in without different sorts of resources. They still find it hard but they are willing to go back over things they haven’t understood until they get a right answer.'

'They get everything going, turn up the sound and try all the rollovers, click on everything. They don’t necessarily follow them through in the same way or in the way they might be intended, but they work their way through them.'

'They like the feedback they get and are quite happy to repeat examples and tasks in a way they wouldn’t if they were working with a pen and paper. It is also very helpful working with classes that have floating populations. They can go back to where they got up to without disrupting the progress of the class. There’s always something useful for them to do.'

'In terms of effect, I find they [learning objects] produce a higher level of recall as long as there is something to prompt their thinking. This was the most significant change – the retention of knowledge in students’ memories.'

'This gear is made for our situation. The project has just helped us to explore it a bit further and it has been a great introduction. But we’ll just go on from here and use it much more extensively.'

**Implications for consideration**
Finding suitable curriculums for students like those at Macleay is a significant challenge. By definition, they haven’t enjoyed school and what happens there very much and are thus difficult to teach in conventional ways. TLF digital curriculum resources have been most beneficial in supporting the teaching of mainstream as well as other content.
Middle Swan Primary School, Middle Swan, Western Australia

Context
Middle Swan Primary School is located in the eastern Perth suburb of Stratton, in the centre of the Swan Valley area. Of the residents, 34 per cent are less than 19 years old. About a quarter of the properties in the area are rental. The rest are privately owned and occupied. Stratton is mostly residential. The Middle Swan area also has some industry, most notably brickworks, and is known for Swan Valley wineries.

The school
The school was established at its current site 18 years ago. At its peak enrolment period, it had 900 students. The school population is expected to plateau, as the number of families with young children is declining. The population profile is changing. There are now more lower socioeconomic status families than previously. There are two non-Indigenous and one Indigenous playgroups run at the school site. The school offers a breakfast club two days a week and is planning to increase the number of days in 2009. The school used to host an Education Support Centre in its past.

The school has a principal and three deputy principals, 47 teaching staff and 18 education assistants. There are two Aboriginal and Islander education officers. A chaplain is also at the school two days a week. One of the deputy principals is funded through the state program for behaviour management, and the school has a priority focus on attendance and behaviour management.

The school tracks transience as part of a cluster school approach to attendance and retention. There is some degree of transience, with students mostly moving interstate. Attendance is on a par with like schools, and the levels of attendance for Indigenous students are above the state average.

The school has three specialist literacy and numeracy teachers (funded by both the state and the school). The school has received national awards for its work in literacy and numeracy. It was one of the top three schools for innovation in Western Australia and received an award in 2008 as one of the ‘leading schools in the use of Smartboards’. One of the teachers was the Microsoft Teacher of the Year in 2008.

The students
There were 610 students enrolled at the school in 2008. Of the students at the school, 19 per cent are Indigenous. This proportion will grow, as there has been a steady increase in the numbers of Indigenous students enrolling in the early years.

Literacy and numeracy benchmarks match with like schools. When students are tracked longitudinally, the school performs above the state average in improved student performance between Years 3 and 5.

The students are in multi-age groupings throughout the school. This is done to provide opportunities for peer tutoring and to sustain student/teacher relationships.

ICT at the school
All of the school’s 26 classes have access to an IWB: each block of four classes has access to three IWBs. ICT has been a priority for expenditure in the last four years.

Most teachers want to use ICT and do so. The students ‘love it’, and students are encouraged to help the teachers use them.

There are no computer laboratories in the school. All the student computers are in classrooms. There are five or six in each room, and their use is integrated into teaching programs. The school’s philosophy is to integrate the use of ICT through the learning areas. This work is led by an ICT coordinator, and the focus area for 2008 was science.

Most students have access to ICT outside of school: ‘A fair percentage of students would access computers. More would access Foxtel’.
The school’s approach is to ‘build capacity within the school’. The school aims to develop shared leadership and sets up mentoring opportunities within the staff, rather than use ‘outside experts’. Sharing sessions are part of the professional learning program, where teachers describe what they have been doing and using in classrooms. All materials are on the school’s intranet, which supports sharing of resources and learning: ‘a lot of sharing goes on’.

Teacher participant: Judith Pescodd
Judith is in her sixth year of teaching. She worked with Indigenous students for the first six months of her teaching career, has taught at primary schools with high Indigenous enrolments and has taught overseas as well.

She describes herself as self-taught in ICT and computers and worked with the ICT coordinator to develop her IWB skills. She says her capacities ‘started snowballing’ and now she uses the computers and IWB in her classroom routinely.

All the students in Judith’s class can log in to the shared drive and access their own student folders. This allows for access to ICT, which has expanded their uses for learning. She wants the students to develop their ICT skills in a purposeful context. She believes that there is a gap between her students’ access and ICT capabilities, when compared to students who have access to computers and the internet at home.

Judith has been specialising in science for the last two years. She is one of the facilitators for Primary Connections in Western Australia and has trialled science materials incorporating Indigenous perspectives. She has also made a DVD with two other schools on this topic, and the DVD was shown at the World Indigenous Peoples Education Conference in December 2008.

The project
Area of investigation
Can I integrate the use of TLF digital content into teaching and learning programs in the areas of numeracy, science and literacy? How do they benefit my Year 6 Indigenous students?

Judith teaches a Year 6/7 class, and four of the Year 6 students are Indigenous. These students were the focus of her project. Judith worked in three different learning areas, numeracy, science and literacy, in the fourth term of 2008.

Numeracy

TLF digital curriculum resources used
L871 Wishball challenge: numbers
L8457 Wishball challenge: hundreds
L8459 Wishball challenge: tens

Activity
Judith integrated the Wishball series into her mathematics rotations. The whole class used Wishball on the stand-alone computers, while the target group of students used the IWB. One of the purposes of using Wishball was to identify students’ strengths and weakness at a detailed level. These students did not have a strong understanding of place value and basic number facts.

The learning objects were also used to reinforce work done previously in concrete ways in class.
Results
Judith found that these learning objects were popular with all the students. She was able to work specifically with the small group of targeted students to assess their areas of understanding and ‘address these immediately at the point of need’. She found that the targeted students were ‘interested and keen’ and worked with ‘sustained attention’ on the task at hand. One of the Indigenous students who was described as ‘reluctant’ is now eager to use Wishball. Judith believes that these students now have a better understanding of decimals as a result of working with Wishball.

Judith expects to continue to use the Wishball series with these students when they move to Year 7. She believes that using the learning objects provided the students with opportunities to develop their skills, including working with ICT, and to do so in a supportive class environment.

Science

TLF digital curriculum resources used
L1184 Fair test: growing peas
L1185 Fair test: growing tomatoes

Activity
Judith chose these learning objects because she thought the students needed reinforcement and scaffolding in the Investigating Scientifically strand of the Primary Connections framework. This program uses a multi-sensory approach to learning. The majority of students in the class perform at or below the science benchmarks and Judith believes that a lot of repetition, reinforcement and scaffolding are needed to support student learning. She is trying to get all her students to level three against the benchmarks. She used the learning objects in conjunction with the Post-It Note Investigation Planner, as part of science rotations. Judith wanted to make the connections between the planned process and the learning object in an integrated way. The planner required the students to define their investigation, represent what the investigation would look like, list what they needed, answer questions about the process of their investigation and predict the outcomes of the investigation and the reasons for them. A model of a table for recording results was also offered to the students, although they could choose another way to do so if they wished. The Indigenous students completed their planning and recording their observations working with the learning object. One of them completed her own evaluation of the investigation as well.

Judith modelled the activity on the IWB to all the students and they then worked in pairs on the stand-alone computers to conduct the investigation and to record their results. After the first rotation, Judith realised that the students required more assistance in understanding the learning object and in recording their results.

Results
Judith observed that having the students engage in multi-sensory activities provided through a learning object increased these students’ application to their written tasks. She was pleased that by constructing the work in this way, she could link science and literacy curriculum intentions and provide opportunities for students to further develop their collaborative skills.

On reflection, Judith believes that she should have spent more time at the beginning of the program teaching the language of the learning object, for example words such as ‘germinate’ and ‘nitrogen’. She thinks this is particularly true when scaffolding the learning for the Indigenous students in her class. She plans to use a ‘word wall’ before using these learning objects again. She may also use them in the Life and Living strand of the curriculum. She believes that using learning objects is not ‘cut and dried’, and that she can continue to use them in better ways.
Using The Le@rning Federation digital curriculum resources to enhance the education of Indigenous students 80

**Literacy**

**TLF digital curriculum resources used**
R6841 Bip the snapping bungaroo

**Activity**
This activity was directed at three strands in literacy: reading, viewing and writing. The Indigenous students are achieving below the literacy benchmarks. Judith also chose this activity because she wants to increase the amount of content that relates to the background and experience of the Indigenous students in her class. She found that this digital resource relates to the Noongar group in Western Australia and so then found copies of the story in book form as well to use as the basis for a seven-week series of lessons. Judith placed the series of lessons and activities on the IWB at the beginning of the program.

Judith grouped her ‘weaker’ students together and worked with them using guided reading processes, while the other groups worked cooperatively. These students also worked with the Aboriginal and Islander education officer on the IWB.

Judith first showed the film on the IWB and the students had a class discussion about it. This gave Judith the opportunity to gauge the students’ level of understanding, as well as giving the students the opportunity to use and develop their oral skills.

The series of activities included a viewing activity, work on adjectives, characters, comparing the book to the film and developing a Venn diagram to display similarities and differences, and creative writing, including developing the ‘next chapter’ of the story. Judith also established links to books in the school library. She plans to include a local elder in further developing this series of activities in 2009. She also plans to use *Edward the emu* to work on art and representation.

**Results**
Judith observed that the students who were usually reluctant to read and participate in literacy lessons engaged with both the digital and paper texts. One Indigenous student (an English as an additional language learner) who performs well below the benchmarks achieved some success in his learning. Judith attributes this to the opportunities provided by the digital environment for him to work hands-on and collaboratively with his peers.

Students could view the story before all the activities and could discuss the story afterwards. Judith thinks that working with both digital and paper texts gave students the opportunity to work with both visual and verbal presentation, and that this supported them in developing their literacy skills. She also thinks that this methodology, including making sure that each activity was scaffolded, supported students’ confidence and their collaborative skills. The students sought out the book after viewing the interactive text on the stand-alone computers.

**Summary**
Although it was too short a time to assess learning progress against formal indicators, for example benchmarks, the project has confirmed for Judith that integrating TLF digital curriculum resources into her teaching program has already shown benefits. She plans to incorporate more digital content and thinks it is now much more productive when used with the IWB.

Judith has observed that her students, including her Indigenous class members, have improved their attitude to learning since using the programs that included TLF digital curriculum resources. She wants to continue and expand her use of the materials in her teaching, and in particular use them to raise her students’ achievement through being able to identify skills and understandings that need development. She also wants to expand her use of the materials to reinforce and scaffold skill development. Judith has found that one of the advantages of using the learning objects has been that she can assess student skills: ‘I can really see what they can do’.

Judith plans to put her programs on the intranet for other staff members to access.
Judith firmly believes that it is up to the teacher to determine the way digital curriculum resources are used. She does not believe that the TFL digital curriculum resources can be used ‘like a game, on a stand-alone computer’ for students who are not achieving at or beyond the benchmark. She thinks these students need a ‘lot of scaffolding and modelling’ and that the digital curriculum resources must be integrated into the learning areas. She sees them as a powerful tool, whether they are used on IWBs or stand-alone computers.

Implications for consideration
The learning objects support student engagement, and for these students there were indications that integrating the digital curriculum resources into a work program increased their willingness to learn.

The learning objects identify areas of weakness/misunderstanding and lead to direct intervention with the small group of students.

Indigenous students respond well to content that reflects their culture and experience.

The ICT context and teacher skill and interest determine the extent to which the digital curriculum resources can be used well for Indigenous and other students.
Narromine Public School, Narromine, New South Wales

Context
Narromine is a town of 3,500 on the Macquarie River, 40 kilometres west of Dubbo in central New South Wales. It is located in an agricultural area which, in good years, is rich and highly productive, with wheat, cotton, citrus, cattle, fat lambs, corn, barley, oats, sorghum and lucerne among the products produced by farms that surround the town.

The school
This long-established school has 13 parallel and four composite ‘home’ classes across K to Year 6. It streams for numeracy learning. In 2007, gender-based classes were established in Year 6 to address students learning needs in literacy. Reading Recovery, Jolly Phonics, Count Me in Too and Counting On are some of the programs in operation at the school provided for that purpose and to support levels of numeracy performance.

It has four executive staff, 14 classroom teachers, four professional support staff and four Aboriginal education assistants, as well as eight part-time teacher aides. The group of staff is highly stable; they have generally been teaching for some time and in this area.

The students
Enrolment has been about 400 for some time. Nearly 40 per cent of that enrolment currently consists of Indigenous students. Four in-class tutors are employed part-time to support these students’ literacy and numeracy skills. The school also has a homework centre.

Although some students have attendance issues, which the school is addressing through personal attendance plans, attendance rates are very similar to state averages and markedly higher than the averages for schools in the region.

The Basic Skills Test results in numeracy and literacy indicate a substantial skewing towards the lower end of performance compared with state averages.

ICT at the school
In its documentation, the school emphasises its interest in developments in education through and with ICT. One of the five target areas of its plan for 2008 is that: ‘All staff … incorporate technology in all classrooms, with teachers developing a range of learning activities appropriate to each stage and demonstrating a high level of competence in the use of technology’. Provision is made for increasing teacher skill levels through professional learning activities.

The school has IWBs in most classrooms, along with more than 90 computers, at least four of which are in each classroom for student use. It also has scanners, digital still and video cameras and editing equipment.

Teacher participant: Jo Ellis
Jo has been teaching for 14 years in schools in Dubbo as well as at Narromine. She has an IWB in her classroom and believes that it can be a powerful tool for teaching and learning. This wasn’t always the case. Until fairly recently, she describes her mode of using it as being like ‘a glorified overhead projector’ – scanning images and then projecting them, for example.

She has had no formal training in the use of digital technology in the classroom; however, she decided to improve her skills and the range of applications as a result of noting what other teachers at her school were doing. ‘They [the IWBs cost a lot of money and I wasn’t getting what I could out of mine. They obviously had a much higher capacity to engage the children.’ She sought and received informal help from a colleague.

For the last two years, she has used the IWB in most of her teaching sessions and has developed a wide range of interactive and other digital resources. She decided to target three learning areas in particular (human society and its environment, creative arts and mathematics/numeracy) and has found TLF content valuable in this regard. ‘I’ve used heaps. There are better and worse ones but the
good ones are terrific. The good ones show the children what is to be learnt in a variety of ways, visual, text, sometimes sound, and they enjoy the interactive stuff. They also give students a range of points of access so that they can find something they can do. The poorer ones, I think, are more one-dimensional. Some are too wordy for the kids I work with. I’ve used the Ad campaign series and To catch a thief for literacy and they help a lot with reading and comprehension. The Bridge builder series is another one I think is excellent. The objects provide context and purpose, a reason for doing things. There’s more authenticity, which I think is valuable.’

Jo has a Year 5 ‘home’ class and a Years 5/6 lower-stream maths class with an enrolment of 28, most of whom are operating at very early Stage 3 level (early Year 5) but with substantial variations in ability level. ‘The students bring so many influencing factors to school and find maths “hard work”.’

Besides the IWB, the classroom has five desktop computers for student use. After the digital curriculum resources are introduced to the class, students use the computers regularly, working both individually and in pairs.

**The project**

**Area of investigation**

*Can the use of TLF content increase engagement of Indigenous students in lower-stream mathematics classes and thereby help improve learning outcomes?*

This topic was chosen because there were four students who Jo believed were more capable than indications suggested. They were notable for the difficulty of engaging their interest in learning maths. She felt these students had the highest level of need. Their knowledge of number facts was not good especially those related to multiplication. She initially chose to focus on this area but decided it was too narrow and widened her interest across all the maths learning they would conventionally do.

Jo defines the symptoms of ‘disengagement’ in the classroom as many other teachers would: starting tasks reluctantly (‘Can’t do this Miss. Too hard.’), poor task completion, low levels of concentration, easy distraction and time-wasting, consequent behaviour disrupting other students.

All four students she chose to focus on had satisfactory but not high-level literacy skills.

Three were regular attenders; the other (in Year 6, S) attends sporadically and has a very difficult home life. He is a keen learner if he feels he is succeeding. He has ambitions to move into the next stream up (‘He’s always saying, “What have I got to do to move up groups Miss?”’), but his attendance holds him back.

The other boy (Year 5, I) attends regularly but is ‘at risk’ in terms of his behaviour. He is generally uninterested in school work: ‘it’s boring, too hard’. These attitudes are long established.

The two girls (L and J) are both in Year 6 and belong to the same friendship group, ‘the tough, cool girls’ for whom it is very important to maintain reputation and profile. Neither was particularly inclined to listen to teachers. Academic performance was not the way in which success was measured.

**TLF digital curriculum resources used**

Scale matters series
Part adder series
Difference bar series
Take away bar series
Arrays factor series
Fraction fiddle series

**Activity**

This project began in July and continued over two terms.

The conventional way in which this class proceeds is to introduce a new concept to be learnt each week. This is introduced to the whole group via IWB activities. Customarily, the class is divided into groups, one of which will continue with IWB activities and one of which will work on the computers.
This class has five daily one-hour sessions. During the final session each week, an assessment occurs of student performance related to what has been taught that week.

The four students are part of this conventional activity.

As noted above, a substantial amount of TLF digital curriculum resources is used in this class. Jo made the following notes on more general class reaction to some of this material.

**Scale matters**: Generated lots of conversation. Children were conversing using the appropriate mathematical language and skip counting back to zero effectively. The group worked well together to solve problems.

**Part-adder series**: Moving the ‘sliders’ with numbers changing immediately allows children to see and understand the effect. The language promoted and used included ‘bridging’ ‘compensate’, ‘make a ten’, ‘go up by tens’, ‘break up the number’, and ‘place value’. The children could see and understand how numbers were broken up and then see them as a whole.

**Fraction fiddle**: The children particularly enjoyed the graphics. Use of the birds ‘eating’ made it real and the children could identify and relate to the situation. The drop-down menus and the options they provided were great and much appreciated. The results of the problem solving in different formats allow for all children to access the relevant information: number line, fraction, symbolic fraction, model and number sentence.

**Bridge builder**: Produced a high level of engagement and interaction. They really wanted to see the bridge built.

**Results**

In Term 3, Jo conducted a pre-test of students’ general mathematical skills before introducing the TLF digital curriculum resources, followed by a post-test.

The four students’ results were as follows:

<table>
<thead>
<tr>
<th>Student</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>41%</td>
<td>51%</td>
</tr>
<tr>
<td>2.</td>
<td>44%</td>
<td>53%</td>
</tr>
<tr>
<td>3.</td>
<td>abs</td>
<td>31%</td>
</tr>
<tr>
<td>4.</td>
<td>31%</td>
<td>41%</td>
</tr>
</tbody>
</table>

A pre-test had been conducted for Term 4 work, but the post-test had not occurred at the time of writing. The results of the regular topic-related tests were as follows:

<table>
<thead>
<tr>
<th>Student</th>
<th>Chance</th>
<th>Add/subtract</th>
<th>Space/geometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>D</td>
<td>89%</td>
<td>54%</td>
</tr>
<tr>
<td>2.</td>
<td>B</td>
<td>73%</td>
<td>78%</td>
</tr>
<tr>
<td>3.</td>
<td>C</td>
<td>89%</td>
<td>54%</td>
</tr>
<tr>
<td>4.</td>
<td>abs</td>
<td>93%</td>
<td>84%</td>
</tr>
</tbody>
</table>

Student four has now been shifted to a higher stream. In the order referred to above, Jo’s summary views on the students are as follows.

**Student 1**: TLF materials give him the confidence he needs to get on with learning. They get him over hurdles that would otherwise stop him learning. He is much more likely to remain on task for the duration of a lesson. He assists other group members and explains, demonstrates and uses language comfortably. He particularly enjoyed **Fraction fiddle**, **Photo hunt** and **Bridge builder**.

**Student 2**: He now often leads interest in the activities. He can find something to apply his exuberance to and feels much more confident about contributing. His times table knowledge has improved.
**Student 3:** Her attitude has changed significantly. She is engaging with the work, and it is clear she wants to be successful.

**Student 4:** Work with the objects has helped her in understanding and demonstrating her understanding of new concepts. She has had a huge jump in results. She has been moved to the top stream class.

With regard to academic behaviour, Jo notes that use of the objects has particularly encouraged appropriate mathematical language. But she also notes students’ new capacities to solve mathematical problems. ‘[Use of the objects] helps set them up to succeed. The sorts of skills I’m observing at the moment are application of what has been learnt to other situations in terms of things like breaking up numbers, doubling, making a ten, compensating, all steps on the path to becoming numerate.’

Jo’s summary of what happened: ‘In terms of encouraging engagement, I would say five ticks out of five for that. In terms of improved outcomes, I would say use of the learning objects plays a part in that process along with many other things. But I’m very happy with the impact that use of the learning objects has had on the students.’

**Implications for consideration**
This is a very common school situation: finding ways to interest and engage reluctant/disaffected learners. To find an entry point, any entry point, in helping to resolve such a situation is valuable. This case suggests that TLF digital curriculum resources can be used for this purpose. Like most of the other teachers interviewed for this project, Jo is adamant that they need to be used in context and embedded in other teaching and learning processes for full effectiveness.
Northfield Primary School, South Australia

The context
Northfield Primary School is located in the northern suburbs of Adelaide. Seventeen per cent of the population in the Northfield suburb is aged between five and 19 years of age and 58 per cent of the housing is owned or being purchased. The demographic of the suburb is changing, as its nearness to the CBD makes it more attractive for home purchase. It is mainly a residential area.

The school
Northfield Primary School was established in 1861. By the mid-1950s, much of the school’s enrolment came from the nearby migrant hostel. The school now caters for students from Preschool to Year 7. It is a category 2 school (second highest complexity rating) and is allocated funding on this basis.

Northfield is an accredited United Nations global peace school and the school has chosen to operate under a peace code. The school uses restorative justice philosophies and methods. The peace code gives common values across the wider school community and to provide a common language of behaviour and expectations. The school has a focus on human rights and cultures.

Students are encouraged to believe that ‘they can make a difference’. The school positions itself as the public school of choice in the area, and there is focus on success. The students managed the process to involve the AFL Port Power team in their play for peace program. The federal sports minister donated a signed Socceroos top for the school to auction to support the students’ work in raising funds following the cyclone and floods in Burma in 2008. Other successful projects in the school include an Early Years in Literacy project involving six sites, an Early Intervention in Numeracy for Aboriginal students project and the Reconceptualising Reception project with the new Childcare Centre.

Northfield Primary School has a principal, a 0.5 deputy principal, a school counsellor and 12 classroom teaching positions. The school also has specialist staff in art, physical education, Reading Recovery, English as a Second Language, special education, Aboriginal education, as well as a literacy mentor and a teacher librarian. The school has a number of school assistants, including a bilingual support officer and an Aboriginal community education officer.

The school is part of a maths for learning inclusion project cluster. Early intervention is a school philosophy, and closing achievement gaps in literacy and numeracy is the focus. The principal supported the school’s involvement in this project because she continues to ‘support the enthusiasm of the teachers and their motivation to make a difference to student learning’. She also wants the school to use TLF digital curriculum resources more widely. The principal believes that the school can take on these development projects because the staff members ‘are a close team’ and ‘take leadership roles as classroom teachers’.

ICT at the school
Before 2008, four classrooms had IWBs. Now all the classrooms have them. The classrooms have two computers in them, and there is one server and six points in each classroom. There are four computers in the library and 20 computers in the computer lab. The school also has digital cameras and other digital media. The school uses Centra for internet-based video-conferencing. The implementation of ICT across the curriculum is supported by an ICT teacher and ICT technician. The ICT teacher works with teachers in their non-instructional time. In addition, the school has established learning teams, where teachers learn and work together on developing their practice. ICT was a focus for these teams during 2008 when IWBs were installed. The principal believes that the depth of ICT skill among the staff varies and that the learning teams are building capacity across the whole group, with the more experienced and confident ICT users able to take a leadership role.

About 10 per cent of the students have access to the internet outside of school, while many of the students have access to electronic games.
The school is initiating the development of learning materials on Moodle, beginning with a unit on children’s rights. This is accessible to all staff members through the shared drive and can be used on the IWBs.

The students
The student enrolment has grown from under 200 students to more than 300 in 2008, and further growth is anticipated, particularly as the school will become the major feeder primary school to the new super school, to be built nearby.

Over half the students receive government assistance. Over 65 per cent of the students are from a non-English-speaking background. Many of these students are from refugee families. The school hosts an Arabic school on Saturdays and a Vietnamese school on Tuesdays. It also runs a mother tongue maintenance program in Arabic. Indigenous students vary between 10 per cent and 15 per cent of the school’s population. (A number of these Indigenous students are from families who have come to Adelaide for long-term medical treatment from the remote areas of the state.) Students with a disability are integrated into classrooms.

Transience among the student population has been reduced by 15 per cent in the last few years. The school has an attendance policy and process, and the school’s attendance is on a par with the state average. Action plans to support attendance are developed with identified families. Education support plans have been developed with all the Indigenous students and their families, and these are monitored.

Students at Northfield perform above like schools against the benchmarks and are close to the state average. At Year 5, 50 per cent of the students performed in the highest levels in numeracy in 2007, slightly less in 2008. The current focus area for improvement is Year 5 and 7 reading performance. The school expects that students’ rate of improved performance level increases from Year 3 through Year 5 to Year 7. In the main, students demonstrate medium-to-high-level improvement by Year 7, except for students who are new to the school. Indigenous students at Year 5 perform at a higher level than students in like schools.

Teacher participant: Sarah Rogers
Sarah has been teaching for three-and-a-half years at Northfield, after completing two short-term contracts in junior primary classes. She taught a mixed Year 3/4 class in 2007 and a Year 2 class in 2006. Sarah is teaching a Year 3 class in 2008.

Teacher participant: Tara Wittenberg
Tara has spent three years teaching at Northfield, where she has been since her graduation. She taught a Year 2 class in 2006, a Year 1/2 class in 2007 and a Year 2 class in 2008.

The project
Sarah and Tara teach in adjacent classrooms, and there is a common door between the rooms. While each class has its own area, there is also a large amount of team teaching that occurs across Years 2 and 3. Each of the classrooms has a large floor space, and the teachers move the portable IWB as required between the working spaces. The IWB has its dedicated computer, and there are four computers set up as a pod, all with internet access.

The teachers had been using IWBs for one-and-a-half terms before they began this project. They had used various interactive activities, but they had not used TLF digital curriculum resources before this project. They were keen to explore the use of TLF digital curriculum resources, as well as focus on the different ways ‘[they] could use the [IWB] to enhance their teaching’.

The classes share a school support officer, Jenni Potter, who also worked with the teachers and students in this project. Both classes use computers, and the IWB is used at least three times a week for set lessons. The students also use the computers, and the IWB, when they are formed into groups, which rotate through work, for example working with the SSO or doing guided reading with the teacher.
Sarah’s class has two Indigenous students. Tara’s class has three Indigenous students. The classes include a range of learning styles and achievement levels, from reception level to Year 5. The students’ achievement levels range from reception to Year 4. Sara and Tara worked together on this project with the five Indigenous students from both classes. This was the core group: three other students left the school during the project. Two of the five students receive additional support: one for literacy and another for numeracy. Another two students have a negotiated education plan (for students with a disability) and low levels of literacy and numeracy. One student works at the appropriate level for literacy but not in numeracy.

**Area of investigation**

*Do learning objects scaffold the learning of Indigenous students to increase their engagement, confidence and motivation, within the learning area of mathematics? Does TLF content provide advantageous learning for Indigenous students?*

**TLF digital curriculum resources used**

**Learning objects**

**Mathematics**

L7547 Building site  
L1069 Face painter 1  
L2318 Number trains: skip counting  
L2808 Divide it up series  
L589 Music maker  
L2382 Mystery spinner  
L116 The slushy sludger: best guess  
L5980 Balance the blobs  

**Science**

L204 Night and day: seasons  
L1126 Light and shadows: casting shadows  

**Digital resources**

R7408 Catalyst: the planet of the rings  
R8462 Happy feet  
R3187 Parkes observatory  
R4565 Christmas pageant  

**Activity**

The students completed a pre-project survey about their attitudes to mathematics and to using IWBs and computers as part of their mathematics program. As well, the students were assessed against a social, emotional and academic skill matrix (the engagement assessment tool that their teachers developed) before they began using TLF digital curriculum resources.

The activities were done either with the whole class, or with the combined group of Year 2 and Year 3 students. Sarah and Tara developed a work plan for each of the digital curriculum resources they incorporated into their program. Each of the teachers’ work plans included a list of intended learning outcomes, a description of prior learning the students had experienced, teacher observations and comment on the students, including the Indigenous students’ participation in the activity.

TLF digital curriculum resources were used every day during the project, and the students ‘wanted to use them … they had such fun’. One of the students requested access to the IWB so that she could teach students from other classes about TLF digital curriculum resources. Sarah and Tara found that the students were teaching them, when they were using *The Slushy sludger*. Sarah and Tara extended the project as they went along, including more TLF digital curriculum resources as they built on the students’ interest and skill development.
Sarah and Tara started folios for each student and put work samples for each activity in them. They stopped doing this when the folios were full, and then made observations of the students while they were using the materials. They took photographs and completed assessments of engagement at regular intervals. The students completed an evaluation at the end of the project.

**Results**

Sarah and Tara reported on the impact of each of the digital curriculum resources in a portfolio. The portfolio includes examples of student work, completed measuring assessment proformas, photographs of the students working with the materials and the teachers’ observations and reflections. The students used *Building site* to extend their knowledge of bird’s eye view mapping, which they had already studied in class. The teachers observed that the students would often use this learning object in their spare time and try to complete it at higher levels. One of the Indigenous students who had been identified as having low numeracy skills used it numerous times, began to understand the concept and was successful at the first two levels.

The teachers observed the students working together and heard comments which show that the students understood the concept and could help other class members:

- ‘No, you have to pretend you are in his shoes. Look he is over that side.’
- ‘You can’t see the purple block because it will be behind the blue block. You only put up what you can see.’
- ‘It is hard at level 4 because they go up as well as across and you really have to think hard about what you would be able to see.’

The teachers thought that *Face painter* engaged the students. They could identify 3D shapes and talk to each other about the activity. One of the Indigenous students improved her academic performance against the engagement tool by two points on a 10-point scale.

The *Number trains* learning object was used to expand the students’ understanding of skip counting. They had done skip counting previously, but Sarah and Tara were surprised to find that the previous work was shown to have gaps, when the students used this learning object. They reassessed their teaching of number patterns, provided more opportunities for students to use *Number trains* and developed ways of explicitly teaching number patterns beginning from a number other than 0 (twos, fives and tens). For example, the students used number strips and worked in pairs to practise the concept. When the students used *Number trains* again, the students ‘were far more successful’, and many of the students could ‘recognise the patterns as well as help others’. As an example of this, one of the Indigenous students scored high on the engagement assessment tool while using this learning object, in contrast to her low scores before the class started using learning objects. The teachers will use *Number trains* for assessment with each student to ‘clarify their learning’ and link their performance in this activity to the levels of achievement of learning outcomes. They have developed an assessment rubric for pattern in number, with four skills.

Skip counting was extended later in the project by using *Music maker*, which again engaged the students. One of the Indigenous students showed much improved scores in each of the three domains in the measuring engagement tool. All of the Indigenous students could complete all the aspects of the assessment, either independently or with assistance. Comments on the students’ progress included: ‘got the number sequence confused but sorted it out’, ‘used counting as a strategy’, ‘became more confident using 5s’, ‘needed some verbal cues’.

The teachers thought that *Divide it up* was very popular with the students. Students used concrete methods, for example blocks, as well as the learning object on the IWB, while working on the concept of division. Students were observed using the language of mathematics, for example understanding and using the word ‘remainder’ appropriately. The teachers observed that the students could affect changes in the learning object, for example changing the lollies from candy to liquorice allsorts, and that this capacity to ‘control [configurations] made the process more interesting for the students’. The students were engaged, and each of the Indigenous students showed improvement in their engagement, including their cognitive engagement.

The students had the opportunity to work on their favourite TLF learning object. The teachers taught them how to use the search engine to find materials within their year level. This activity confirmed that
the learning objects engaged the students. During this session, both classes were using the computer lab. The two teachers observed that the noise did not get above ‘working level’, that students were helping each other and ‘sharing their new discoveries with each other’. High on the list of favourites were *Catch a thief* and *Divide it up*.

The students used *Mystery spinner* as part of their work on chance and probability. The students could describe in writing the spinners that they made before using the learning object. Two of the Indigenous students were observed talking about the concept of predictions with each other and with their friends: ‘because they are about the same, it could be two halves or four quarters and you could just make two of the quarters red and two blue’.

*The slushy sludger* was used to extend the students’ understanding of chance. The students had previously identified their understandings of language from ‘impossible’ to ‘certain’ as part of the work in this area. Again two of the Indigenous students were observed working together and continually discussing the different ‘sludgies’ shown on the IWB. *Balance the blobs: find the rule* (focused on working mathematically and the concept of balance) worked particularly well for one Indigenous student, who ‘was very quick off the mark to realise the rule’: ‘the pattern shows that we are counting by 5s, it is almost like times tables’.

Sarah and Tara extended their use of TLF digital curriculum resources into science, as they were now convinced that their use benefited the students. In their study of the earth’s rotations, the students used *Night and day: seasons* and *Light and shadows*. Again, each of the Indigenous students scored higher on the measuring engagement tool than they had at the beginning of the project. Her teacher commented that ‘[x] was able to confidently approach the [IWB] and have a go!’, and for another student who scored high on cognitive engagement, ‘being able to discuss her thoughts with others helped [x] with her understanding’.

In a further development of their project, Sarah and Tara began including TLF digital curriculum resources into other units of work. They included a clip from *Catalyst* (*the planet of the rings*). They found the accompanying notes very helpful and used them ‘to learn with the students’. The students responded well to the film clip, and the students could use the site to provide answers to their own questions, posed following their viewing of the clip.

*Happy feet* was used in a unit on multiculturalism, *The Parkes observatory* was used as part of the unit on space, and *Christmas pageant* for a timely look at then and now in studies of society and environment. Each of these engaged the students, and they enjoyed working from the digital curriculum resources to, for example, make comparisons about then and now.

The class did a brainstorm at the end of the project. The Indigenous students all responded positively to the experience of using TLF digital curriculum resources. Comments from the five Indigenous students, as written, include:

- ‘they teach me things I didn’t know befor’
- ‘when you play them [learning objects] you learn a lot…[I] learn to count by 5 better’
- ‘I like the *Number trains* because I lent that I can count in 5s and 10s and I will tell my friend to play it’
- ‘My favourite games were *Catch a thief* ….[[i]] is a trying to remember game’
- ‘… it helps me share at home’.

Looking back over the project, Sarah and Tara felt they could say that TLF digital curriculum resources did improve Indigenous students’ learning. Extensive use of the learning objects supported the students’ engagement and in all cases increased the Indigenous students’ understanding of the concepts, as demonstrated in the teachers’ classroom observations and assessments.

The teachers have observed changes in their Indigenous students’ learning. They have observed gains in confidence in two students, who now volunteer to participate in lessons, which had not previously occurred. They have observed that one student’s number knowledge has grown and she now ‘challenges herself’ while completing the learning objects. Two other students are ‘now retaining and valuing their learning on a more consistent basis’.
One of the students was quite removed from the class and its activities before this project. He would ‘just sit there sometimes’ and was described as the class ‘wallflower’. He would distract himself from the classroom by rolling around the floor. He no longer does that. He will now ‘put up his hand and have a go’.

The teachers referred to individual students and some of the gains they had made. One Indigenous student, described as having ‘a quick maths brain’, was supported through using the learning objects: ‘she made connections, and it helped that they [the learning objects] make connections with real-life situations’. Another student who was under-achieving at all levels ‘came ahead in all the strands … she did the graph on her own’. Another student developed ‘improved social skills’ and now initiates conversations. She can verbalise: ‘talk, explain, predict’. This is seen as significant growth in engagement and skill level. Another student ‘now has a go’ and has ‘come out of the shadows’ of a dominating friendship and participates in learning activities on her own terms.

Sarah and Tara said they had spent a lot of time developing a safe learning environment, for example teaching the students how to react if a class member gets the answer wrong. TLF digital curriculum resources, used in that context, both ‘help build confidence’ and help the students support each other’s participation and learning. They use TLF digital curriculum resources to ‘cement connections’, to introduce new units and as part of planned blocks of work, for example in numeracy. The teachers also believe that the materials support and reinforce the Indigenous students’ understandings of appropriate school behaviours, for example ‘learning how to take turns’.

All the computers in the school now have a direct link to TLF site. Sarah and Tara introduced their work and TLF to the whole of the staff at a meeting, showing them how to access and use the resources. They also provide informal support to their colleagues.

Sarah and Tara now integrate TLF digital curriculum resources into their programs on an ‘everyday basis’. When they begin a new topic, the two teachers identify resources that they believe will aid their teaching. They find that the resources cater for a variety of learning styles and often bring ‘concepts and ideas together for the students’. Furthermore, Sarah and Tara believe that the students learn and ‘can confidently demonstrate what they have learned’. They believe that they have shared some ‘wonderful moments’ as they both realise ‘yes – they’ve got it’.

The following is the full list of TLF digital curriculum resources used by the classes in the project (not all these were reported on; some were referred to by the students during their brainstorming activities):

Number trains  
Catch the thief  
Sorting animals  
Shadows  
Divide it up – lollies, puppies, hardware  
The slushy sludger  
Balance the blobs  
Building site  
Cassowary fractions  
Music maker  
Face painter  
Seasons  
Night and day  
Human body  
Moon (digital resource)  
Saturn (digital resource)  
Moon walk (digital resource)  
Parkes observatory (digital resource)  
Happy feet (digital resource)
Papunya School: Warumpi Kuula, Northern Territory

Context
Papunya is an Aboriginal community about 250 kilometres west of Alice Springs. It has a population of around 300, a proportion of which is transitory, and was established in the 1950s as a Lutheran mission with people from four language and cultural groups: Luritja, Pintupi, Warlpiri and Pitjantjatjara, groups which remain today. None of the Indigenous residents of Papunya speaks English as their first language, and it is rarely used otherwise. There is very little literacy, although as a remnant of mission days some of the older people may read hymns or parts of the bible in Luritja. The only place English is spoken generally is the school. Very few houses have television, and there is no mobile phone coverage. The sources of employment at Papunya are its enterprises – the medical clinic, the shop and the school. It also has a police station and two Australian Rules football ovals. It also has an arts centre, Papunya Tjupi.

The school
The school was established as a part of a mission. It became a government school in the late 1970s. It has five classes, including Pre-school, Transition/Year 1, Years 2/3, Years 4/5 and a Middle Years group which contains students to Year 9. There are five non-Indigenous teaching staff including the principal and one Indigenous teacher and five Indigenous teacher aides, all with a great deal of experience. It is also staffed with a coordinator for its Accelerated Literacy Program. Like many remote schools, it is difficult to staff and has had nine principals (many of whom were acting) in the last three years. One non-Indigenous member of staff has been at the school for nearly four years, the rest for nearly two.

The students
The school currently has an enrolment of 86. Three of these students are non-Indigenous. The rest, reflecting the nature of their community, learn English at school as a third or fourth language. None of the students reached the relevant NAPLAN benchmark. About 30–40 per cent can be described as mobile and are often ‘shared’ with other schools in the area (a very large area, including as far away as Kintore). Most of these schools are part of the group school structure, thus allowing the sharing of information about some mobile students. Student attendance is generally quite good (70–100 per cent), although there are some young people in town who are registered with Centrelink but who have not enrolled at school. The petrol sniffing that once occurred at Papunya is now a thing of the past. In addition, there is a high incidence of hearing disability due to bouts of *otitis media*. Twenty students were recently tested for hearing loss, and all but two had it to a significant degree. Some of the older students leave to go to boarding schools in Alice Springs, Adelaide or further afield. It was suggested that their families’ aspirations for the young people is that they are strong in their dealings with the dominant Western culture.

ICT at the school
Students do not have computers at home. The school has four IWBs, 18 desktop computers and 10 recently acquired laptops, all networked and connected to a satellite internet feed. Technical support is provided via a visit for two hours every month or two. Students very much enjoy using the computers at school, by personal choice for downloading music and games. The community’s primary use for the internet is banking, and this happens via the school’s computers.

Staff ICT skill levels range from very limited to quite high in specific areas. Two staff members had recently participated in a program called Action Learning with Learning Objects (ALLO).

Teacher participant: Mark Smith
Mark has been teaching for 10 years in a wide range of settings including Pakistan and the UK. This is his second year at Papunya. He has undertaken a university course on webpage development and was one of the two participants in the ALLO program. He rates his ICT skills as quite high and was engaged in setting up the school’s 10 new laptop computers for classroom use.

He tries to incorporate the use of ICT in his class as much as possible as ‘another useful medium to get the message across’ and to extend the range of learning media available for his students. He has
been using Scootle to access TLF digital curriculum resources and has found it very useful. ‘It saves a lot of time. Very teacher friendly.’

He teaches the Middle Years class (chronologically Years 7–9), which has 10 students of whom eight are regular attenders. Reflecting the mobile nature of the school’s population, ‘There are always a couple of floaters’. All have the same language status as noted above.

Literacy skills are broad ranging, with highest around Level 2 (intended to describe Year 3 in mainstream settings) and with similar levels of numeracy skills. The students’ computer skills vary, but they enjoy using the technology. ‘They have no fear.’ The aspects they enjoy most are the interactivity, using the net and downloading music and games. ‘They know how to search for and find these.’ Mark suspects that they are good at following well-worn paths but might struggle if faced with new sorts of problems that required a more comprehensive knowledge of computer function.

His classroom has an IWB, which ‘has made a big positive difference’, and 10 networked desktop computers.

**The project**

Mark decided on two areas of investigation (treated separately below).

**Area of investigation 1**

*Can the use of TLF’s digital curriculum resources strengthen teaching about resistance to drugs and other harmful substances?*

This topic was chosen because of its relevance to community issues and because Mark had reviewed available TLF content and found some suitable material to employ.

**TLF digital curriculum resources used**

R9308 Sammy Butcher – Out of the shadows: I have seen it all (film extract)
R7024 Yolgnu boy, 2000: petrol sniffing (film extract)

**Activity**

These extracts were used in a unit titled ‘Too strong for drugs’, which was taught an hour a week for a term. They were embedded in a range of other activities, including use of other material from YouTube including antismoking advertisements. Students also made a video, ‘Drugbusters’, consisting of still digital images with a sound track performed by the students themselves. This was an opportunity to use the students’ knowledge of the film ‘Ghostbusters’ and to blend work from the accelerated literacy program, which at the time was using Paul Jennings’ *A Good Time for Ghosts*.

TLF digital curriculum resources were shown to the whole group on the IWB followed by discussion.

**Results**

Mark’s view: ‘Both were excellent. Powerful tools to get across the message of this unit.’ ‘They prompted a great deal of discussion and really hit home.’

Reasons for this include the following.

- There was a strong recognition factor. Sammy Butcher, the star of the first clip, comes from Papunya.
- The digital curriculum resources were highly culturally meaningful. Yolgnu Boy incorporated significant indigenous cultural knowledge, clearly understood by all members of the class.
- There is no speaking in the Yolgnu Boy clip. Both clips get their message across visually. This was very helpful for the students in the class who struggle with English language.
Implications for consideration
This case provides one clear and very strong instance of support for the inclusion of Indigenous-specific materials among TLF’s digital curriculum resources. It might be noted that the examples:

- are not historical but deal with contemporary life and issues which can be readily understood by Indigenous people who remain connected to culture and traditions, and

- are high-quality dramatisations of experience rather than historical artefacts etc. It is not suggested that the digital curriculum resources should be solely of this type; however, the impact that the selected resources had on the students at Papunya strongly supports the inclusion of this kind of material by TLF.

Area of investigation 2
*How suitable is the use of TLF learning objects for developing understanding of the concept of volume and units of measurement that relate to that concept?*

This topic was chosen because it was next in line in terms of Mark’s teaching schedule, and he had found suitable TLF digital curriculum resources via the use of Scootle.

**TLF digital curriculum resources used**
L160 Cubirocks go!
L161 Cubirocks galore!
L162 How big is a cubic metre?

**Activity**
The topic was introduced through some hands-on activities with concrete materials, using blocks to build a larger block, for example, and using this process to get across the idea that volume is an entity and can be measured. These ideas were described and discussed with and by students.

The learning objects (which are ability-scaled versions of the same process) were used during two 20-minute blocks. Mark has subsequently returned to their use a number of times in class to reinforce what had been learnt.

**Results**
Mark had tried to explain the idea of volume to the students before and had limited success. The learning schedule he instituted through the project was much more successful. They began to understand the notions under consideration via hands-on work with the concrete materials. TLF learning objects provided very useful reinforcement of the ideas that were emerging with the blocks. The students could ‘read’ their meanings effectively, and they enjoyed using them, contributing to their enjoyment of learning and engagement.

Mark is satisfied that each of his students who participated in those lessons now understands that volume is what is inside a three-dimensional object and that there are various ways of measuring this.

**Implications for consideration**
Perhaps the most important implication from this experience is the value of combining a range of learning experiences to develop the understanding of an idea or a new skill. As with Mark’s other investigation, this is rediscovery of what has been well established through theory, research and practice. However, it might be that the value of the learning objects in this instance is related to the fact that they provide a third avenue for support and understanding beside concrete operations and pen and paper work. In the case of these students, this provides an avenue for learning concepts that is not completely mediated by the understanding of Standard Australian English language.
Stirling Campus, Port Augusta Secondary School, South Australia

Context
Port Augusta is a coastal town 300 kilometres north of Adelaide in South Australia. The population is around 15,000 and about 4,000 Indigenous people live in the town or in the Davenport Aboriginal Community. The town was once a traditional meeting place. It is an industrial and service city and tourism is growing. Its main employers are Flinders Powers Operating Services (generating electricity) and EDI Rail, which provides rolling stock services. The community also hosts the El Alamein Army Base. The growing mining industry in the north and east of the state are also expanding the demand for services in the city. The population trends indicate that the number of young Indigenous people is the most rapidly increasing proportion of the population.

The school
Stirling Campus is one of two that make up the Port Augusta Secondary School. It was established in its current structure in 1995. Year 8 and 9 students attend the Seaview Campus while the Year 10, 11 and 12 students attend at the Stirling Campus.

The school has 48 teaching staff, including an Indigenous teacher. There are 15 ancillary staff, of whom two are Indigenous. The five Aboriginal community education workers are all Indigenous. The school has a principal across both campuses, and a deputy principal and assistant principal at each campus. There are 10 learning area coordinators in the school and a teacher librarian at each campus. The staff of 52 is described as stable and there are no transfers planned from the school for 2009.

The school has developed close links with the Graham ‘Polly’ Farmer Foundation, and a number of Indigenous students also attend the foundation’s enrichment centre. An Indigenous Aboriginal education teacher will begin in 2009: the position has previously been held by non-Indigenous teachers.

The campus includes a District Special Education class for students in Years 8–12.

The senior school has a focus on VET programs in a number of areas and includes a mining engineering group, as well as programs in retail, sports and recreation, hospitality and tourism.

The students
There are 450 students at the school and of those, 37 per cent are Indigenous. Student numbers have reduced in the last decades because of significant changes in the industrial base of the town. Attendance is described as ‘an issue’ for over a third of both Indigenous and non-Indigenous students at the school. This is seen as a matter of concern, and various strategies are being expanded or developed to improve the attendance rate. Transient students are not common at the school, largely because the Indigenous students who move in and out of the town have strong connections with the local Indigenous R–9 school. In 2008, 54 per cent of the students received government assistance due to their lower socioeconomic status (School Card).

The students at Port Augusta Secondary School perform ‘at under average’ when compared with the state benchmarks for literacy and numeracy. The school allocates significant resources to these areas for ongoing development.

ICT at the school
The school has five computer labs, each with 25 computers, and there are another 20 computers in the Resource Centre. A further 43 computers will be available as part of the Digital Education Revolution from 2009. This will bring the ratio to one computer for every two students. The school is being upgraded and, as part of this process, it is planned to wire the school so that IWBs and data projectors can be placed in each classroom. The school plans to install the equipment alongside the training program planned for 2009. At the moment, there are two classrooms equipped with IWBs. The school delivers some distance education programs to more remote schools, using Centra.

The principal estimates that about 80 per cent of the staff could use ICT as part of teaching and learning programs, but, because of the current hardware deployment, about 50 per cent use it
regularly. The principal sees ICT as a teaching tool, and that teachers themselves are critical to learning. He believes that ICT helps students develop literacy skills and supports students’ progression, as they can be more in charge of their learning.

**Teacher participant: Shane Loader**
Shane has been teaching at this school for five years. It is his first appointment after graduating, with a focus on mathematics and science. While he had no formal study of ICT and curriculum, he has always had an interest in ICT and ‘plays’ with it, believing that if he can ‘learn from scratch’ he can understand how ‘everyone else approaches it’. Shane categorises himself as an experienced user of ICT.

Shane uses the IWB, and data projector routinely in his classrooms. He also uses the computer labs once or twice a week, so that the students can work individually rather than in a group or whole-class setting.

**The project**

**Area of investigation 1**
*Does the use of TLF content motivate Indigenous students and aid in accelerating the catch-up process?*

This area of investigation was chosen because Shane is concerned to bridge the learning gaps he has identified in his students and to do so in the most efficient way. He had not used learning objects before with his classes, although he used other digital curriculum resources and programs and thinks he had some success with using computers with the students.

**TLF digital curriculum resources used**
*For probability*
- L2641 Dice duels
- L2635 Dice duels: fair or unfair?
- L2382 Mystery spinner
- L2634 Dice duels: go-kart race

*For trigonometry*
- L2331 Trigonometry: using tangent
- L2332 Trigonometry: using sine
- L2333 Trigonometry: using cosine
- L2335 Trigonometry: finding angles

*For similar and congruent triangles*
- L6554 Exploring relationships of angles

**Activity**
Shane worked with two classes in this investigation.

One is a Year 10 mathematics class that has literacy and numeracy levels generally two to three years behind the benchmarks. The students are described as disengaged and rarely attempt set work in class. Generally, a little more than half the class attend regularly, and no student moved from the class in the course of this investigation. Several of the students in this class have a diagnosed disability. Of the 20 students in the class, 11 are Indigenous. Shane chose to use the computer room for these lessons as this is less demanding of class group skills. He thinks the students have well-developed skills when using mobile phone and MP3 technology but are ‘naïve or limited’ when using other types of technology. He observed that students in this class sometimes needed a whole lesson to learn how to use the learning object.

**Probability**
Some concepts of probability had been introduced to the class before using the learning objects, and Shane had established that the students had little understanding of these concepts. The students found it difficult to use the first learning object he introduced and ‘clicked their way’ through it. Shane
then developed work sheets to guide the students through the learning objects, and he spent ‘a lot of time’ deconstructing each page of the learning objects. He believes that the students’ literacy levels prevented them from reading and following instructions in the learning object. He found that most students had to use the learning object several times to complete the work sheets.

The spoken components of the learning objects were not available to the students, as the headphones, speakers and jacks had been disconnected to prevent vandalism and inappropriate use. Shane found that the students needed a lot of support from the teacher, even though the students indicated in their survey responses that they did not need help from the teacher. Shane found that the absence of a ‘back’ function in many of the learning objects was a source of frustration to the students, because if they had missed information on a previous screen, they had to restart the object from the beginning.

Shane reported that the students developed conceptual understandings of fairness as it relates to probability but were not able to make predications and were reluctant to ‘have a go’. Mystery Spinner was well done by most students who were able to translate the graph to the composition of the spinner through using the learning object.

**Trigonometry**
Again Shane established the students’ prior knowledge using a quiz before he used the learning objects with the students. Most could recognise a right-angled triangle. None of the students had heard of the subject-specific language: sine, cosine and tangent. Some students were then able to relate these words to the symbols on their calculators.

Before using the learning objects he had identified, Shane covered work on sine, cosine and tangent, and the students had learned to identify sides (opposite, adjacent, hypotenuse), and they had done this well. The students also learned how to calculate the missing angles of sides. Shane intended the learning objects as consolidation of what the students had already learned and as an opportunity to extend them.

In comparison with the students’ first experience of the learning objects, Shane believes that they were able to work through them with minimal teacher assistance, once they had received one-on-one teaching of the first example. He thinks the students engaged well with the **Unit circle**, part of three of the chosen learning objects. The students could see how the answer was obtained using this tool, when it was not evident to them when using their calculators.

However, even with the work sheets to support them, and continued exposure, the students did not pick up another concept – the use of similar triangles. Again, Shane believes that the students' literacy skills and what he calls their desire to rush through their work prevented greater benefit from using the learning objects.

Shane reported that most of the students gained success and a greater understanding of the topics through using the learning objects. He observed that the students had gained confidence about using the learning objects, for example looking for clues on the screen page to help them answer questions. He also observed that as their confidence increased, the students were more willing to collaborate with each other, in particular the other Indigenous students.

**Similar and congruent triangles**
The pre-test showed that all of the students performed poorly in this learning area. They did not understand the subject-specific language (corresponding, alternate, co-interior) or the concepts which attend this language. This activity was intended to follow on from the identified gap in the students’ knowledge following their work on trigonometry on the same topic. The students worked through the learning object as a whole class using the IWB. They began by answering the questions in their head but later on began working with others. All of the students contributed, and they appeared excited to be participating.

Shane observed that the students quickly built their confidence and understandings of the concepts, such as opposite, alternate and corresponding angles, through using the learning object. He observed that the Indigenous students who previously had not accepted help from others, even from their friends, were now working with others to complete the work.
Area of investigation 2
Does the use of TLF content motivate Indigenous students and aid in accelerating the catch-up process?

Shane also worked with a Year 10 science group from the highest ability class. While few have problems with literacy and numeracy, Shane believes that these students do not strive to achieve as well as they could. He also believes that the students turn away from science because they find the abstract demands difficult in this learning area. Ten per cent of the students are Indigenous, and the class members attend school regularly.

TLF digital curriculum resources used
For structure of matter and metals
L3125 Exploring atoms
L2562 Exploring atoms – atom structure

For organic chemistry
L2526 Plastics
L1030 Your rubbish pile – managing wastes

Structure of matter and metals
The pre-test highlighted gaps in the students’ prior knowledge: the structure and composition of atoms, the meaning of terms such as malleable, ductile and corrosive, and the periodic table.

The students worked through the learning objects well, after some early problems navigating the objects. The post-test showed that most students increased their understanding as a result of using the learning objects. The work sheets showed that students had understood the concepts in most cases. The learning objects also enabled students to pick up the ‘more subtle elements which require understanding’, through the activities inherent in the learning objects.

Shane found that these learning objects were very useful because the students could re-familiarise themselves with the concepts and build on that knowledge to learn new concepts. The learning objects were also helpful in revisiting the underpinnings of the topic, and for preparing them for more complex learning.

Organic chemistry
The students were questioned to establish their prior knowledge. This showed that few students knew about organic compounds. Shane used the IWB to work with the whole group and to introduce the learning objects, as well as using the computer rooms once or twice a week so that the students could work individually. He also developed complementary work sheets to guide the students.

The students’ before and after evaluations showed that there was an overall increase in their understanding of the work. This is ascribed to using the learning objects.

Body systems
Shane had intended to use learning objects as part of the work on body systems with this class. He did not do so, because he could not find learning objects that he thought were suitable for this topic.

Results
Shane used a mix of observation, teacher judgement and some surveys to gauge the impact of TLF digital curriculum resources on Indigenous students’ learning. What follows is a summary of his findings.

Shane summarised the results of an abbreviated form of the TLF survey, which the students completed after each exposure to a learning object. For the students using the mathematics learning objects, more Indigenous students than non-Indigenous students reported that they found the learning objects ‘interesting and fun’, and thought they ‘helped them to work with others’. The Indigenous students also thought that the learning objects helped them think about new ideas. More Indigenous students than non-Indigenous students reported that they found the learning objects ‘hard to use’, and they required more help from the teacher. There was less differentiation between
Indigenous and non-Indigenous students in their opinions/feelings about attitudes towards using the science learning objects, although the Indigenous students put a higher value on the characteristics of interesting and fun and helped working with others.

Shane believes that the students demonstrated much higher levels of engagement in their work when using the learning objects. When Shane integrated the learning objects into the activities for the topic, he observed that the students spent the entire lesson focused on the task, including the work sheets. This compared with the students spending very little time on task during usual classroom activities. He thought this use of learning objects was a significant change and that over time it would have a positive impact on the students’ learning.

Shane observed that the best class configuration was to use the learning object with the whole class or as an individual activity using one computer per student. He did notice that over time the students became more willing and able to work with each other and offer suggestions and support. The students’ understanding of the work involved improved in most cases.

Shane observed that the students’ literacy levels had an impact on the ease with which they approach and use the learning objects.

- Learning objects need to be embedded in a program where enough ‘learning has been done so [the students] don’t feel daunted’.
- Explicit expectations about the required work, expressed through the work sheets, helped to set up a ‘learning loop’ between the learning object and the other in-class activities and supported the students to meet learning goals.
- Learning objects with a narrative focus and their highly visual features engaged the reluctant students, including the Indigenous students in the mathematics class. The style of the learning object did not seem to make a difference to students’ engagement in the higher-achieving class.
- Combining learning objects with other digital learning materials and classroom work appears to be a useful combination for these students.

**Teacher participant: Graham Broughton**

Graham teaches Year 10 mathematics to students in the Mining Engineering Group. He also teaches Year 11 trade mathematics, coaches in primary schools and is a tutor at the Polly Farmer Foundation. He used to teach in the mid-1960s at Port Augusta, and, after a career that included working in a range of senior roles in educational publishing and government departments, he went back to teaching, despite his intention to retire. He is completing a Graduate Diploma in Mathematics at the University of Southern Queensland and is a self-taught ICT user, with wide experience in a variety of workplaces as well as in education.

Graham’s project was undertaken with a group of 15 students from Years 10, 11 and 12. These students participate in the Mining Engineering Group. This group was set up because of the potential for training and work in the local mining industry. Students are invited to participate, and they are described as ‘aspirational for trade-based careers’. The group, which includes 12 male and three female students, began in Term 3, 2008. Six of the young men and two of the three young women are Indigenous. Graham teaches this group for mathematics, English and work education and is their pastoral care teacher as well. The group’s attendance is described as excellent, and Graham thinks that the strategies he uses to support attendance work well. The students’ literacy is described as about 12 months lower than year-level expectations and their numeracy levels as two to three years lower.

**The project**

**Area of investigation**

*Can TLF content help students learn basic facts and algorithms for problems involving number and measurement?*
TLF digital curriculum resources used
L6561 Exploring trigonometry
L2329 Trigonometry: sine
L2328 Trigonometry: cosine
L2330 Trigonometry: tangent
L2332 Trigonometry: using sine
L2333 Trigonometry: using cosine
L2331 Trigonometry: using tangent
L2326 Trigonometry: measuring with angles
L2327 Trigonometry: similar triangles
L2334 Trigonometry: finding the hypotenuse
L2335 Trigonometry: finding angles

Activity
Graham identified these objects as a result of a pre-test he did with his students. He used the ACER Progressive Achievement Test in Mathematics Test 4. Graham organised for the work with TLF digital curriculum resources to take place in the computer room because he believes that the students work best individually. He also worked with small groups of students who had missed the lessons in the classroom, using the IWB.

Graham spent two or three lessons a week over a three-week period, working with TLF digital curriculum resources, and as each student completed a learning object, they completed a usefulness ranking on a four-point scale. The learning objects were not used as a stand-alone experience with the students. The students rotated through work set by the teacher, the learning objects and other web-based programs. Graham believes that programs such as Mathletics are useful because students can access a personal best score for their work, and students’ access is levelled to suit progression through levels of difficulty.

Results
Graham observed that the students could complete the learning objects ‘just by clicking “next”’ and thought that primary students would benefit more from them. However, Graham did observe that when using the learning objects to introduce new concepts in trigonometry, the students had little difficulty in picking them up, when his previous experience had been that students had ‘much difficulty’. He thought he would use the learning objects again in this way. He also thought that he would ‘give another run’ to the learning objects related to statistics.

Implications for consideration
The learning objects made a significant difference to the time-on-task for students who are disengaged from their education, including the Indigenous students in these classes. This is seen as a positive contribution to successful learning, in particular for the disengaged students, many of whom are also Indigenous.

The learning objects helped students understand new or difficult concepts.

The learning objects work best when embedded in the teaching program, including scaffolding the information and concepts needed to engage in the learning objects.
St Mary’s College, Broome, Western Australia

The context
St Mary’s College is located in Broome, a town two-and-a-half hours by plane north of Perth. Broome is near the Kimberley Region of Western Australia and had its beginnings in the pearling industry in the late 19th century. The town of about 14,000 people reflects the multicultural community that grew up with that industry. Indigenous people make up about 36 per cent of the population of the Shire of Broome, and it is projected that this proportion of the population will increase.

The school
St Mary’s College was established in 1995, following the amalgamation of the existing kindergarten, primary and secondary school. The college has a primary and secondary campus and in 2009 will establish a middle school, with the Year 7 students moving to the secondary campus. The existing early childhood education centre has a particular focus on the needs of Indigenous students.

The college program is aligned to the state’s outcome-focused curriculum. The secondary campus runs an alternative program, the Pathways Program, which has intensive literacy and numeracy components and a focus on VET in the senior years. The great majority of students in this program are Indigenous.

The college has 45 teaching staff, six staff in the administration team, a team of 12 Indigenous teaching assistants, and a leadership team led by the principal, with two heads of school and two assistant heads. There are 10 coordinators across the learning areas, religious education and student services.

In the last two years, there has been a ‘healthy influx of older people’ into the staff, which was described as being ‘disproportionately young’. Two full-time and two part-time teachers remain from the staff group that was in place when the principal took up his position, six years ago. In that time, 130 staff have been appointed to the school.

The students
There are 580 students at the college, and 55 per cent of the students are Indigenous. There are 180 students in the secondary school. Attendance ranges from 79 per cent to 96 per cent. There are 29 students who board at a local residential college so they can attend St Mary’s. These students come from communities across the Kimberley, including remote desert communities.

Ten Year 12 Indigenous students graduated from Year 12 in 2007, in a total cohort of 21 students.

ICT at the school
The Pathways Program has used IWBs for a number of years. The rollout has been accompanied by a two-year professional development program. The college is aiming for a 1:2 ratio of computers to students, and upgrading of the computer labs and the library computers is under way. The school has placed a priority on using ICT as tools for learning. There has been a lot of internal professional development and ‘the students are showing the teachers’. The principal expressed surprise at the lack of expertise in the use of ICT in the recent teacher graduates he has encountered. He believes that most have done some units, but the process of using ICT in teaching and learning is ‘not embedded’ in university teaching. The senior staff believe that ICT suits Indigenous learners, who are described as ‘very visual’. As well as maintaining their interest, ICT can also increase systematic and disciplined approaches to learning.

Teacher participant: Paul Woodbridge
Paul was a mature-aged student and graduated in his mid-thirties in the United Kingdom. Before then, he had varied employment, including as a surveyor. He has taught in the United Kingdom and in Thailand (ESL) and spent two years teaching in Victoria. This is his second year in Broome. He trained as a middle school teacher in the United Kingdom and has taught in primary schools in Australia. Paul is now teaching in the college’s Pathway Program. Paul has not had formal training in ICT and has developed his skills on the job. He uses a range of digital learning materials with his students and has used TLF digital curriculum resources in the past. He is anticipating that once the
necessary software is installed, he will use Scootle to select objects and then put them onto the students’ pages of My Classes, accessible with the student password.

Paul’s students show a range of skill development, with most performing under the state benchmarks for literacy and numeracy. In this class of 11 Year 10 students, the reading ages range from 6–12 years. Four of the students live in the hostel for students from remote locations. Three of the students are young women. Paul reports that his students attend well when they are in Broome. The Aboriginal teaching assistant works with the teacher to support regular attendance.

The students also have a ‘large turnover’, due in part to ‘homesickness’ and ‘a lot of moving around’. The students do not show behavioural problems but the school leadership team believes that they do not engage readily, in part because they have not experienced much success through their schooling.

The project

Area of investigation

Can TLF content support the development and improvement of biography writing within the Pathways Program?

This topic was chosen because the language program includes mastering the genre of biography writing, as distinct from reading and viewing components of the course. Previous experience had demonstrated that the Pathways students responded well to ICT and given the learning task, Paul wanted to use TLF digital curriculum resources that would be structured and explicit, as an integral part of his program.

TLF digital curriculum resources used

L363 Patrick Brennan: the legend of Ned Kelly
L6189 Examining opinion in a biography
L1175 Cal Calvino celebrity garbage
L5216 Making a difference: Michael Long
L1282 Timeline: Nhu Minh’s story
L6197 Merv Bishop’s story
L6184 The abandoned house: nouns and adjectives
L5214 Making a difference: Pat O’Shea

Activity

Paul began his project using an unassisted writing guide that he has developed. He used this to identify skill gaps in the group. He then analysed the learning objects with the view of using them to address these gaps. Paul developed a program for between one and two periods per week over 10 weeks from September to November 2008. He experienced some difficulties in accessing the materials online and used a DVD of TLF digital curriculum resources and the IWB, working with the students as a whole group, rather than students working on individual computers. Paul used the learning objects on the classroom IWB, alongside work sheets and work books.

Each of the learning objects was linked to an activity, for example The Legend of Ned Kelly was used to brainstorm the sorts of questions that would generate information needed to write a biography. Paul’s program also required the students to understand the kinds of questions that generate positive or negative responses, while at the same time developing their understanding of opinion in biography. Time sequencing was also worked on, with the teacher scaffolding the students’ skills through teaching the vocabulary, for example ‘later on’, ‘during’ and ‘after that’. Students used the initial questions they had developed to examine the Michael Long biography.

For the next stage, the students were to use their own lives as the basis of a time line. The questionnaire to be used to develop biographies of people the students knew was also a piece of scaffolding with questions and sequence reiterated for the students. This process was further developed using the Merv Bishop materials, and emphasis was again placed on paragraph use, time connectives, verb tense, nouns and adjectives. The students wrote, edited and published their biographies on PowerPoint. The final products were to be presented at the end of year assembly in 2008.
Results

Some components of the original plan were not realised, due to time pressures. However, Paul believes that there were significant results from this project. He saw 'learning gains' in his students in, for example, their understanding of the impact of positive and negative questions, a necessary element of developing critical literacy skills. Another example is of a student who improved his reading age from 10–11 years of age to 12–13 years. Students completed the program of work and 'got the hang of it [the genre]'.

The students were 'keen to get up and do it [use the IWB]' in comparison with their usual response to shared reading tasks using text. He thinks that the students show increased motivation when using TLF digital curriculum resources. Paul does not believe that TLF content will bring the student to school, but does believe that once the student is at school, the materials support their engagement and motivation. He also believes it improves their learning because the learning objects focus 'on learning as opposed to being an assessment or diagnostic tool'. The learning objects are another 'source of instruction'. Paul observed that the students encouraged each other 'to get it right' and were more on task when TLF digital curriculum resources were integrated into the program. TLF content provided the students with access to a variety of biographies as well as the opportunity for them to relate to a variety of people. The students wanted to find out about the people. They also wanted to break the tasks down, and the materials were good 'for note taking and revisiting' work done elsewhere. The students were 'keen to learn and engage'.

Paul included the Indigenous Tutorial Assistance Scheme (ITAS) tutor in this program and students had the opportunity to further consolidate areas of the program, for example working on nouns and adjectives in class and in the ITAS group. Paul thought that the ‘content was great and interesting’ and that the materials fitted well into the state curriculum frameworks. He thinks that access to quality-assured materials is a bonus for teachers as is the link between the materials and curriculum outcomes.

Paul says that he would not use the digital curriculum resources on their own. He prefers to use them within a program and to provide follow up and concrete tasks. He said the literacy levels of the materials meant that there was a need for very deliberate scaffolding on his part. He thought it was worthwhile, but said it would be very helpful if TLF digital curriculum resources had different levels to access as teaching points, in particular when linking age appropriateness and students’ skill level. He found that he was bridging the vocabulary and conventions of Aboriginal English into Standard Australian English as part of his approach to the writing task so that students could more readily access the learning objects. He argues for audio being part of all the learning objects for similar reasons.

He is planning to develop more links using TLF digital curriculum resources and other sources. For biography, he wants to focus on Michael Jordan as the starting point, as the students are all very interested. He wants to connect up TLF digital curriculum resources with YouTube in his program. He hopes the students will be able to present their biographies in PowerPoint and include video clips and photos next time.

Teacher participant: Melissa Weatherley

Melissa graduated as a teacher in 1992 and worked for 10 years in the building and serviced office industry in Australia and overseas. She worked as an operations manager, IT and Telecoms manager and program manager. She then returned to teaching and worked in a girls' grammar school in Melbourne for three years before coming to Broome. This is her fourth year at St Mary’s and her first year working in the Pathway Program. She sees herself as highly competent with ICT and her skills have been developed in her workplaces. Melissa is finishing her Graduate Diploma in Career Education with a focus on remote and Indigenous students.

Melissa takes her Year 8–9 class for English, mathematics, studies of society and environment and science. There are 10 students in her class, and seven of them are Indigenous. One of the non-Indigenous students has a diagnosed disability. All of the students in her class have an individual learning plan which focuses her planning. She observed that the students had knowledge but were not confident in demonstrating their knowledge and skills in front of their peers in a traditional classroom setting. Melissa delivers what she calls a 'highly individualised program' for each student. She has seen attendance improve in her class and all the students attend. She thinks this is because
they enjoy the work and experience success. She uses TLF digital curriculum resources ‘a lot’ in her class in mathematics and science, and has used digital resources as part of a cultural studies program. Melissa believes that they improve student motivation.

**The project**

**Area of investigation**

*Can TLF content support the development and improvement of narrative writing skills?*

This area of investigation was chosen because it fitted the broad curriculum program of the class and because Melissa wanted to develop her students’ writing skills, as writing tasks set at the beginning of the year showed that this was an area of literacy which needed skill development. At that time, the students ‘had no idea where to start – they couldn’t generate ideas for narrative writing and struggled to articulate their thoughts into concrete words on paper’. She believes narrative is a good place to start a focus on writing skills and that this approach allows for sentence work, grammar and the development of the sense of audience. Melissa also wanted to use the project to focus on how to incorporate TLF digital curriculum resources into her ongoing curriculum planning and teaching.

**TLF digital curriculum resources used**

L6184 Super stories: the abandoned house – nouns and adjectives  
L6187 Super stories: the sea cave – verbs and adverbs  
L1276 Finish the story – boat disaster  
L862 Dream machine – metaphors  
L8469 Super stories: verbs and adverbs – assessment

**Activity**

Melissa used the IWB with the whole class as her main approach to teaching this program. As well as using TLF digital curriculum resources, Melissa sourced other materials to form part of her program. Students also carried out individual writing tasks as a regular part of the program.

She introduced the basic narrative pattern of beginning, middle and end. The beginning of a story was given to the students, taken from *Land’s Edge* by Tim Winton. Story endings were taken from both a non-TLF source (*Good Night Stories*) and a TLF learning object (*Finish the story*). The whole class worked on a group beginning or an end of a story. The students then worked individually on their own stories.

The program then moved to the specifics of nouns and other grammar, using learning objects with the whole class. Students identified the words and phrases they liked most and shared them with other class members. The printable work sheets for these learning objects were used with the class so that they could work on their tasks individually, following whole class activity using the IWB.

Melissa believes that it was important to break the concept of narrative writing into manageable parts and that the learning objects were helpful.

Although the final assessment had not been completed at the time of the consultant’s visit, Melissa believes she can observe improvement in the students’ understanding and skill levels. She thinks there has been ‘an enormous and quick improvement’ in spelling, writing, and in students’ oral sentence construction. She has observed students transferring their understanding of metaphor into their oral work in class. She wants the students to improve the quality and quantity of their writing. One Indigenous student who had recently come from a remote interstate school at the beginning of the term responded particularly well and has now published his work in the classroom.

Melissa believes that TLF ‘is fantastic for my low literacy students’. She found that there were ‘plenty of TLF materials’ she could use. She thinks that TLF digital curriculum resources provide a ‘great focus’ and that using the IWB provides a way for the whole class to engage in learning they could not do independently. The materials support explicit teaching, for example scaffolding the language inherent in achieving the learning outcomes (for example parts of speech), particularly for those students whose English language literacy skills mean they can’t yet work independently with the objects. She is impressed with the way ‘everyone’ wants to be ‘out front and have a go’.

Using The Le@rning Federation digital curriculum resources to enhance the education of Indigenous students 104
Melissa has provided student access to other TLF digital curriculum resources, for example *Fish market*, and she has found that her students want to use the learning object at home, once they have understood the game and she has provided them with access from the school through Scootle. Melissa found that it was easy to access TLF catalogues, using Scootle.

The next section of Melissa’s program will focus on character writing, and although she wants to use TLF digital curriculum resources, she has not yet found suitable materials. Melissa said the students found it hard to complete the learning objects in one lesson and felt that they lost their momentum at times. However, having her students write, read and share using the IWB for visual display of TLF digital curriculum resources allowed her to provide ‘explicit teaching as required’.

Melissa believes that the students are more confident in tackling writing tasks since they have used TLF digital curriculum resources and she can see progress as the students are transferring skills in this area to other writing. In 2009, she will use TLF digital curriculum resources from the beginning of the year so that, among other reasons, the students gain confidence more quickly and therefore experience success more quickly. When the students were using TLF digital curriculum resources, ‘they were always engaged’. Melissa reports that she did not hear comments from the students such as ‘This is too hard’ or ‘I can’t do this’ – comments she usually heard about writing tasks in her classroom.

Melissa thought that although she used TLF digital curriculum resources for somewhat younger students than the guidelines suggested, the materials were ‘not babysitting or dumbing down’. She thought the materials worked well with her whole of class approach, and in that context she managed the links so that they were appropriate to the students’ learning tasks. That said, she would like to see more levels in the learning objects so that students with a wide range of literacy skill levels can access the materials at their own level independently.

The students in this class particularly liked learning objects with game features, and Melissa would like to see more of these developed in this learning area.

Having access to the IWB in her classroom means that Melissa uses TLF digital curriculum resources frequently. She also believes that she can be more spontaneous with the computer access to TLF site from her classroom.

Melissa reported that the project demonstrated to her that TLF digital curriculum resources provide highly explicit materials, which focus on one thing, which she can ‘build on, and keep building on’.
Implications for consideration
TLF digital curriculum resources support explicit teaching and skill development which improve student performance.

As part of a program, the materials increase time on task for Indigenous students.

Indigenous student confidence and group skills improve in a learning environment which includes TLF digital curriculum resources.

A strength of TLF digital curriculum resources is that they focus on teaching, rather than on assessment or diagnosis.

The materials fit well into the state curriculum frameworks.
Spearwood Primary School, Spearwood, Western Australia

Context
Spearwood Primary School is in the suburb of Spearwood in Perth. The area is predominantly residential and is located southwest of Fremantle. Twenty-one per cent of the population is between five and nine-years-old, and 13 per cent of the suburb’s population was born overseas. Sixty-eight per cent of the homes in Spearwood are fully owned or being purchased. However, the amount of rental housing available is increasing in the suburb and the average household income is below the national mean. The suburb was a semi-rural community and is now changing as rental and housing patterns change.

The school
The school was established in 1914 and moved to its present site in 1972. The school caters for students from Years 1–7. The school also has an Early Childhood Centre. Ten of the 16 rooms are used as classrooms, while the others are used for a computer lab, the partial immersion Italian program and music. The school has established grounds and facilities.

The curriculum includes an extension program for students, a learning support program and a focus on ICT.

The school has a principal and two deputy principals. There is one level three teacher and 14 other teaching staff. There are 16 non-teaching staff at the school who provide administrative support and assistance for students with a disability, while others are education assistants, from kindergarten through the primary years. The school also has an Aboriginal and Islander education officer. The staff is described as ‘quite stable, with a small turnover’.

The school is placed in band three of the socioeconomic index.

The students
The school has an enrolment of 280 students. Of these students, 22 per cent are from an English as an additional language background. Some of these students are recent arrivals, while others are the children of non-English-speaking parents. Indigenous students make up 11 per cent of the school population. Thirty-two per cent of the students attend from beyond the school's catchment boundaries.

Transience is emerging as an issue in the school, and about 20 per cent of the student population changes in a year. Attendance rates are on a par with the state average. Year 7 students achieved above the state average against the writing benchmarks in 2007. The students were below the benchmarks in the other areas of numeracy, spelling and reading, and these results are similar to like schools.

The school and staff use the Whole School Strategic and Operational Plans each year to identify and target a curriculum need and then develop and implement a plan and review progress for students requiring additional support or who are identified as students at educational risk.

ICT at the school
Spearwood was part of the 100 schools project and now has access to additional teaching time to support the use of ICT across the curriculum. There are three new computers in every classroom, 15 in the computer lab and four in the library. There are IWBs in the Years 3/4 and 6 and 7 classrooms. More will be purchased for all the rooms, including the languages rooms, as part of the three-year plan. All classrooms are fitted with wall brackets so that the IWBs can be shared. The school also has a bank of 12 laptops. Most of the staff lease laptops and access the wireless network. The music program uses iPods, linked to other equipment, rather than computers. The students have access to digital cameras and a video camera and media projector.

The principal says there are ‘pockets of brilliance’ in the staff use of ICT in their teaching programs and thinks that this school is above average in its ICT use. He describes ICT as a ‘powerful teaching tool’ and the school philosophy is to integrate its use into teaching and learning. The professional development program has been delivered ‘at the point of need’ and team teaching and modelling are
most often used. Some staff are members of a virtual cluster using web conferencing (using Moodle) with schools in other states, as part of the Australian Values Project. TLF learning objects have been used successfully in music and in junior classrooms in Years Five to Seven, and it is planned to expand their use across the school.

**Teacher participant: Helen Cox-McLeod**

Helen started teaching in 1982. She completed a Diploma of Teaching and later was awarded her Bachelor of Education. Helen specialised in science and Aboriginal education. Helen’s first posting was for three years in ‘quiet fringe suburbia’, and this was followed by two years near Geraldton. Helen has been at Spearwood for 21 years and has worked in a variety of roles, including being the ICT coordinator for the 100 schools project from 2001 to 2006. She has worked in middle primary for the last six years, having spent the previous years in junior schools.

Helen also studied statistics and is very interested in constructing and interpreting data as a way of understanding student progress. She is now working with the English Committee to develop programs that are driven by student learning needs, as identified by benchmark and other test results.

Helen has learned to use ICT as part of her teaching program, ‘on the job’.

**The project**

**Area of investigation**

*Can TLF content help students to choose a repertoire of mental, paper and calculator computational strategies?*

**TLF digital curriculum resources used**

- Arrays series
- Wishball series
- Cassowary fractions series
- Number partner series
- Difference bar series
- Multiplier bar series
- Divide it up series

**Activity**

Helen is teaching a Years 4/5 class. It has five students in Year 5 and 22 in Year 4. This group includes some students who have been identified as being at educational risk. There are three English as a second language learners and five Indigenous students in the class. A number of the students experience the school as a source of stability. The Indigenous students are good attenders, and there is good liaison between the school and the families.

Helen tracks student progress over time. Her aim is to improve student achievement by two levels within 12 months, including students who are below the benchmark.

Helen has been targeting literacy with her Indigenous students, and their reading and writing skills have improved significantly, as well as their perception of themselves and their capacity to learn. She has used TLF learning objects previously and has found that they provide ‘meaningful and relevant curriculum that these students enjoy’. These Indigenous students do not have access to computers and the internet at home, so Helen explicitly teaches them ICT skills, what she calls ‘life skills’, as part of any work program.

Helen’s project focused on the Mathematics Number strand of her overall implementation of integrating ‘e-learning programs across the curriculum’ at Years 4 and 5.

There are three computers in the classroom and they are set up as a learning centre. Students rotate through using computers as part of their learning program, and the aim is that all students use them ‘at least once a day’. The students also use the computer lab, usually for three half-hour sessions a week. This classroom has an IWB, and Helen uses a data projector routinely.

Using The Le@rning Federation digital curriculum resources to enhance the education of Indigenous students
Helen said the *What works: the work program* influenced her approach to working with her Indigenous students. She took particular notice of the discussion about questioning and wanted to include those understandings in her project.

The students had already been working on place value activities and playing a variety of place value games. The mathematics learning objects were used as part of a process. For example, when the purpose of the program was for students to learn about whole number and place value, they were given diagnostic tasks and asked to circle the biggest number in a series of exercises, as a pre-test activity. Access to *Wishball*, which explores number and place value, was used to develop students' understandings, after which they moved on to concrete activities (blocks, calculators). Then a pen and paper test was used to assess the extent to which the students could apply their learning.

Students used a reflection process, which included responses to questions such as 'What was my goal?', 'What were the learning strategies I used?', 'What did I know?', and 'What do I know now?'

Helen used the First Steps Assessment Tool to identify other areas that needed further work in mathematics, identified the 'teaching points' and then selected learning objects that addressed these areas. She thinks that *The multiplier*, *The array* and the *Divide it up series* support and extend students' mathematical confidence.

Helen also set up pairs, where an Indigenous student would work with a partner who was confident about the concepts. She thinks that the learning objects supported peer tutoring well.

Helen said she was careful to link other resources to the way in which the learning objects were ‘set up or scaffolded’, so the student could experience ‘continuity and feel familiar’ with the concepts and materials. This, she said, meant ‘a lot of organising’. She also teaches mental strategies explicitly, for example inquiry learning methodologies and student-centred learning approaches such as Six Thinking Hats.

Helen also targeted these activities to the students at ‘the bottom end of the curve’ in reading, writing and saying numbers. For example, one student who could do this with 10s and 100s, and not with 1,000s, was then directed to *Wishball*. In that context, Helen found that the learning objects were very helpful for ‘individualising’ the teaching and learning process for different groups within the class. She could engage with the student directly about what was on screen and could ‘be more involved in their learning’. Because the learning objects are ‘conceptually accurate’, Helen also found that it was possible to probe more and vary her questioning, as the questions related to what they see on screen and the graphics worked as an aid to her questioning. She also found that her questions were simpler and more explicit and were directly relevant to what was on the screen. This meant that she could scaffold and structure her questions to help develop the students’ understanding. Previously, she had worried that her questioning ‘might be too challenging’ but did not experience that in this context.

Helen thinks that using the learning objects is a way for her to think about ‘how they [the students] engage in their task’ and how to extend their understanding of the concept: ‘What will you do next time?’, and ‘What will you do differently next time?’.

When working on *The arrays series*, Helen found that using the printout facility meant that the students could do self-assessment, and the teacher could track and monitor what the students were doing and work with them to complete the work successfully.

Helen thinks that the learning objects work well with her Indigenous students to support and encourage teaching the language of mathematics. The students then use it to explain what they are doing.

**Results**

As an example of the gains made during this project, Helen described one of the students: ‘[he] is changing his attitude – he is doing homework, wants to learn and is making progress’. Another student is now above the benchmark and close to the target after one year and one term.

Helen gathered student comments:

- ‘I like working with learning objects because some of the things help me learn different things.’
‘I don’t use my fingers for multiplication now [after using *The arrays series*].’

‘I used rows and columns and skip counted [in response to a question about the strategies used to successfully complete a task].’

Helen believes that her Indigenous students learn well with the learning objects. She finds that the students are ‘highly motivated’ when they use them. She has found that the learning objects provide flexibility either through the different levels within a series, or through using learning objects appropriate to the skill level rather than the age of the students. She likes being able to target her choice of learning object to what the students need, for example concept reinforcement through practice or scaffolding. She believes that the students can develop independence when working with the learning objects and believes that this increases their own confidence in themselves as learners. She also believes that the learning objects’ resources provide ‘quality teaching and learning’ opportunities to engage with the students as learners. Mathematics comes alive, and ‘doing all these things’ lets the students know that you care about their learning. She believes that this matters.

Helen intends to broaden her use of leaning objects and expects that she will continue to choose the ones that will best help the students and expand a learning process around them.

**Implications for consideration**

Good teachers use learning objects well.

Learning objects provide flexibility across skill levels.

Setting a learning target for the Indigenous (and other students) and using data to assess progress works well. Students can describe their own achievements.

Integrated use of learning objects, in a sophisticated relationship between activity and tracking learning progress, seems to have benefited these students.
Warrnambool Schools, Victoria

Warrnambool is located on the Victorian coast, 260 kilometres west of Melbourne. It is a regional hub with a population of around 30,000. It has a busy commercial district which serves the population for a considerable surrounding distance and, positioned at one end of the Great Ocean Road, it has an active tourism industry. It is in the middle of an area rich in volcanic soils. Dairying, beef production and other pastoral and agricultural industries have flourished for many years. While it has areas of government housing, including one near Warrnambool West PS, one of the schools in this project, it is a comparatively wealthy and vigorous community with a wide variety of community resources in terms of health, education, social services, activities and recreation. The community is predominantly of Anglo-Celtic heritage with considerably less ethnic diversity than, for example, Shepparton, the site of other studies in this project.

The traditional land owners of this area are Gunditjmara, Kerrupjmara and Kirrae Whurrum. The southern coast of Victoria was an area of comparatively high population density prior to European colonisation. However, the rich soil, wide plains, accommodating climate and proximity to the coast meant that this region was settled quickly, with the Indigenous people’s access to their lands diminishing almost completely over a 20-year period.

In 1861, an Anglican Mission was established at Framlingham, close to Warrnambool, which was taken over by the colonial government shortly thereafter. It was subsequently run as a government reserve with various degrees of external and local interference from the non-Indigenous population. When interference did occur, it consistently resulted in reductions in the size of the land parcel available to the traditional owners. About one-sixth of the original tract was left when Framlingham was declared Aboriginal land in 1970. The federal electorate in which Warrnambool is situated (Wannon) has 1,100 Indigenous people, the main communities being in Warrnambool and Portland.
Warrnambool College

Context
Warrnambool College is one of two Years 7–12 government secondary schools in the town. It is the product of an amalgamation of Warrnambool North Technical School and Warrnambool High School in 1994.

The school
Warrnambool College is a big school organised into the customary year levels. Year 9 has an integrated program focused on innovation and sustainability with a strong emphasis on technology. A wide range of other special focus programs operate at the school including a Homework Centre for Indigenous students funded through a Parent School Partnership Initiative grant.

The college has 85 teaching staff (72EFT), a number of aides for various purposes and, among other support staff, a 0.8 Koorie academic worker and a 0.3 Koorie educator.

The students
The dominant student group was described as ‘an Anglo-Celtic monoculture steeped in traditional views about education, work and life pathways’. This was in the context of noting the school’s high level Year 12 outcomes, qualified by a retention rate 7–12 of 49 per cent and a description of the academic abilities of the student group as ‘generally conforming to a bell curve’.

In the past two years, enrolments have been 963 and 997. ‘It [enrolment] waxes and wanes. This area has quite a large transient population.’ This does not apply to the school’s Koorie students, however. There were 22 enrolled in 2008, and these numbers tend to remain stable. Two of these students are in Year 12, a matter of pride and satisfaction for the school. All Koorie students have Koorie Individual Learning Programs.

While students’ backgrounds are extremely varied socioeconomically, characteristic of a large provincial secondary school, nearly 40 per cent of students are eligible for the Education Maintenance Allowance. The school has a substantial group of students with special needs integrated in mainstream classrooms.

ICT at the school
The school has a very strong ICT focus. In 2009, it will receive 134 computers from the Australian Government’s Education Revolution initiative, bringing the school’s computer: student ratio to 1:3. There are four labs with 26 machines in each, plus four other pods with six to eight computers in each. There is specialist equipment in arts and science, a class set of laptops, 19 IWBs, flip cameras, and a good deal of high-level hardware and software in the school’s LOTE centre. There are many other computers ‘sprinkled’ throughout classrooms.

The school is described as ‘having been on the front foot with relation to technology for a long time’. It has a designated position for an ICT innovation coordinator, and an ICT professional learning team which supports staff skill and awareness levels. Forty of the 85 teachers were estimated as being experienced and capable users of ICT. Nine of the 10 recent graduates working at the school were described in the same terms.

Teacher participants
A number of staff from the school were involved in the project. Fiona McKenzie, the deputy principal had responsibility for general supervision, Cheryl Helman (the 0.8 Koorie academic worker), Vicki Burrows (a parent employed to support the project) and Tanya McDonald (the staff teacher for the school’s Homework Centre) did most of the hands-on work, while Greg Twitt, the college’s ICT innovation coordinator, looked after the technology and the assessment procedures.

The Homework Centre operated in partnership with nearby East Warrnambool PS.
The students
The target group was focused on 13 Koorie students in Years P–9 from both schools (five secondary and 10 primary) whose attendance at school was sporadic and whose basic skill levels in literacy and numeracy were generally low, ranging from 1.0–4.8 (VELS levels), all well below what is described as ‘age appropriate’. In addition, they tended to have low-level ICT skills and experience.

The project took place in the college’s library, where the Homework Centre operates, which is suitably equipped with computer hardware.

Area of investigation
Can TLF content help to improve the number skills of Indigenous students?

This topic was chosen because of an evident need among the students and, if progress could be made, it was seen as an important contribution to increasing the effectiveness of these students’ education.

TLF digital curriculum resources used
Bridge builder series
Circle puzzles series
Biscuit factory series
Other content, mostly numeracy based

Activity
The general procedure was to offer this support through participation in the Homework Centre for Indigenous students twice a week (Mondays and Tuesdays after school, from about 4–5 pm) for most of two terms. Although this didn’t really eventuate, families were encouraged to become involved. After some afternoon tea, students could work on any homework they needed to complete, but would also spend part of a session working on selected digital content to improve their number skills. It was intended too that students would work on their literacy skills through reading and other activities including TLF digital curriculum resources.

Each student had their own individual support programs along with their own folders containing a record of what had been done.

Prior to commencement and on completion of the project, students completed assessment via the Victorian Curriculum and Assessment Authority's online procedure, a multiple-choice test.

The students ‘started off at sea’ in terms of using the equipment. Passwords and system navigation were new experiences and provided a considerable level of challenge.

Those who attended, however, got into a routine and developed their own workspaces and procedures and fairly quickly became quite independent learners. But of the 13 students targeted, only five (three from the college and two from the primary school) attended with any regularity.

Results
Initially, the students loved the interactivity of the screen-based work but didn’t read the instructions and so tended to click through. It was thought that sound support for instructions might improve this issue by ‘slowing the kids down so they listen to the words’. A bouncing ball on each word was advanced as a possible idea. ‘It would probably help their literacy skills as well.’ This changed over time and the students who came worked more sympathetically with the materials. They (again, the ones who came) expressed their own pleasure and interest in coming to the sessions and with what they did there. (‘I like the stuff on Scootle [TLF digital curriculum resources], I enjoy doing it.’ ‘I like that it’s all on computer, and that it’s easy.’ ‘I like coming to the Homework Centre because it is fun and I like learning maths.’)

The pre-test and post-test results were as follows.
VCAA On Demand Testing – Adaptive Number Test

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<th>Gender</th>
<th>Pre-test score (VELS level)</th>
<th>Post-test score (VELS level)</th>
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<td>M</td>
<td>1.9</td>
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<tr>
<td>3</td>
<td>M</td>
<td>1.2</td>
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<td>3</td>
<td>M</td>
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</table>

Greg Twitt’s comments on the results are as follows.

‘We were not able to get many students to do the post-test assessment. These were the students that only came to a few sessions early in the semester and we were not able to retain. Even with the promise of food, they didn’t come to our final session!’

‘There is only a very small cohort of students, and unfortunately one of the students that we put the most time into appears to have gone substantially backwards! I am not sure how meaningful the results are, and whether using an online test as the only assessment was the best. Anecdotally, the students seem to have improved overall.’

The summary provided by the staff on the student who ‘went backwards’ includes these comments.

‘[Student name withheld] has felt comfortable using Scootle materials as a learning resource tool, building confidence as she completes her set tasks. She has strengthened her skills in number and literacy and makes it clear to the tutors the areas she requires assistance in. [She] has made good progress and has been working within the proximity level of a Year 3. She will still benefit from furthering her times table and counting skills to assist her with future addition and subtraction problems.’
Warrnambool West Primary School

Context
Warrnambool West explains the location of this primary school, about 40 years old, built in the context of a government housing development and subsequently merged with Dennington Primary School, Dennington having been a small town outlying Warrnambool and now caught up in the conurbation. The school is several kilometres from the heart of the city, and the surrounding district is still predominantly lower SES.

The school
The school is a Years P–6 government school with 75 per cent of its students eligible for the Education Maintenance Allowance. Many of its students are from single-parent families. There are 11 classes with an organisational overlay of junior, middle and senior sections. Numbers of students at various levels determine whether classes have composite age groups or not.

There are 11 classroom teachers, three integration aides, a language support position, a non-teaching welfare position and a chaplain. The staff is fairly stable and experienced, with many of the teachers having been at the school for some time.

The students
At the time of the visit, Warrnambool West had an enrolment of 260 students, of whom 15 were Koorie. The material above regarding the area suggests the sorts of students who might attend the school and the sorts of needs they might have. Most of the Koorie students in the junior school were working ‘at level’. Of the 10 in the senior school, six were clearly working ‘below level’, some significantly so.

ICT at the school
The school has two computer labs, one with 20 computers, the other with eight. These labs are accessed mainly by students from the senior section of the school. In more junior classes, most rooms have four computers. There is also ‘a trolley’ of laptops.

The issue, however, is maintenance. The school has an allowance for a visit from a technician once a week. Some weeks had been missed at the time of the visit and considerable outages had resulted. This was a matter of some concern to the project participants. ‘[Information communication technologies] are okay when they’re working, but if they’re not they can be a terrible waste of time and effort. Teachers can’t afford to plan with things that mightn’t work.’ Perhaps as a result of such problems, the level of interest in teaching with ICT in the school was described as low to medium, with ‘passive encouragement’ being given to build skill levels and interest.

Teacher participants
Siobhan Lilley has been teaching for 12 years and has been at this school since 2000. She has been using computers since her upper-secondary school years and is a capable and confident user. Her skills have been developed through after-school professional development sessions. She would like to use digital content more frequently in the classroom, but at the time of our discussion she was not confident about the reliability of the school’s hardware. They are her comments above on this subject.

Meredith Davis has had a wide range of support roles at Warrnambool West beginning with roles as a parent volunteer. At present, she works as an integration aide for students with special needs and operates in other language support roles. She has qualifications in speech therapy, and in 2008 worked with about 35 of the school’s students, mainly in one-to-one arrangements out of class. She has been with the school for many years and has a computer at home which she uses regularly. Meredith strongly supported Siobhan’s views about the reliability of the school’s system and its maintenance and upkeep.
The students
Six of the school’s 15 Koorie students were selected to participate in the project – three from Year 5, one from Year 4 and two from Year 3. All were having problems with their school work, and it was thought that participation in the project may provide a boost for their skills. One of the Year 5s did not come to any sessions, however. He is labelled as having ‘opposition/defiance disorder’ and attempts to encourage or direct him to engage in any activities he doesn’t want to do customarily fail. It appears that he doesn’t want to engage in most of the activities that school provides. Regular absence is a problem with several of the other students.

The project
Area of investigation
Can TLF content improve the learning and engagement of Indigenous students in understanding basic number facts?

This topic was chosen because six of the 15 Koorie students at the school were working below their anticipated level. Attendance was an issue for most of these students, many of them being apparently uninterested in school. ‘Therefore, student engagement was the big issue.’

TLF digital curriculum resources used
L106 Array series
L103 Number pattern
L1084 Hopper
Part adder series
Musical numbers series

Activity
The idea was for Meredith to withdraw these students during the first block of maths once a week on Mondays for an hour. Mondays proved to be problematic, with holidays and special events falling regularly on that day. So the session was shifted to Fridays.

The students worked in the smaller of the two computer labs, going through digital content which had been chosen for its relevance to their needs and where the rest of their class was up to. It was also planned that they could access the materials again during the week.

Meredith’s role was to support them and to monitor, diagnose and assist their learning. Pre- and post-testing was to occur.

Results
Unfortunately, the standard pattern of absenteeism included both Mondays and Fridays as part of a very long weekend. Records are available for the first eight of the planned 10 sessions. Of the six students, one had not attended at all (see above), one had been four times, two had been five times and two had been six times.

Meredith’s notes indicate the level of difficulty in mounting this project.
‘Week 2. The Koorie students were included in the Dox camp to Melbourne.
Week 3. Koorie Education interschool morning. All Koorie students absent.
Session 2. Three students were absent.’
‘Session 5. Computers in Room 7/8 were not allowing students to access Digilearn [TLF digital curriculum resources]. Some couldn’t find “R” cached services. Some wouldn’t access Digilearn, others got in but came up with an error message. Computer Tech unavailable.’

On a number of occasions, the network was not operating, on others access was reduced by other groups having priority, and there were some difficulties in operating some TLF software.

In some cases, class teachers decided they wanted their student/s to remain in class or to shorten the session because, for example, a LOTE session was going to begin or because ‘half-an-hour was
enough'. The materials were made available to the classroom teachers but, in general, they preferred to use paper-based materials.

On a more positive note, Meredith reports that teaching processes working this way (with everything else working and going well) was satisfying. Students were able to work independently while strugglers could be helped directly. Monitoring progress was easy, and the students enjoyed most of the materials.

Among the recounts of difficulties, there are more cheery observations where students, for example, who are clearly bored/disengaged come round. ‘[Student A — name withheld] can’t be bothered and is wasting heaps of time.’ Half-an-hour later: ‘She is working well now. [Student B — name withheld] is enjoying “Hopper” and is very busy at it.’ And, in a later session, some obvious insights are occurring to the students who are there. ‘[Student C — name withheld] recognised the fact that you can use multiplication and estimation to complete the task.’

But, ‘Session 4. Warrnambool Show Day. All students except [name withheld] have stayed home.’

Pre- and post-test results were not available, and in the circumstances not highly relevant.

**Implications for consideration**

The issue of students’ non-attendance impacts dramatically on any assessment of the effectiveness of the digital curriculum resources, as does the technological challenges encountered.
Table Cape Primary School, Tasmania

Context
Table Cape is the headland which looms over Wynyard, a town with a population of about 5,000, on the northern coast of Tasmania, a short drive from Burnie. It is situated in rich farmlands, closely settled in the coastal strip.

The Tommeginer people are the traditional owners of the area. Table Cape is also home to Indigenous people from other parts of Tasmania and the mainland.

The school
Table Cape Primary, a Year K–6 school, has two campuses. The project operated at the Gibbons Street campus, where the Years 3–6 students attend. There is a mix of staff experience levels at the school, with some skewing towards older and more experienced teachers who have been working at the school for quite some time. Gibbons Street has 10 age-based classes, 12 teaching staff and several non-teaching or occasionally teaching assistant principals.

The students
The school as a whole has 416 students with 240 in 10 classes at the Gibbons Street campus. Forty of the total student population are Indigenous, with 25 Indigenous students at the Gibbons Street campus.

Both campuses border government housing estates, but students come from the variety of backgrounds that might be expected in a country town. There are a significant number of bus travellers from the farms which surround the town. ‘A mix of rural farming families, government housing, members of the old well-connected community with an increasing but not large transient population’, is how the principal described the students’ backgrounds. ‘There’s a lot of extended family support here. Kids and their families are generally friendly and easy to get along with.’

In terms of student performance and abilities, averages were a little below the national benchmarks in literacy and numeracy, which meant that the school has focused on additional programs and support in those areas. ‘We have a significant group of students with learning disabilities and fewer than you might expect at the top end.’ Some students are regular absentees. ‘Monday, the day when you often introduce new concepts and activities, is a common day to be away.’

At an estimate, fewer than half the students have computers at home, although good use is made of the facilities available publicly and commercially in the town. Some students have requested that TLF digital curriculum resources be made available for out-of-hours use.

ICT at the school
The school has made a major investment in ICT. Each Years 5 and 6 classroom has an IWB. There is a multimedia centre with 16 desktop computers. Classrooms have at least two in each, with some having one or more in addition. Classes have timetabled sessions in the multimedia centre for two hours per week with some variable availability at other times. But the teachers felt that it was the IWBs which had made the difference.

‘Even though you get used to it, shared equipment is always a problem. The Smartboards [IWBs] are always there in the classroom, and you can really get value out of them. You take ownership of the idea with a whole lot of new practices that you can develop. I’ve never felt that confident with computers, but after a fair bit of trial and error and lots of learning experiences, I wouldn’t be without it now. There is a bonus in having the IWBs always there as an incidental resource, meaning that you can use [digital curriculum resources] immediately.’ They are easily accessible from the school’s server. ‘I use the whiteboard every day.’

There hasn’t been a great deal of formal professional learning provided; it has mainly been semiformal with staff sharing new ideas and practices at level meetings, and this process was deemed to be highly successful. ‘It’s practical. It gives you things that you can get on with straight away.’
Teacher participant: Jane Nott
Jane has been teaching for six years, all at Table Cape. When she was at school, computer use was only for some students. However, at university it became a normal part of her life. It is an automatic consideration in her class programming, and she describes herself as having becoming dependent on access to useful hardware. (They are her comments above on the use of IWBs in the classroom.)

Jane has also used TLF digital resources for teaching and learning during NAIDOC week, the Get Into geology series of learning objects for a unit on geology, and That’s not fair (TLF learning object) for a unit on civics, citizenship and democracy, and she has been particularly pleased with their efficacy and the response from her students.

The class
Jane has 25 students in her Year 5 class. The general description of students above also applies to her class. Four of her students are Indigenous. Her project focused on two of these students with comparatively low-level literacy skills. Neither would have access to ICT at home.

The project
Area of investigation
Can TLF content help to develop students’ understanding of specific aspects of grammar and letter patterns?

This topic was chosen in response to specific identified student needs and fitted in with the class plan.

One of the students was fairly competent but had a specific learning disability, apparently a phonological awareness issue. He was unable to syllable count or segment words and had trouble hearing final sounds. He also had some physical problems with both ears.

The second student had major attendance and behavioural problems, and the hypothesis to be tested was whether more individual work would increase his level of engagement and interest and reduce the level and amount of his disruptive behaviour.

TLF digital curriculum resources used
Letter planet series
L1277 Car crash (finish the story)
L6184 L6185 Abandoned house series

Activity
The two students were given an opportunity to work on the learning objects while the rest of the class was engaged on work on the same topic. They also had dedicated one-on-one time with Jane to work more closely with questioning, prompts and other support. These times also gave them an opportunity to indicate what they had learnt, which they did with the aid of screen shots from the learning objects on which they identified what they had learnt.

The concepts were first introduced to the whole class and ‘normal’ activities were completed to expose students to the idea and examples of conjunctions, similes and adverbial phrases. As a follow-up to these lessons, the learning objects were used to revise and consolidate the grammatical features previously taught. With Car crash, the narrative was read together with the whole class and a class discussion was generated about the three previously introduced grammatical features. Students then individually completed the activities in the learning object. The students were then asked to print out the final copy of the narrative they had edited and were asked to indicate the grammatical features in the text. A similar process was followed for Abandoned house.

There were some difficulties encountered.

The first student needed to be assessed by a speech and language pathologist to learn more about the nature of his difficulties and determine the cause of his inability to detect sounds. This did not occur till late October, six months after the request and towards the end of the project. In this case,
Jane found it difficult to find learning objects that targeted phonological awareness in particular. *Letter Planet* proved too easy for this student.

The second student was not in class for 19 days during the period of the project due to absence, internal suspension and shift to a ‘buddy class’.

Timetable changes caused some problems with access to the multimedia centre when it was required for the project and there were some hardware problems which hindered plans and progress.

Jane would have liked more options for generating responses online to the *Car crash* learning object, which, otherwise, she thinks is an excellent resource.

**Results**

Jane was delighted with the results of using the materials for the whole class. ‘You couldn’t have got that quality of teaching without the use of materials like that.’

She chose three methods of assessing what had happened with the two students: a test series, students indicating their understanding of what they had learnt by identifying grammatical features on a screen shot, and her own observations of their behaviour.

Her own observations were positive. ‘Both students were notably more engaged in their learning while using the learning objects. The student with the hearing problems benefited greatly from the audio instructions. It also supported the development of his literacy skills. When using the digital content, the other student was always engaged and interested. Both students appreciated and responded to the immediate feedback on their performance. They were also extremely helpful to the teacher, enabling greater insight into the students’ understanding of each grammatical concept and their ability to apply this understanding in new and unfamiliar situations. In particular, the ‘new’ narrative at the conclusion of *Abandoned house* provided students with the ability to demonstrate the knowledge they had acquired.’ (See below.)

The tests used were the Vocabulary Progressive Assessment Test (VPAT) and the Comprehensive Progressive Assessment Test (CPAT).

**Student One**

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
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<tbody>
<tr>
<td><strong>CPAT</strong></td>
<td>8th percentile</td>
<td>23rd percentile</td>
</tr>
<tr>
<td><strong>VPAT</strong></td>
<td>4th percentile</td>
<td>29th percentile</td>
</tr>
</tbody>
</table>

**Student Two**

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPAT</strong></td>
<td>38th percentile</td>
<td>38th percentile</td>
</tr>
<tr>
<td><strong>VPAT</strong></td>
<td>45th percentile</td>
<td>79th percentile</td>
</tr>
</tbody>
</table>

It would be problematic to assign such significant gains in three of the four of these results to work with digital curriculum resources. However, there is very strong evidence that there have been some very direct gains. What follows is an example of identifying grammatical features from a screen shot (from *Car crash* in this instance). This is the work of Student Two.
Finish the story: car crash - (TLF L1277 v3.0.0)
Westminster Primary School, Westminster, Western Australia

Context
Westminster Primary School is located in the northern suburbs of Perth, eight kilometres from the CBD. The school was established in the late 1950s. The suburb is largely residential, and is undergoing demographic changes, largely because of its proximity to the CBD. The local community is becoming more diverse because of increased amounts of public housing and housing for refugees being provided in the neighbourhood.

The school
There are three schools on this site: the primary school, a Junior Primary School and an Education Support Centre. The school is categorised as Band 2: that is, it receives the second highest resource allocation based on the low socioeconomic status of its students.

The school has a principal and a deputy principal. There are 11 teaching staff and a chaplain. The school has appointed a level 3 teacher, who takes leadership in the science learning area. There are six ancillary staff members. Teachers work in tandem across six classrooms.

The school has a core of staff members who are experienced in teaching in this type of school. In 2008, just under half the teaching staff were newly appointed to the school.

The school has well-established grounds and older buildings.

The school was co-winner of the 2008 Science School of the Year in the WA Education Awards.

The school runs a breakfast club and a rainbow club, designed for students who have experienced trauma. It is intended to build their resilience.

The students
There are 158 students in Years 4–7 and 220 in K–3. The student numbers are trending upwards.

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Students from both schools work in the Education Support Centre, and students with a disability cross over into the mainstream. There are 25 students who have a refugee visa and about 1/6th of the student population is Indigenous. The student profile includes a ‘big population’ of English as an additional language students. Some of the students have family backgrounds of third generation unemployment.

The student numbers are not much affected by transience. Attendance is a few percentage points below the state and district average: 6 per cent of the students attend less than 80 per cent of the time.

Achievement against the benchmarks for literacy (writing and spelling) and numeracy is above that of like schools, with about 13 per cent of students achieving below the benchmark in Year 5. This is broadly replicated in Year 7. Scores for the reading benchmark are lower at Year 5. Comparison with Year 3 benchmark data shows that students improve their achievement between Year 3 and Year 5.

ICT at the school
Westminster was a member of the 100 schools project from 2006. In the past, the computing equipment was old and unreliable. The school now has a reliable network and new computers.

There are four computers in each classroom in Years 1–4 and four have IWBs. The library has six networked computers and an IWB. The school will complete its rollout of new computers and IWBs in 2009. The school also has video cameras. There is a bank of computers in a corridor, which students can use at break times.

The principal feels that the school’s ICT capacity has gained momentum with the network, financial support and the recent power upgrade. In his view, this means that teachers are using the equipment more, whereas in the past, the system’s unreliability discouraged them. He estimates that 90 per cent of the staff are very good at using computers in teaching and learning. The school has an expectation that teachers will use ICT, and he has found that they are willing to share successes with each other and to ask for help.
The curriculum approach to ICT is to make sure that their use is integrated into learning, as opposed to a stand-alone activity. The principal believes that ‘a walk down the corridor’ will demonstrate the level of integration, and show that the ‘kids love doing it’.

Teacher participant: Laurel Strobl
Laurel has been at Westminster Primary School for the past 19 Years. She was a mature-age graduate and has taught in the metropolitan area since then. She has taught at all primary year levels. She is ‘greatly interested’ in literacy and numeracy, in particular with students in low socioeconomic schools. She is concerned about the ‘great tail’ at the lower end of student achievement and has been the Students at Educational Risk coordinator for five years. She thinks that it is important when teaching ‘to deal with it as it is’ and tracks student progress routinely.

Laurel has been interested in computing since she first bought herself an old one while she was training to be a teacher. Using ICT was ‘touched on’ during her training. However, she realised that she would have to skill herself to use ICT in teaching and learning once she came to Westminster. She attended courses after school and taught herself, using online resources, including those for teaching and learning. (She thinks that the BBC materials are useful for ‘drilling and practice’ with her students.) She wanted to teach the students herself, and taught them word processing, by working on brochures for studies of society and environment, in the library computer lab.

Laurel uses ICT ‘all the time’ in her program, to enable students to demonstrate outcomes from all areas of the curriculum. She bookmarks and saves sites to the students’ folders and directs them to their use. She also accesses home computers with those students who have access, by emailing links to them, for example typing tutor programs, as well as putting the links on her shared folder. Another example is the program she developed in studies of society and environment, where she established a WebQuest, using links she had put together, so that students could engage in current affairs, focused on the election campaign for the US president. She established links from that to the civil rights movement and other relevant US history. She used the IWB in class and said the students ‘were mesmerised’, especially the students with an African or Indigenous background. Students can access the class computers from 8.30 am, and Laurel has placed activities and animations in the folders for the students to use. Many of them use the computers out of class time and are confident users who share their knowledge with their peers.

Laurel is one member of the network of teachers who evaluate and test prototypes of TLF digital curriculum resources for numeracy, the numeracy teachers’ focus group.

The project

Area of investigation
Can TLF content help develop an understanding of multiplication and division?

TLF digital curriculum resources used
LO106 The array
LO108 The array: go figure
LO2056 Pobble arrays: make multiples
LO2057 Pobble arrays: find a factor
LO2058 Pobble arrays: find two factors
LO2059 Arrays: factor families
Activity
Laurel’s project was implemented in her Year 5–6 class. She found that two of her Indigenous students, as well as the recently arrived refugees, were not confident about basic number facts and were having difficulty developing their mental strategies for multiplication. Two other Indigenous students in the class were not included in the project because they were competent in this area. She established a group of these students, and worked with them while the rest of the students worked independently.

Laurel’s group used the IWB, and she used the learning object to explain and demonstrate rows and columns. Students used the IWB to complete arrays and count the number of rows and columns. After completing the learning object and drawing arrays to match given multiplication facts, some of the students in the group could correctly answer multiplication questions. Others had to count the squares to get the total. Students found it hard to verbalise the difference between the arrays, and Laurel had them develop arrays using features from the classroom, for example the room windows (6 columns ×2 rows). Students then drew arrays using squared paper that matched a variety of multiplication facts that Laurel had written on the IWB. One of the Indigenous students did not complete the task correctly, along with two of the English as an additional language students. Then Laurel used the learned facts drop-down facility in the learning object and said the students ‘were impressed’ with the number of facts they had calculated and the arrays they had drawn. They visibly gained confidence in their own ability to learn by the end of this session.

The next part of the activity, in the following week, used Go figure to extend the work. One of the students had been absent for the previous work, and so Laurel went back to the original learning object with him. The students worked through the learning object, translating the facts onto squared paper. One of the Indigenous students who was behind in his grasp of the concepts asked to use a multiplication site before school, and Laurel noticed that he and some of the others in the class were ‘getting very involved’ learning some of the table facts through an interactive times table game (www.woodlands-junior.kent.sch.uk), used as part of this section of the program.

In the next iteration, Laurel used Pobble arrays, because the students had shown that they understood the basic idea of rows and columns in arrays and related it to ‘lots of the same number’. Laurel worked with the students predicting the answers to problems posed in the learning objects. She moved between the learning object and using the IWB to demonstrate and explain, with the whole group helping to solve the problems.

Again, the concepts were revised using Arrays. Most of the group could now describe an array and its purpose. After using Pobble arrays: making multiples, the students began to see ‘the relationship between the grouping of the two digits in their arrays and the sharing out of a total into rows with equal numbers of pobbles in them’.

Results
At the end of the series of activities using these learning objects, Laurel observed that the Indigenous students had improved. Their attitude was more confident, and they wanted ‘to have a go’. She also thinks they became more positive because they could do the work. She also attributes this success to the way the group could use the learning object on the IWB, and find it supportive and ‘non-threatening’. Laurel can see some improvement in learning outcomes as well. The Indigenous student who used the materials out of class passed a recent maths test for the first time. Laurel would like the school to have banks of laptops and peer tutors in the lab, so that the Indigenous students could access these kinds of activities outside the school, because she believes that access and practice are keys to success.

The students completed a survey about TLF digital curriculum resources. One of the Indigenous students thought that the learning objects helped him ‘learn more than a maths book’ and ‘have fun learning’, while another enjoyed the opportunity to work alone.
Teacher participant: Frieda Allingham
Frieda has been teaching for 20 years in primary and pre-primary settings in the metropolitan area of Perth. She has been an art specialist for 17 of those years. She has had service breaks for children. This is her first year as a permanent teacher and her first year at Westminster.

Until this year, Frieda has not had much experience with ICT. She has found it much easier to access ICT through the classrooms than through the computer lab. The other reason she is using ICT more is that she finds the students are more independent users of ICT than previously, and she feels confident to support them. She has accessed professional development opportunities provided through this school. Other than that, she says, she has picked ICT up by herself.

Frieda worked with Laurel in this project, and the project covered some of the same ground as the one implemented by Laurel.

Area of investigation
Can TLF content help develop an understanding of multiplication and division?

TLF digital curriculum resource used
LO106 The array

Activity
Frieda is teaching a Year 5 class of 26 students. Most of the students in the class are English as an additional language learners, and five of the students are Indigenous. Within those five students, Frieda sees a wide range in experience, background and skill. Several of these students are irregular attenders, and one is identified as having behaviour problems. One of the boys is achieving well in numeracy and literacy. The students can access the computers in their classroom, although they do not have much access out of school. Frieda concentrated her activity on two of the Indigenous students in this class who perform below the numeracy benchmarks. She picked numeracy because the students had no strategies for working out two-digit computations. She thought that the very concrete and visual approach in the learning object would help these students. These two students worked on the learning object independently, on stand-alone computers.

The first time she used the learning object with the students, they did not ‘get the concept’. On the second attempt, one ‘got it and kept going’. This student was also observed teaching another student how to use it. She can now apply the concept to other situations, and this limited intervention has been seen to be very successful for her. The other student is now beginning to apply the concept into other situations.

Results
Frieda sees this activity as very useful to both the students and herself, especially ‘considering how many things [she] has tried’ to develop students’ understanding of this concept. She thinks that the learning object worked with these two students because they could work at their own speed and work independently. This is in contrast to their more usual experience of responding to questions in the whole class. She thinks that they could work ‘less self-consciously’ and that the students, through working as individuals on a stand-alone computer, developed a greater level of confidence. Frieda believes that the visual prompts in the learning object support student learning and made it plain to the students what they were expected to do, and did so with direct instruction. This predictability also increased their confidence.

Frieda observed that one of these students who has attention deficit disorder, was able to ‘hold it [attention] longer’ when working with the learning object on the stand-alone computer. He finds it difficult to work in small groups or on his own. This methodology appeared to engage him, to the point where he could articulate his understanding orally, if not yet on paper. In addition, this student increased in confidence when he learned how to logon, find the learning object and work ‘happily without looking for assistance’. The volume of work he achieved was remarkable, given previous experience, as was the time he spent on task.
Frieda thinks that the activity with the TLF learning object has contributed to her having a better assessment of these students’ skills and understandings. She found that the activity gained results and ‘quite quickly’. She now believes there is a place for activity that is not only concrete. She plans to use more learning objects and wants to provide activity relevant to the skill level of the range of students, as she now thinks it will keep the capable students, as well as the struggling students, more engaged. She thinks the learning object was useful at reinforcing what had been introduced to the students because, although it was a form of drill, the students thought it was fun and colourful.

Implications for consideration
For low-achieving Indigenous students, the learning object provided opportunities for successful learning.

TLF digital curriculum resources provided opportunities for drill and practice, in a format the students enjoy.

Using TLF digital curriculum resources improved the Indigenous students’ confidence and skill levels.
Weipa Campus, Western Cape College, Queensland

Context

Weipa is on the shores of the Gulf of Carpentaria, about 600 kilometres by plane and 850 kilometres by road north-west from Cairns. The Indigenous people of the area – the Troch peoples – have traded with peoples of the Indonesian archipelago for centuries. The peninsula, which forms one arm of the Weipa bay, named Cape Duyfken by Matthew Flinders, is likely to have been the first part of Australia sighted by Europeans in 1606. A Presbyterian mission was established in the area nearly 300 years later, in 1892. Today it is a town with a population of about 3,500, with the sorts of facilities which might be anticipated in towns of that size elsewhere in the country. The town is home to the largest bauxite mine in the world and the service industries which support such an enterprise.

The first government school opened in Weipa in 1967. Western Cape College, a P–12 college, was created in 2001 and opened in 2002 through the amalgamation of schools at Weipa, Aurukun, Napranum (Jessica Point) and Mapoon. The largely Indigenous campus at Napranum (12 kilometres south of Weipa) was closed in 2005, with its students enrolling at Weipa. Campuses still remain in nearby Mapoon to the north and in Aurukun to the south.

The school at the Weipa Campus is structured in three stages: Junior (P–3), Middle (4–9) and Senior (10–12). In the Middle Years stage, students spend most of their time with ‘core’ teachers in homerooms. The Bound for Success Curriculum Framework, common to and consistent across government schools in far north Queensland, is used for all unit planning and common moderated assessment procedures, the ‘tasks’ referred to below. The Weipa Campus has a large staff, teaching and support, which is not subject to the high levels of turnover of most schools in very remote locations, perhaps because there are considerable attractions here for people who like outdoors activities. A Special Education Unit with a staff of four supports students with disabilities, and the Learning Support Team also has a staff of four with two additional part-time Reading Recovery teachers. The school also has a substantial number of teacher aides.

The total enrolment at the three campuses is more than 1,000, with the bulk of these students (980) at the main campus in Weipa. About half the Weipa students are Indigenous, with almost all enrolments at the remaining two campuses being Indigenous. The Weipa Campus has grown very rapidly in recent times, almost doubling its enrolment over the past four years. The mine operations have increased in scale with a proportionate impact on the workforce, but it was also suggested that local confidence in the school has increased markedly and thus fewer students are going away to school. Academic outcomes have improved significantly over the past four years. Numbers in Year 12 have gone from 13 to 32 in the past two years, and it is estimated that enrolment at that level for 2009 will be 56, about half of whom will be Indigenous students. The opportunities that mine work presents provide an incentive for students to remain at school and succeed. Western Cape College places a very strong emphasis on post-school outcomes, or either ‘earning or learning’ as they are described. Career planning commences in Year 9, and the Structured Workplace Learning Program available for senior students is very popular.

It was suggested that the Indigenous students living in Weipa from families with jobs were well integrated into the demands of schooling and comparatively successful, but the ones from Napranum displayed the sorts of variability in that regard more typical of a remote community. It is worth mentioning that not all Indigenous students living in Weipa had family ties with Napranum, with many coming from other quite distant parts of Queensland or being in families where only one parent is Indigenous.

Learning through the use of ICT has been made a priority across the three campuses and is an element, in particular, of the school’s Middle School vision. It is strongly supported through the school’s internal professional learning program. The Weipa Campus has three computer labs and a class set of ‘tablet’ computers. Classrooms have up to six desktop computers and all teachers have laptops.

Teacher participant: Lee Ivers

Lee, a generalist primary teacher by training, has been teaching for 14 years in a wide range of settings. This is the second time he has taught at Weipa. It was also the site of his first appointment.

At his last school on Horn Island in Torres Strait, he was the ICT support teacher, a specialist role which involved supporting staff as well as providing ICT learning across the school for students and playing a
key role in the administration of moderated assessment tasks. He describes the development of his interest in ICT as ‘falling into it’. In order to teach overseas, he undertook a graduate diploma course in English as a second language teaching and two of its component subjects were related to teaching and learning with ICT. Subsequently, it has become ‘a burning passion’. He is a regular participant in the related professional learning provided by the school, although he notes that most of his learning has come from watching excellent teachers work with these tools. Now, he ‘couldn’t imagine working in a classroom without digital resources’.

His home class is a Year 7 group of 23, of whom 20 are regular attenders. One is rarely seen and the other two attend sporadically. He takes them for their literacy and numeracy blocks and for two weekly hour-long sessions for ICT as well, thus teaching them for about two-thirds of the week. He also has a role at Weipa in supporting work related to the moderated assessment tasks. A teacher aide works with his class for a portion of the week, mostly providing in-class support for individual students.

In terms of basic skill levels, Lee describes his class as falling into thirds: one-third working at average/high mainstream level, one-third with a very low level of skill (with ‘gaps you could drive a truck through’), and the rest somewhere in the middle. Some of the students, fewer of the Indigenous than the non-Indigenous students, have computers at home. They are used there mostly for downloading music and game playing.

This is the ‘tablet’ class. All students have individual tablet laptops (portable computers which can be operated with a stylus or digital pen, or a fingertip, instead of a keyboard or mouse). Lee notes that a reasonable level of literacy is required for this particular digital resource to be used successfully – rather as a spellchecker requires some idea about correct spelling for effective use. ‘It can produce some additional levels of difficulty and become way too onerous. For some kids it’s a drowning experience. ICT can be used as a wonderful teaching tool for things like demonstration, reinforcement and for the ability to research. But the sorts of learning activities you provide must be varied. You don’t, shouldn’t, use them [ICT] all day.’

That said, Lee uses a wide range of digital resources, including those from TLF, with his class. He accesses TLF digital curriculum resources from the Queensland Department’s Learning Place and finds them particularly valuable for numeracy/maths. ‘They are a “go to” for maths. The visual support elements are great and I find the vast majority benefit. The brighter ones can surge on, and lower end kids do develop new skills. Their capacity to support reinforcement without it becoming boring is very important.’

The students who enter his class have a range of skills and skill levels in using ICT. Many of them are very capable users of PowerPoint, reflecting the interests of their previous teachers; some have had experience with digital movie making.

**The project**

**Area of investigation**

*Can TLF content help a student with an intellectual impairment and a hearing impairment recall basic multiplication facts related to 2s, 5s, and 10s?*

As may be obvious, this area of investigation was chosen to see if the learning of an Indigenous student with a range of problems could be more effectively supported through the use of TLF learning objects related to maths.

The boy in question has a moderate hearing loss in both ears and some degree of intellectual disability. He uses a bone conductive hearing aid with the room wired with a sound field system. Nonetheless, he misses a lot of class discussion, misses words and word endings, has trouble explaining to others, is easily distracted and tires quickly. Unsurprisingly, he has a very low level of basic skills. He reads at a Year 1 level, he has a basic level of spelling (‘quite good’) which he tends to be able to remember, but his numeracy skills are minimal. For half his program he is with his home class (two sessions a week with an individual Indigenous aide; the preference is to have him working in the room with the rest of the class) and for half a day he participates in an alternative program.
Using The Le@rning Federation digital curriculum resources to enhance the education of Indigenous students

TLF digital curriculum resources used
L106 The array
L108 The array: go figure
L2057 Pobble arrays: find a factor
L2058 Pobble arrays: find two factors
L2056 Pobble arrays: make multiples

Activity
For one session a week over a period of a 10-week term, the student is provided with TLF learning objects that have been chosen to reflect the state of his numeracy development and supported with their use.

Results
This interview was conducted at the sixth week of this process, ‘halfway through, and still a work in progress’.

The prompts provided by the learning objects have been helpful and the stimulus they offer to the student’s learning are good. When he is working by himself on the computer, the privacy aspect is very helpful, but at this stage major gains have not been made.

There has been some improvement in his understanding of ‘doubles’ and to a lesser extent in counting by fives, but without a high level of support he knows no more multiplication facts by heart. ‘With maths unlike literacy, he doesn’t see the point of learning.’

Teacher participant: Debra Taylor
Derbra, the oral language coordinator at the Weipa Campus of Western Cape College has been teaching for more than 20 years, for the last four of these at the Aurukun and Weipa campuses of the college. She is a long-time user of ICT and believes that ‘they should be at the forefront of education, especially for Indigenous kids’. She believes that computer use frees students of some of the difficulties of issues about identity and race by providing a more neutral and less culturally mediated learning environment. She also notes the value of learner control and the ease of revisiting material. For Indigenous students, this means they are no longer grappling with the demands of learning in another language. Put simply, using ICT reduces the stresses and strains of trying to keep up with the teacher’s spoken Standard Australian English.

Debra works with all the Year 1 students in groups of 20–25 for two lessons per week. She has the Indigenous students of Year 1 for one ‘block’ (70 minutes) each day, and her specific task is to build skills in Standard Australian English, by building on their Indigenous language skills. Of the 25 students under discussion, 20+ would be learning Standard Australian English as an additional language to their home languages, various local languages and creoles. For these Indigenous students, it is not just a case of learning another new language but about being exposed to the written word at the same time. Few have had access to anything like computers at home or exposure to any literacy materials in their home language. Their literacy and numeracy skills are being built from scratch in their new language, Standard Australian English.

Debra described attendance as ‘consistent’, which needed qualification in local terms. The average number of days missed was between 50 and 80; 105 from one particular student, or more than half the year, was the worst.

In the particular classroom where Debra is based, there is no computer access. For one block a week, one of the computer labs is available, but it is set aside for whole class use. For the purposes of this project, Debra used her laptop.

The project

Area of investigation
Can the use of appropriate TLF content help Indigenous students with English as an additional language increase their acquisition of Standard Australian English and their level of engagement?
This area of investigation fitted naturally with Debra’s teaching task, group of students and belief in the value of working with ICT. ‘I can’t work it out. How can my Aboriginal and Torres Strait Islander kids do Mathlab, use Scootle, and do all that stuff, while in the classroom they seem to have no idea?’

She chose to work with two students who were finding learning particularly difficult. The female student (T) was reading at ‘dictated’ level, the male student (R) was a regular absentee.

**TLF digital curriculum resources used**

L7852 Letter planet series

**Activity**

Pre-testing was conducted before the start of the project. This test involved both qualitative and quantitative data: an oral language transcript, a word recognition list, general observations about computer use and levels of engagement with the task, along with comments from the classroom teacher. Post-testing occurred at the end of the project.

Each student was withdrawn from class for three sessions per week for 20 minutes each time over a four-week period. They worked on a literacy-based learning object (see above), appropriate to their ability and needs.

**Results**

*Student 1:* In the first session, T initially found it hard to manipulate the object, and then she decided to go too fast without listening to the instructions. At the beginning, she couldn’t comprehend what the digraphs were about but did improve as time went on. She stopped at the second task. She didn’t know anything about ‘space’ or ‘aliens’. During the second session, she found the navigation easy and began enjoying the task, listening to the instructions and began to talk along with the sound from the computer. She could identify the relevant words and was beginning to connect sentences. Her responses when completing the tasks was increasingly correct first time.

By the third session, she was working quickly and comfortably with the computer (‘she’s a star at manipulating the program’), even putting wrong answers in deliberately to see what happened and possibly to prolong her time working on the computer. She was able to restate a sentence from the instruction page, ‘Look at the good book’. She showed big improvements in her sentence making, was reading for meaning and recognising some new words – but not the digraphs, which she would refer to by the names of the letters, and on the computer, not on the paper word list being used for testing – as well as recalling. The teacher commented that it would be valuable to include a requirement/opportunity for students to repeat oral prompts. The fourth session was similar to the third. There was still no transference from the computer to the word list. The teacher speculated that the word list may contain too many words and be too difficult.

The summary of pre-test and post-test data with some observations was as follows.

<table>
<thead>
<tr>
<th><strong>Pre-test data</strong></th>
<th><strong>Post-test data</strong></th>
<th><strong>Observations</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcript</td>
<td>Required repeated prompts from assessor to enable conversation to occur.</td>
<td>Able to connect program content and context to conversation.</td>
</tr>
<tr>
<td>Responses when completing computer task</td>
<td>Quick to grab hold of pattern and steps. The sentence creation was a major struggle.</td>
<td>Completing word find was easy. She would deliberately make errors to extend computer time. Her sentence creation improved dramatically.</td>
</tr>
<tr>
<td>Word recognition checklist</td>
<td>No result.</td>
<td>Very little progress.</td>
</tr>
<tr>
<td>Computer proficiency</td>
<td>Quick to engage and pick up requirements.</td>
<td></td>
</tr>
</tbody>
</table>
**Student 2:** Only two sessions were conducted with R. He was extremely quick at taking control of the program, which meant he was more interested in the program and in its technical mastery than the actual content and its purposes. He went through the sentences quickly and got most of the material ‘correct’ without listening to hear if he was making sense. The same difficulty emerged regarding any knowledge of what an alien might be. The context was outside his knowledge and experience, although he got the idea of fuelling up and referred to the spaceship as a truck before correcting himself.

During the second session, he remained absorbed in the process of using the computer. He discovered there were several ‘mouse’ navigation options and investigated these while still being disinclined to wait for instructions. He was able to identify and use the three digraphs easily and began to say the words along with the computer when he dragged and clicked. He began looking for meaning in some sentences.

**Implications for consideration**

The results from Debra’s program are quite adequate to indicate that more extensive use of digital curriculum resources could be of value to these children. Obviously, they would need more accessible hardware. The context, aliens filling up a spaceship with flying words that represented fuel, was far removed from the experiences of the Indigenous students, which reduced the potential for learning. Also making the sounds being studied relevant to the language needs of Indigenous language learners is another must. Both students were able to show the benefits of being in control of their own learning, of being able to replay instructions when needed, and of not having to struggle with the code switching that listening to Standard Australian English speaking teachers demands of them.