

# Connecting authentic activities with multimedia to enhance teaching and learning, an exemplar from Scottish history

## ABSTRACT

*Much of the current focus on maximizing the potential of ICT to enhance teaching and learning is on learning tasks rather than the technology. These learning tasks increasingly employ a constructivist, problem-based methodology especially one based around authentic learning. The problem-based nature of history provides fertile ground for this approach when combined with the scope for enquiry provided by primary and secondary sources. Barnhill forms one in a series of CD ROMs on themes within Scottish History which combine a wide range of historical sources and learning tasks including those built around authentic learning. The context is Scotland's History, but both the design of Barnhill and its learning tasks have a much wider application*

## INTRODUCTION

Commenting on the impact of ICT on Australian Schools, Taylor and Young (2009) concluded that ICT had not realized its full potential. Her Majesty's Inspectorate of Education in Scotland (2007) reached a similar conclusion when reporting that 'in the impact ICT has had on learning and teaching, excellence exists only in isolated pockets'. These findings suggest that ICT has not transformed teaching and learning in ways claimed by its early advocates (Dryden, 1994) and appear to support Dillon and Gabbard's (1998) contention that many such claims were unfounded. According to Prensky (2001a), this failure opens a wide gap between 'digital natives' and school-based learning.

Nevertheless, ICT allows access to a wider range of resources than are readily available in conventional formats which when combined with sound pedagogy creates powerful tools for learning. This article discusses the impact on teaching and learning of *Barnhill*, a multimedia CD ROM supporting investigations into Victorian attitudes and policies towards poverty as illustrated by Barnhill Poorhouse (Workhouse in England and Ireland) in Glasgow, the largest institution of its type in Scotland. The evaluation of this CD ROM demonstrates that ICT can enhance learning so contributing to the more general debate over ICT. However, this evaluation stresses the centrality of pedagogy, especially one built around the development of knowledge, understanding, and enquiry within an authentic framework. *Barnhill* is one in a series of related multimedia resources and, while the context relates to Scottish History, the overall themes and learning tasks find parallels in many other countries.

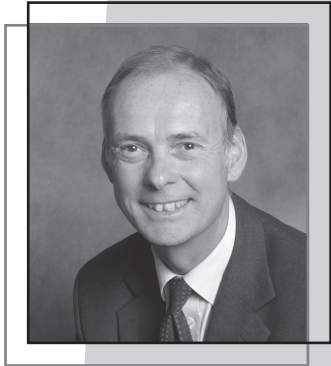
## ICT IN TEACHING AND LEARNING

ICT and history education have often been regarded as well matched bed-fellows with the new technologies supporting access to and interpretation of primary sources. Munro (1990) argued that there were 'powerful learning advantages to be gained' from datasets of census information since they supported the formulation and testing of hypotheses, local history, and comparisons over time. Nonetheless, more sceptical voices raised doubts over the actual impact made by ICT on teaching and learning across all disciplines. Cuban's (2001) study concluded that the impact of computers had not been transformational since teachers had adapted this

innovation 'to existing ways of teaching and learning'. Cuban's conclusions conflict with evidence that ICT can enhance teaching and learning, especially in history, by supporting the interrogation of varied primary and secondary sources including census data (Spaeth and Cameron, 2000), developing historical understanding and skills (Calandra and Lee, 2005) and catering for diverse learning styles (Gardner, 1999).

Much of the current research into enhancing teaching and learning through ICT focuses on the learning tasks, notably authentic activities, where learning is achieved by the active construction of knowledge supported by several perspectives in real life contexts (Oliver and Herrington, 2003; Reeves, 1999). Authentic activities also integrate assessment into the challenge (Schwartz et al 2000) and find parallels with problem-based learning in that the starting point for learning should be a problem, query or puzzle that must be solved (Boud and Feletti, 1997). History is problem-based and as such provides fertile ground for authentic learning.

In Australia and Scotland, the interrogation of historical evidence is fundamental to history teaching (National Centre for History Education, 2009). The national history course for the middle years of Scottish Secondary Schools stipulates that pupils must evaluate sources with reference to their historical significance, the points of view conveyed in them and to the relevant historical context (Scottish Qualifications Authority, 2007). An enquiry methodology built around primary sources helps pupils 'do' rather than simply receive History (Haydn, Arthur and Hunt, 1997) with technology making sources more accessible for pupils and more manageable for teachers (Lee and Clarke, 2004). Therefore, the increasing use of primary historical sources provided further potential for ICT to enhance teaching and learning.



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## MULTIMEDIA CD ROMS

Authentic learning, multimedia and the emphasis on primary sources provided the context for a series of CD ROMs produced for schools on the central themes of nineteenth century Scottish History, namely, Highland Clearance, agricultural changes in lowland rural Scotland and the impact of industrialisation and urbanisation. These themes find parallels in many other countries and the resultant emigration from Scotland influenced Australian History. The programs include:

*Tiree, Famine and Clearance* (1996) provides a case study into famine and clearance in the Highlands and Islands;

*Doon the Watter* (1997) covers the first example of a modern mass tourist industry with holiday makers travelling by train and paddle steamer down the River Clyde or going 'doon the watter';

*Auld Reekie and the Dear Green Place* (2001) allows pupils to investigate contrasting lifestyles in Victorian Edinburgh (Auld Reekie) and Glasgow (Dear Green Place);

*Changing Scotland, Scottish Society 1880-1939* (2003) focuses on the impact of industrialisation and urbanisation on people's lives;

*Barnhill* (2005) analyses the largest Poorhouse in Victorian Scotland;

*Ruled by the Seasons* (2009) examines life in nineteenth century rural Scotland.

*Changing Scotland, Scottish Society* was produced for pupils in Secondary Year 5 (pupil age 17) with the other CD ROMs developed for pupils from Primary 6 to Secondary 2, pupil ages 11-14. Nonetheless, the CD ROMs feature a similar range of primary sources with census databases forming a spine through each program. *Changing Scotland* contains the population census returns of six Scottish towns selected to illustrate features such as housing conditions. One pupil noted that this database was useful in investigating the past since 'you can see different people that lived at the time eg how many people were living in the same building'.

Other primary sources, chosen for the insights they provide into the past, supplement the census: photographs; drawings; advertisements; autobiographies; diaries; film; music; newspaper articles; poems; dramatic reconstruction; recipes and letters. These sources link to learning tasks designed to develop knowledge, understanding and skills, such as searching a database, looking for information and justifying findings. The following screenshots, taken from the chapter in *Barnhill* which allows pupils to investigate what happened to children, illustrate the links between information, sources and learning tasks.

Initially pupils study Rose Napier's application for poor relief, Figure 1, and search for her entry in the 1881 census as an inmate in Barnhill, Figure 2.

Figure 1. Rose Napier's application for poor relief.

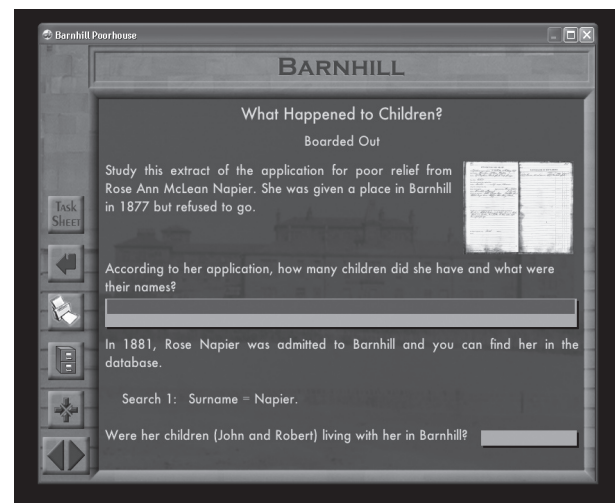
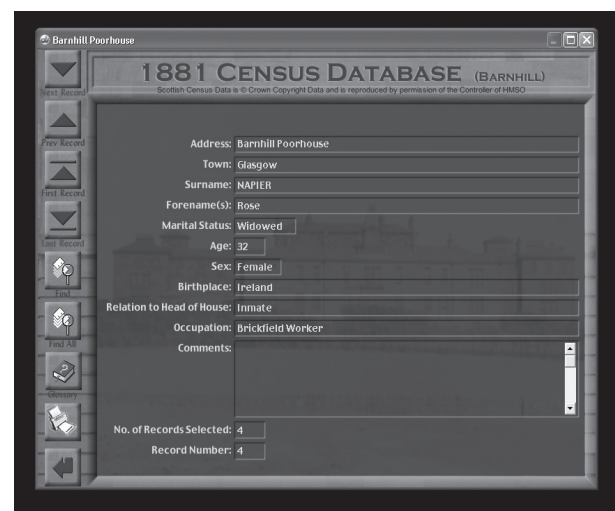
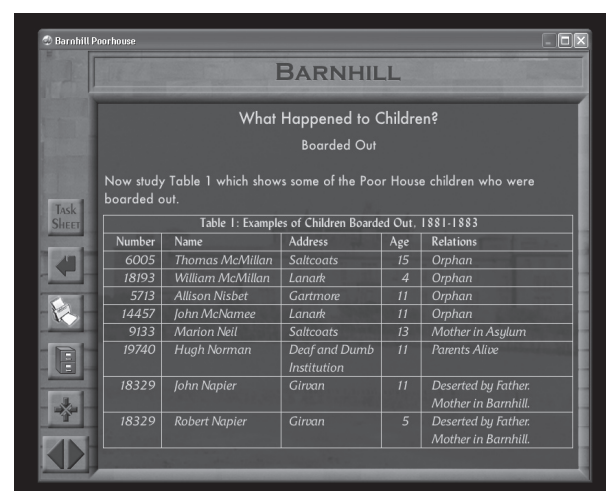


Figure 2. Rose Napier's entry in the census database.



Rose Napier had two children, John and Robert, neither of whom were living in Barnhill with their mother. Pupils have to locate John and Robert from a list of boarded out children, Figure 3.

Figure 3. John and Robert Napier, boarded out in Girvan.



Pupils then search for John and Robert Napier in the 1881 census for Girvan, a small town on the west coast of Scotland, Figure 4.

Figure 4. Searching for John and Robert Napier in the Girvan census database.

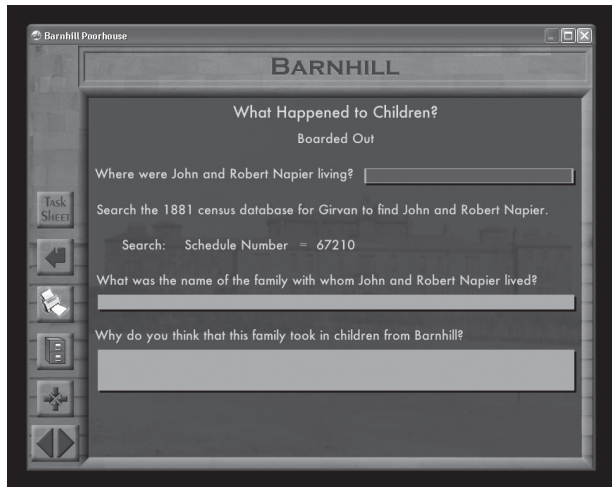
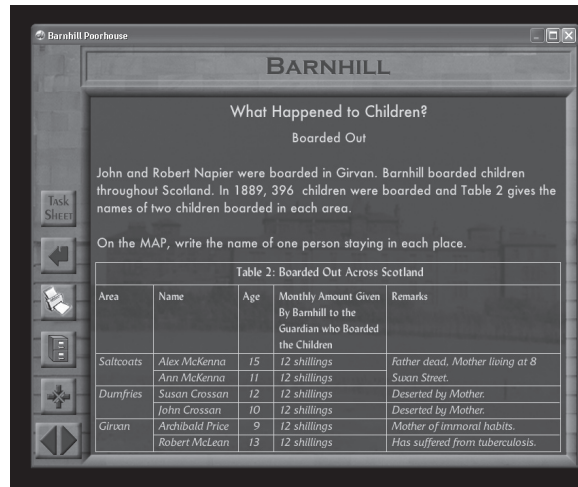


Figure 6a. Further information on boarded out.



Figures 5a and 5b show their entries in the census database.

Figure 6b. Further information on boarded out

Figure 5a. John's entry.

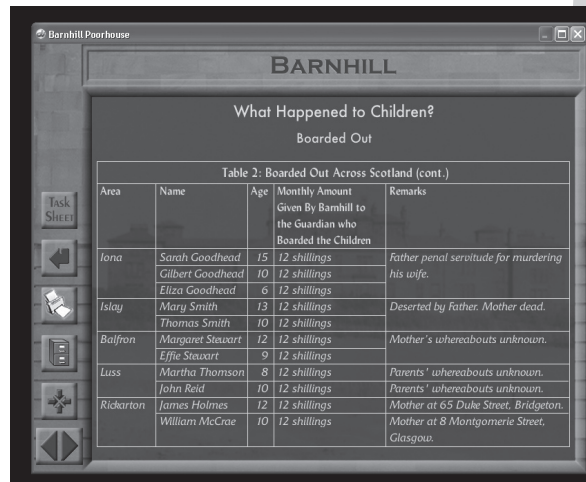
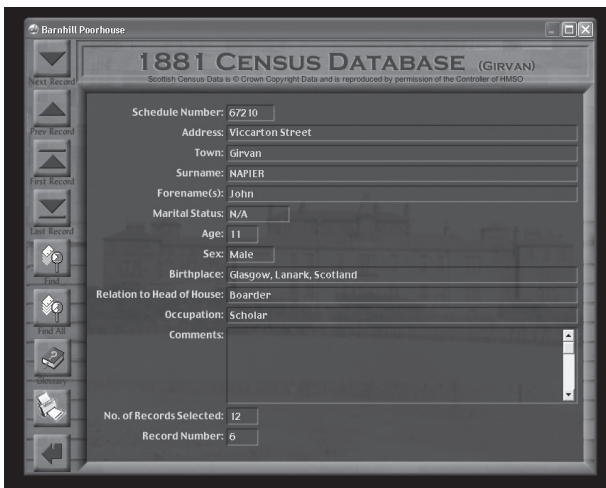
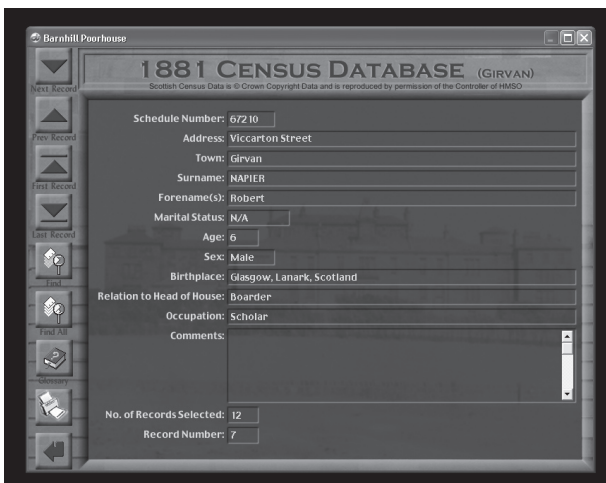


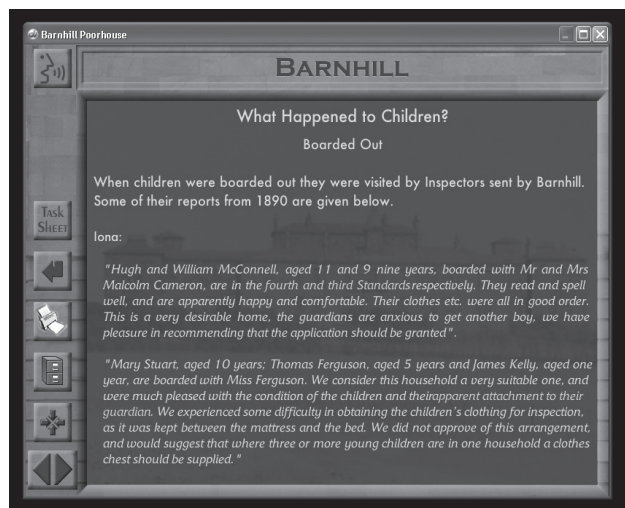
Figure 5b. Robert's entry.



Inspectors visited the boarded out children to check on living conditions, notably education, which the Victorians regarded as the main route out of poverty. These inspectors' reports give further information on the children, Figure 7. In the longer term many children were adopted by families and employers in the area in which they were boarded out, with girls often becoming servants and boys sent to work in agriculture, a trade or local business. Many Poorhouse and Workhouse children were sent to Australia (Public Record Office Northern Ireland, 2009).

The program then provides further information on where other children were boarded out and the money provided through the Poor Law for their keep-about £7 per year, Figures 6a and 6b.

Figure 7. Inspector's report on boarded out children.



These screenshots provide a very small sample of the learning tasks ranging from analysing sources to searching for information. In the above section on what happened to children the tasks include compiling a database of boarded out children, Figure 8, and writing a letter as a boarded out child, Figure 9.

Figure 8. Pupils task to compile a database.

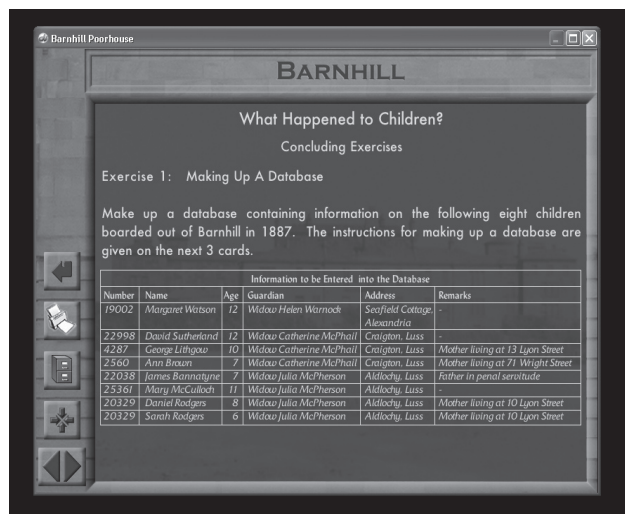
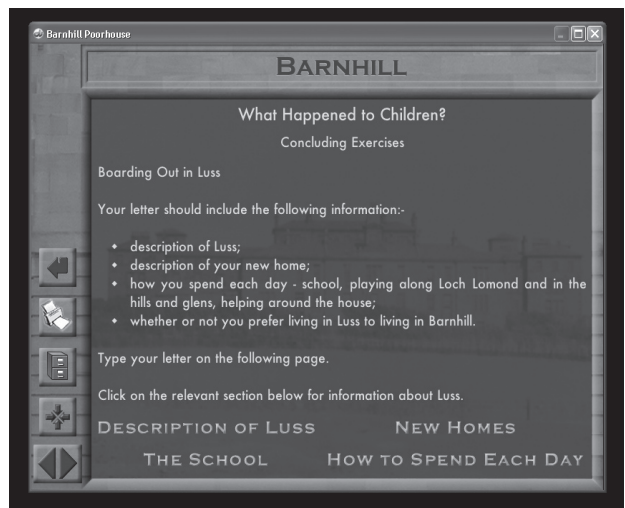


Figure 9. Pupil task to write a letter.



These and other learning tasks build to an authentic challenge in which groups of pupils are presented with a scenario whereby houses built on the site of Barnhill are being cleared so revealing artefacts from the Poorhouse. Pupils, working in teams of archaeologists, must select any three artefacts and give a presentation to a panel of experts from the recently opened Museum of Social Work to explain why their chosen artefacts should be displayed to illustrate life in a Poorhouse. Presentations must set the artefacts in context by providing background information on life in nineteenth century Glasgow. Finally, in a task designed to focus attention on the characteristics of an effective presentation, pupils complete an assessment sheet using an on-disc template for the museum expert to use when judging each presentation.

### PUPIL AND TEACHER EVALUATION

Sixty-three pupils aged 11-12 years and 3 teachers in two Primary Schools evaluated *Barnhill* between 2004 and 2006. The schools were chosen as having the necessary ICT resources, a range of pupil abilities, and a social studies' programme which included a Victorian topic. The evaluation used pupil and teacher questionnaires and interviews. A DVD showing pupils and teachers working with the program was also produced. Pupils evaluated their own ICT skills in such areas as searching a database and making up a multimedia presentation before and after working with the CD ROM.

The evaluation was carried out by the Principal Investigator with the evaluation of earlier programs influencing the design and development of *Barnhill*. One pupil evaluation of *Doon the Watter* noted that the program was not interesting, it needed 'a person or something to take us through and it should be more colourful'. Consequently, John Campbell, the fictitious name given to street boy, takes pupils through *Barnhill*.

Pupils were asked to comment on their reaction to the program, the primary sources and the learning tasks. Pupils then recorded the 5 most important pieces of information which they had learned about the Poorhouse and evaluated the impact on a range of ICT skills. A separate section contained questions on the Barnhill Challenge and its associated assessment exercise. The teacher questionnaire focused on the impact on teaching and learning from independent learning and skills through to classroom organisation. Teachers also evaluated the Barnhill Challenge.

### PUPIL EVALUATION

Pupil comments were generally positive with eighty nine per cent recording that they had enjoyed working with the program:

*'It showed you an example of how they lived their life in Victorian times';*

*'It made you think about people in their times and how they lived';*

*'Barnhill made you actually realise how poor people were and what they suffered';*

Reasons for negative evaluations included: 'it needed more visual representation'; 'was not interesting' and 'I got confused'. Some pupils would have liked it in the format of a game. This



last point concurs with Prensky's (2001b) call for educational software to be games-based matching pupil experience outside formal schooling. However, it would have been too expensive to program *Barnhill* as a game and the format was influenced by Mayer's (2001) seven principles of multimedia design which advocate excluding extraneous words, pictures and sounds.

Pupils rated the census databases, film, photographs and first-hand accounts as the most useful resources recognising the support to enquiry skills provided by the databases: 'you could type in a name and up would come the age and things like that'; '... you can find exact information you want' and 'you can find it quickly as well'. Film and photographs allowed 'you to actually see what is happening', matching Swan's (1996) endorsement of archive film within multimedia since it provides 'vivid visual images'. Pupils also valued the first-hand accounts 'because the people had a lot to say and that's good because if you had to ask anyone about the past it would be them'; '... you saw it from different points of you (view)' and 'it was like talking to someone in the past'.

Teachers organised a wide range of supporting activities, such as: drawing; wall displays; art work; designing and sewing a banner; personal research using the internet; acting out meal times at Barnhill; recreating the classroom in the Poorhouse

School and personal reading. Pupils recognised that these activities played an important part in learning. The 'wall display was full of information', while books and the internet 'helped me learn because I had to find out'. This warns against claims that the program was the sole reason for changes in knowledge and understanding since it was only one of several resources. Nevertheless, it was the central resource and at the end of the topic pupils could describe key features of the Poorhouse regime and could empathise with those of their own age, 'I learned that children, women and men were separated from each other. Children were boarded out and they moved away so they couldn't see any family'.

Pupils rated a range of skills required for working with the program from 1 (most improved) to 8 (did not improve very much). Pupils gave the highest ratings to devising and giving a presentation, using a computer and interrogating a database to reflect the resources which they found most useful and the Barnhill Challenge.

In a pre-topic assessment of eight ICT skills, every pupil in one class recorded that they needed to practise creating a multimedia presentation, but in the post-topic assessment the rating for multimedia presentation had moved to either 'very' or 'quite well', Figure 10.

**Working With Computers**

Put a tick in the box which you think describes how well you can do the following tasks.

Name of Pupil: [Redacted] 21.2.06

Task	I can do this		
	Very Well	Quite Well	I Need to Practice This
Use a computer responsibly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create and edit a document or report with text and graphics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Create a simple multimedia presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Create and search database	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Study a CD ROM by yourself and in a group	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Send and receive e mail	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Search for information on the internet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Save images from the internet and copy them into a document/report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pupil Comments: I need to practice creating a multimedia presentation

Teacher Comments:

Figure 10. One pupil's assessment of his ICT skills before working with Barnhill. At the end of topic the third category had moved up to very well.





The success of the Barnhill Challenge supports other research into enhanced learning through authentic activities (Reeves, Herrington and Oliver, 2002). The suitcase, nurse's uniform and the wicker basket were the most commonly selected artefacts for reasons which included:

*'We thought they had a lot of history and give a good example of Barnhill';*

*'We chose these artefacts because they told so much about Barnhill';*

*'...the suitcase showed what happened to children'.*

Pupils used PowerPoint for their presentations with individual roles ranging from writing the accompanying script to selecting illustrations. One pupil wrote, 'my role was background colour and pictures and help pick the pictures'. Her classmate '...had written the script and gave the presentation and helped make the presentation'. The challenge highlights how problem-based learning 'fosters self-directed learning', with pupils learning how to learn (The University of Western Australia, 1996) in developing knowledge alongside skills of looking for information and justifying conclusions. The challenge 'helped me improve my skills of looking for information because you only got a little bit of help'; 'it helped me improve my knowledge because it helped me challenge and gave me answers to different information' and 'it made me really think about being boarded out and the school etc'.

When evaluating the key advantages of devising the presentation assessment form, pupils gave the highest ratings to 'helping decide what to put in the presentation', 'knowing what the audience was looking for' and 'knowing my individual role'. Therefore, the assessment exercise supported the task. Finally, all pupils thought that the challenge was either very or quite helpful in learning about life in the past.

### TEACHER EVALUATION

The availability of computers influenced learning as pupils used class sets of laptops allowing 'children to work ... usually in pairs but they could also move on individually for personal research'. Nonetheless, 'it was difficult to get round so many computers on my own if there were any glitches'. This difficulty was eased with some cooperative teaching, but this support was not always available. Each school was equipped with an interactive whiteboard which in turn influenced teaching and learning. One teacher observed, 'I used the Smartboard and laptops with pupils to focus on certain areas, particularly in the early stages when introducing database searches etc. As a class we were able to discuss pictures/film available on the disc, children were then able to work independently through the program'.

Teachers reported that the 'clear use of icons to access different areas...and tasks involved' helped make the program easy to navigate. Teachers appreciated the differentiated activities and the fact that pupils were able to listen to sound recordings of the sources and selected text, but noted 'answers to tasks would be useful

to quickly and easily monitor the progress of the children'. Consequently, paper copies of the program with answers to some tasks accompanies *Barnhill* but this somewhat negates the advantages of providing resources on a CD ROM.

Teachers worked through the whole program 'but not with all children. This was due to the age and ability of pupils but mostly time constraints and so I gave a topic area to each group who had to work through and report to the class'. In future use, the topic area would be narrowed 'perhaps focus on life in Barnhill and link to Boarding Out as this was particularly relevant to the age group using it and the area of the school to Luss. This would hopefully lead to a greater knowledge of the period and lifestyle'. (Luss is a small village on the banks of Loch Lomond twenty miles from Glasgow where some children from Barnhill were boarded out.)

The Barnhill Challenge developed skills especially 'creating slides including text, pictures and footage. Team skills, discussing and justifying choices and making decisions as a group. Delivering presentations to the class-use of voice, clarity of explanation, dealing with and responding to questions'. More generally, the program developed other ICT skills since '(pupils) generally improved their keyboard skills. How to make a database. There was a purpose and reward to learning certain skills on the computer'. Nonetheless, pupils did not enjoy recording information in a topic booklet and in future 'I would consider not preparing a booklet...and print off pages as they are completed on screen'.

Teachers reported that the program supported independent learning with pupils able to navigate through the relevant section/s with minimal guidance. However, evaluation of *Barnhill* emphasises the continuing pivotal role of the teacher since 'the accuracy of the content in some cases highlighted the need for research to be more thorough – and more closely monitored by the teacher – to achieve a greater understanding of the period'. Authentic learning may alter the classroom dynamic, but teachers remain central to effective learning at each stage from planning through to reporting.

### CONCLUSION

The underlying historical themes of industrialisation, urbanisation and poverty alongside the primary sources included in the CD ROM transcend national borders. A direct link with Australia comes in the large numbers of children from Poorhouses and Workhouses who were sent to Australia. ICT facilitates access to primary sources common to many countries. It would be tedious and impractical for pupils to search manually through pages and pages of census returns, but a database carries out sophisticated searches in a matter of seconds. Nevertheless, it is the accompanying learning tasks which remain crucial to enhancing pupil learning about, in this exemplar, the past. These tasks, while developing knowledge and understanding, should also embrace a problem-based enquiry methodology and one which embraces authentic challenges. We must move the user 'beyond the immediate topic', wrote Schick (1995), 'to provide information the user can apply to other problems, to strengthen cognitive skills for processing new data, or to ask questions which challenge ...'. The *Barnhill Challenge* met this requirement.

The investigative methodology underpinning the CD ROMs demonstrates that when pupils use ICT 'to conduct research

projects, analyse data, solve problems ... and assess their own work, pupils are more likely to develop new ICT, problem-solving, information management, collaboration and communication skills' (Kozma, 2003). This in turn helps answer some of scepticism over ICT. Positive impact does not come automatically since it depends on teachers moving to a constructivist approach, but not at the expense of preparation, planning, advice, monitoring and assessment. Pedagogy should be the main determinant in learning through new technology

## BIOGRAPHY

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