

Parents as teachers: Using parent helpers to guide young children's technological practice

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Abstract

Technology Education is one of eight learning areas of the New Zealand national curriculum. It aims to develop a broad technological literacy through students participating in learning programmes in which they engage in technological practice and through this practice develop capability, knowledge and an understanding of technology as a domain in its own right. Experiencing and exploring contemporary examples of technological practice is recognised as an effective way of developing technological literacy and, in this study, students visited a chocolate factory in order to find out how to make a chocolate gift for Mothers' Day. While the value of learning experiences outside the classroom (LEOTC) is well documented in learning areas such as science, there are few studies which explore LEOTC in Technology and specifically those of junior primary students.

A key element of this process, and the focus of this paper, is the role that parent helpers play in guiding and supporting students during both visits outside the classroom, and construction tasks within the classroom. It also raises the issue of the preparation and scaffolding parents require to enable them to help students effectively carry out these tasks. The role of a parent helper is a crucial one and the data from this study suggests that the status and time given to this preparation is, at times, varied and can have significant impact on children's learning outcomes.

Introduction

The value of students experiencing learning opportunities outside the classroom (LEOTC) is well documented (Anderson, Thomas & Ellenbogen, 2003; Rennie & Mc Clafferty, 1996). Whilst there is research reporting on LEOTC in science (Bolstad, 2000; Dierking, Falk, Rennie, Anderson & Ellenbogen, 2003; Tofield, Coll, Vyle & Bolstad, 2003), we have found no previous studies in technology, nor those which particularly relate to the role that parent helpers play in enabling a visit outside the classroom. LEOTC is defined by the New Zealand Ministry of Education as any learning experience which extends beyond the four walls of the classroom and typically beyond the school grounds (MoE, 2010). The philosophy is that LEOTC programmes need to complement students' in-school learning and provide experiences which could not be made available in the normal school environment (Te Kete Ipurangi [TKI], 2011).

This paper describes two phases of voluntary, unpaid, parental involvement in a Technology Education unit carried out in two New Entrant classrooms (5 year olds) in which the students visited a chocolate factory and used the information gathered there to design and make a chocolate gift

for Mothers day. During the factory visit parents assisted the teacher by transporting the students to the site and also supervising small groups during the chocolate making demonstrations and whilst exploring a retail area. The following week, parents again assisted by helping the children make their chocolate gift for Mothers' Day. Both of these episodes were implemented differently, one being the sole responsibility of the researcher and the other organised by the participant teachers. The outcome of each of these episodes varied significantly and the possible reasons for this will be explored in this paper.

Background

An element of the technology curriculum that is pivotal to students' technological practice is access to the practice of experts. The NZ technology curriculum describes students developing outcomes which are "informed, critical and creative" (Ministry of Education, [MoE] 2007, P32). Furthermore the learning associated with the technology education curriculum stresses the need for students to "examine the practice of others and undertake their own" (Ministry of Education, 2007, p32). There are a range of different strategies through which students can access knowledge of their intended product development but the literature review of this study suggests that a novel experience outside the classroom is likely to offer the greatest learning opportunities. The literature offers some useful considerations for the way we should prepare and plan for these types of experiences including consideration of the anticipated engagement of parent helpers.

Planning and Preparation

Dierking, Falk, Rennie, Anderson and Ellenbogen, (2003) argue that learning is extensively influenced by prior knowledge and experience, interest and the motivation that students bring to the task. This suggests that thorough preparation of students for a visit - in the case of this study, the design task ahead - will effectively prepare them for the ensuing learning opportunities during their factory visit. The aim of this preparation is to ensure that teachers, students and parent-helpers all have a clear purpose for their visit and that parent-helpers have at least some understanding of the knowledge and skills necessary to achieve the goals of the teaching unit. Lambert and Balderstone (2000) and more recently Jarvis and Pell (2002) refer to the importance of teachers creating a 'need to know' amongst pupils – arming them with a genuine research purpose to their tasks during a site visit. Anderson (2003) supports this notion and believes that a student's motivation and agenda for visiting a site significantly impact on how, what and how much he/she learns. Armed with a clear purpose, Falk and Balling (1982) suggest that students are less likely to concentrate on non-relevant aspects of the surrounds, and instead focus on obtaining the answers to questions they require in order to complete their technology task.

Anderson (2003) has reported that visitors' memories of a world expo exhibition were significantly influenced by the socio-cultural identity of the sightseer at the time of the visit. Similarly, the socio-cultural identity of five-year old students attending an LEOTC visit would clearly influence what attracts their attention, what they notice as being important, and what they remember. In a paper exploring guided school tours at a museum, Cox-Peterson, Marsh, Kisiel & Melber (2003) reported that focusing questions and activities were seen to help students make connections between the formal (science) curriculum and the artefacts of the exhibition. This suggests that supervising parents can enhance student learning if they mediate and help connect students to aspects of their visit that, because of their age and socio-cultural background, may be ignored. This support of 'a more knowledgeable other' (Vygotsky, 1987) during the visit who is able to direct students' attention to the ingredients, equipment and the different shapes and structures to chose from when making chocolate, is invaluable, as this, along with hands-on experiences, has the potential to inform the students' future design decisions. Employing the help of parents to carry out this role, to interpret factory presentations and to model and encourage the use of language associated with the chocolate making process, will also enhance students' understanding of, and engagement in the visit.

There are inherent difficulties when planning to take five-year-old students out of the classroom on an LEOTC visit. A high priority we believe, is managing the children’s physical needs in order to reduce any stress or anxiety that may be experienced by children being away from familiar surroundings. This may include their toilet requirements, refreshments and play opportunities. These types of problems may be alleviated by factoring in time for the children to use rest rooms at regular intervals, providing opportunities to have refreshments and anticipating problems which may emerge as a result of the children being confined in a non-school controlled space for a lengthy period. These ideas are summarised in the table below.

Table 1. Summary of parent helpers’ tasks before, during and after the factory visit

PHASES OF THE VISIT	ROLE OF OTHERS - (<i>Parent helpers</i>)
BEFORE	<ul style="list-style-type: none"> ● Understand both the purpose of the visit and the teaching goals ● Understand that the tasks they have been asked to carry out are designed and informed by previous research and the literature of LEOTC Ensure familiarity with the schedule of the visit including time for refreshments, toilet visits and when would be most appropriate to make purchases from the factory retail outlet
DURING	<ul style="list-style-type: none"> ● Supervise and work with a small group of students ● Follow teacher guidelines, that is <ul style="list-style-type: none"> ○ talk to the children about learning goals ○ interpret presentations and products being viewed ○ present/reinforce correct names of items and processes as children view the products and demonstrations ● Draw students’ attention to the products and exhibits relevant to their study
AFTER	<ul style="list-style-type: none"> ● Supervise chocolate making using students designs, planning frameworks and ● questionnaire information

What we did

The two phases of this study that required the support of parents were (i) during the factory visit and (ii) during the children’s chocolate making sessions. The process of preparing parent helpers was a key element of the planning framework. Prior to the commencement of the technology unit, each child’s parent or care giver received a letter inviting them to supervise a group of students during the factory visit, and an explanation of the research that was going to track students’ progress. Five parents from one school and four from a second school participated in the visit, each person supervising between two and four students. In addition, ethical approval was sought from each child’s caregiver which allowed students to participate in the research component of the visit; to have photographs taken, to provide examples of their work and to participate in a series of interviews. The students themselves were also carefully informed about the intention of the research, ensuring they understood that they were free withdraw at any stage if they chose.

On the morning of the visit, the parents who volunteered their help were invited to attend a meeting in which the researcher explained the goals of the visit and the role they were to carry out. They were provided with an information card which listed the learning intentions of the visit and a series of questions to ask the students as they moved through the retail shop, the chocolate-making demonstration and the lollipop-making demonstration. In this way it was hoped to establish clear links between the displays, the demonstrations and the intended outcome of the visit. The information card also listed the language associated with the chocolate making process that parents were encouraged to use during their conversations with the students. The parents were also asked to draw students’ attention to items that highlighted aspects of technological practice such as the

chocolate moulds, colourings, flavourings and the colourful range of chocolates which were on display. Regularly drawing the students' attention to the purpose of the visit and the possible chocolate designs for their Mothers' day gift were also encouraged. It was anticipated by the researcher that if students participated in the visit with curiosity and desire for information, the degree to which they engaged with exhibits should be heightened (Sandifer, 2003).

To accommodate the physical needs of the students, a 'comfort' stop before and after the visit was timetabled. We anticipated that an interruption to the flow of the visit because of a need to backtrack to a restroom, would create a disturbance for groups following the children and could also result in important 'snippets' of information being missed. 'Hunger pangs' could offer another challenge that would distract students from the learning environment, particularly in this study where they were viewing displays in the chocolate factory shop. To avoid this, time for a sizeable morning tea beforehand was planned. Several studies have found "a positive relationship between increased physical activity and concentration" (Bailey, Armour, Kirk, Jess, Pickup & Sandford, 2009, p. 15), and so, after morning tea, the students were invited to play outside for a short time (Wineman, Piper & Maple, 1996).



Figure 1: Visit to the retail section of the factory



Figure 2: Making a gift for Mothers' Day

Findings

The data reported here consists of teacher interviews and document analysis of the students' drawings and stories about how to make chocolate. The teacher interviews were primarily a review of planning for the visit and the technology unit. Analysis of data suggests that the careful attention to detail in preparing the parent helpers was very successful. The two participating teachers, Rose and Hannah, both recognized the value of parents being fully informed about their role during the visit and understanding the learning goals and expected outcomes of the technology unit. Rose made the following observation:

Yes, I think it was made quite clear that it wasn't just entertainment - we were going out there because we were going to do the process. The card you [researcher] gave them made it quite clear what they needed to be pointing out, and actually when we walked through the shop part before we went in I thought they did a really good job - they were really talking to the kids.

Responses from the children indicated that many of the goals of the visit had been achieved. In the document analysis of their post-visit drawings and stories about how to make chocolate, terms such as moulds, fillings, mixing machines and the cooling tunnel were frequently noted. The stories tended to be single sentences, but the drawings and sequence of drawings under which the

teacher scribed their stories indicated a sound understanding of much of the new terminology. For example Roddie explains the chocolate making process described in his drawing:

John and Lance (the factory presenters) are showing us the big block of chocolate. They are putting the big block of chocolate into the melting machine to make chocolate fish. The children are getting a spoon and pouring it into the moulds.

Drawing on similar understandings, Jessica describes it in this way:

We looked at the big block of chocolate. We put the melted chocolate into the fish moulds. The fish went into the cooling machine. It made the fish go hard.

These descriptions compared favourably with the more simplistic descriptions and language of the stories pre-visit. Whilst several of the children knew to use a recipe book to help find out how to make a food product, they were unable to accurately describe elements of the process. Most children attempted to draw on their previous experience of baking and suggested a range of ingredients which mixed together would then be baked in the oven. For example Chrissie explains how she might make a chocolate gift for her mother:

Put the brown stuff in a bowl. Melt it in the microwave. Put butter in. Put flour in then baking soda. Put it in the oven.

On their return to school, the students' models and drawings of their intended gifts were liberally sprinkled with colours, imaginative shapes and sometimes fillings – all design ideas which they observed and discussed during their visit. Some children wanted to make snail shapes for their gift, and curiously, others thought worms would be popular. Many students created stars, fairies and butterfly shapes but no student in either of the groups selected the segmented bar or fish shapes which they would normally have been most familiar with. The focussed walk through the retail area of the factory with the parent helpers, seems to have impacted significantly on the students' designs.

The second phase of the unit which also required parent supervision took place during the construction of the students' chocolate gifts. The gifts were to be based on the clay models they had created the previous day. In addition, the students had taken home a simple questionnaire which included images representing three different flavours of chocolate and a space to include a filling. Alongside each of these were three emoticons to indicate whether 'Mum' loved, liked, or disliked each of the flavours. This information was to guide the students' chocolate making.

It was not anticipated that this phase of the technology unit was likely to attract a different group of parents – parents who had a general idea of what the children were creating but unaware of how the visit, the mother's questionnaire and the making of the chocolate gift were related. All parents had received the same correspondence but the second group did not meet before hand to confirm the expected outcomes of the session or to discuss how best to work with the children. Two of the three parents in the first school had attended the factory visit, so their management of the task was generally directed at creating the chocolate gift for Mothers' Day although attention to the questionnaire varied – some encouraged the children to check their questionnaire results and others didn't.

The four parents helping at the second school had not attended the factory visit. They had missed out on the more focused preparation of helpers prior to the visit and they seemed less aware of the teaching and learning goals and, in fact, altered the chocolate making task. Hannah reported that:

I think a couple of mothers have said "right you're making one for mum and you can make one for yourself".

The approach of the parent helpers significantly impacted on the task focus of most of the children. They appeared to disregard the questionnaire completed with their mothers and turn their focus to selecting flavours and fillings for themselves. One child ate his chocolates before going home, another ate his when he got home and another was unfortunately 'stolen' at 'After School Care'. Only some of the gifts from this group successfully made it home to 'Mum'. Interviews with these children afterwards indicated that they were not as clear about the purpose of the chocolate making.

Mike sums this up nicely with this response to my questions:

<i>Interviewer</i>	<i>Did you take yours (chocolate gift) home to Mum?</i>
<i>Mike</i>	<i>No.</i>
<i>Interviewer</i>	<i>Did you eat yours at school?</i>
<i>Mike.</i>	<i>Yes. I had both. I eated both of them.</i>
<i>Interviewer</i>	<i>Did you?</i>
<i>Mike</i>	<i>Yes cause I was tricking my Mum.</i>

Concluding remarks

This study was an initial investigation into the influence parent helpers have on student learning during LEOTC and a technology unit. The findings indicate that a significant aspect of preparing for this type of learning experience is committing time to preparing and scaffolding parents so that they can not only effectively support the classroom teacher in managing the learning activities, but also enhance the learning opportunities of the students. These findings inform future planning in these areas, highlight the potentially crucial role of parent helpers, and indicate an area worthy of further research.

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