

Children's Museum Experiences: Identifying Powerful Mediators of Learning

David Anderson, Barbara Piscitelli, Katrina Weier, Michele Everett & Collette Tayler¹

ABSTRACT This article reports on a study of young children and the nature of their learning through museum experiences. Environments such as museums are physical and social spaces where visitors encounter objects and ideas which they interpret through their own experiences, customs, beliefs, and values. Our study investigated learning in four different museum environments (a natural and social history museum, an art gallery, a science center, and a hybrid art-social history museum), as seen through the eyes of four to seven year old children. At the conclusion of a ten week multi-visit museum program, interviews were conducted with children to probe the saliency of their experiences, and the ways in which they came to understand the museums they visited. Emergent from this study, we address several issues that indicate that museum-based exhibits and programmatic experiences that are embedded in the common and familiar socio-cultural context of the child's world, such as play and story, provide greater impact and meaning than exhibits and experiences which are decontextualized in nature

INTRODUCTION

Worldwide, museums are focusing attention on their audiences by designing spaces, programs and exhibitions which encourage repeat visits. Audience centered initiatives have been the focus of work by many leading researchers (Doering, 1999; Falk & Dierking, 2000; Hein, 1998; Kelly, 2002 a & 2002b), and attention has focused on all segments of the potential population, from young children to older persons. Studies about visitor needs and interests are usually site specific and provide information about issues relevant to the museum. In the study reported here, we focus on young children's preferences for museum visits from a range of sites with new and innovative programs designed specifically for young audiences.

DESIGN AND METHODS

Theoretical location and scope of the study - This study was part of a larger, multi-faceted investigation of young children's interactive and informal learning in museums undertaken by

¹ Dr David Anderson* (Senior Research Associate – March 2000 to June 2002), Katrina Weier (Research Associate), Michele Everett (Research Associate), Prof Collette Tayler (Team Leader), and Dr Barbara Piscitelli (Chief Investigator) are members of the *QUT Museums Collaborative (QUTMC)*, Centre for Applied Studies in Early Childhood, Queensland University of Technology (QUT), Brisbane, Australia. The project is administered by QUT and funded through the Australian Research Council (Project Funding #C10024104), and the support of museum partners Queensland Museum, Queensland Science Centre, Queensland Art Gallery, and Global Arts Link. * Currently with the Department of Curriculum Studies, University of British Columbia, Vancouver, Canada.

the *QUT Museums Collaborative* (QUTMC) (www.ed.qut.edu.au/ec/museums/col.html), a three-year research project funded by the Australian Research Council, museum partners, and the Queensland University of Technology (QUT). The study reported here employed an interpretive case study approach (Stake, 1995) through which researchers sought to understand the ways in which children become enculturated to museum experiences.

Overall, the study adopted a broad theoretical framework situated within the human and social constructivist domains (Bruner, 1996; Gergen, 1995; Lave & Wenger 1991; Mintzes, Wandersee, & Novak, 1997; Rogoff, 1990; Vygotsky, 1978). In this study, learning was regarded as both a process and a product that encompasses several dimensions, including socio-cultural, cognitive, aesthetic, motivational, and collaborative aspects of learning.

Socio-cultural perspectives examine meaning-making events that occur as visitors interact with tools, signs, symbols, and activities in the context of the museum and its exhibits (Falk & Dierking, 2000; Schauble, Leinhardt & Martin, 1998). This orientation focuses on the processes of visitors learning particularly the ways in which they interact and use the museum in the light of their prior knowledge and experiences.

Cognitive perspectives assume that knowledge is constructed through interaction with objects and people (Hein, 1998; Jacob, 1992; Jeffrey-Clay, 1998), for example, engaging with an exhibit element, or jointly manipulating, using, or playing with a museum-based object in a social context.

Aesthetic theories focus on the sensory, perceptual, affective and emotional experiences and activities of learners (Housen, 1992; Kindler, 1998). This orientation to learning in museums assists with making judgments about the non-cognitive dimensions of museum visits by focusing on visitors' personal responses with emotions (such as joy, disgust, shock, and delight), and through embodied responses (such as movement and gesture).

Motivational aspects of learning (Paris, 1998; Csikzentmihalyi & Hermanson, 1995) describe visitors' use of both internal and external processes to give direction to their learning in a museum setting. Examples of this include the option to make choices,

willingness to accept challenges, capacity to take control of one's own learning, the opportunity to work in collaboration with others, and positive consequences (benefits) for action.

Collaborative perspectives are included in many of the orientations mentioned above. For example, co-construction of knowledge (where a more knowledgeable person assists a novice) is widely considered to be essential in informal learning and is a critical component of cognitive, socio-cultural and motivational views on learning (Litwak, 1993).

The museums - Four local museums were involved in this study, including a natural and social history museum, an interactive science center, an art gallery, and an art-social history museum. The natural and social history museum was typical of many such museums of its kind and contained dioramas of native flora and fauna, artifacts of indigenous and post-European Australian social history, and large scale models of dinosaurs and dinosaur skeletons. The vast majority of these exhibits could be classified as static, non-interactive displays. The interactive science center portrayed a diversity of science topics throughout its galleries, e.g., light, sound, mechanics, electricity and magnetism, and featured an interactive play gallery, called Science Spot, for young children. Most exhibits were stand-alone, hands-on, phenomenon-based, with few readily accessible contextual links to real-world applications of the scientific principles they attempted to demonstrate. The art gallery contained numerous collections of art portrayed in traditional fashion with few links or connections to a visitor's everyday life experiences. The gallery provided two interactive exhibits for young audiences each year, which focused on introducing the discipline and traditions of art. Finally, the art-social history museum, like the art gallery, contained collections of art portrayed in traditional fashion. However, some exhibitions contained elements and themes that linked the museum to the social history of the community in which it was situated. This museum also featured an interactive children's gallery.

The schools, children, and visitation experiences - Four whole class groups (three Year 1 and a preschool; ranging in ages from 4 to 6 years), each comprising approximately 25 children, constituting a total of 99 children (59 males, 40 females) actively participated in the year-long, multi-museum, multi-visit study during the course of 2001. The classes were drawn from four different schools situated in middle-class socio-economic environments

within close proximity to the museums. Three visits by each class to one of the four museum institutions occurred in each of terms 2, 3, and 4 of the school year².

The data sets of this component of the multi-study QUT Museums Collaborative project comprised children's in-gallery interactions and end-of-term interviews, researcher field notes, parent diaries and photographic documentation. In this paper we draw primarily from the outcomes of the first block of three visits to museums children experienced in term 2 of the school year, and utilize the end of term interviews with children as our prime interpretive source, informed by our other data sets.

Each class independently participated in a three-visit museum program to one of the four different museums. Each of the three visits was approximately two hours in duration and generally occurred every other week. Prior to each museum visit, the classroom teacher and a member of the research team guided classroom experiences that were intended to provide connections with personal experiences and knowledge, offer opportunities for reflection on previous visits, and prepare children for the up-coming visit. Visits to the museums comprised a variety of experiences including orientation to the environment, structured tours in galleries and behind-the-scenes, free-choice activities and exploration, as well as opportunities for active engagement both individually and as a group.

Children's social sets were, for the most part, constituted as stable, unified groups of four peers, called "buddy groups". The rationale for structuring the social context in this way centered on the view that such groups would be cohesive units that would learn from interactions with each other and their adult guide, and from the exhibits during museum visits (Lave, 1988; Lave & Wenger, 1991). Children were assigned to groups according to teachers' decisions.

Research design - At the conclusion of the term 2 multi-visit program, researchers interviewed eight groups (two groups from each school; total n=32 children) about their museum experiences. Table 1 details the stratification of groups, year level, school, and museum setting visited as part of the multi-visit program.

² The school year is divided into four terms, each approximately 10 weeks in duration.

Table 1

Distribution of Interviewed Groups Assigned to Different Multi-Visit Programs Hosted by Various Museum Institutions

Buddy Groups	Year Level	School	No. of children in each group	Museum Setting
Groups 1 & 2	Year 1	School A	4 (n _{total} =8)	Science center
Groups 3 & 4	Year 1	School B	4 (n _{total} =8)	Art gallery
Groups 5 & 6	Preschool	School C	4 (n _{total} =8)	Art-social history museum
Groups 7 & 8	Year 1	School D	4 (n _{total} =8)	Natural and social history museum

The eight groups identified for detailed investigation (out of a possible 26 groups) were essentially random in selection, but were influenced by the teachers' recommendations concerning the children's communication abilities.

The interviews conducted with the eight groups were video-recorded and lasted for approximately 30 minutes. A specially designed interview protocol for young children was developed and used to probe the nature and character of children's museum experiences in several key dimensions, including: salient and spontaneous recollections, most memorable experiences, most enjoyable experiences, changes in knowledge and disposition, and links and connections with experiences at home and in the school environment. These dimensions were considered important for a couple of reasons. Firstly, the dimensions were identified in keeping with the theoretical location and scope of the study and our view of the experience of learning from socio-cultural, cognitive, aesthetic, motivational, and collaborative perspectives. Secondly, the dimensions were identified by the education staff of the four museum partner institutions and the QUT research team as important for informing the development of educationally effective programmatic experiences, and, in particular, the range and diversity of experiences built into a multiple visit framework. (Piscitelli, McArdle, & Weier, 1999).

Data analysis - The research team, comprising five members, jointly reviewed each of the eight video-recorded interviews. Each recording was reviewed once to familiarize researchers with the essence of the children's responses to the interview questions. The interviews were then played again to identify sections which indicated the impact of the museum experiences on the dimension of children's: 1) salient and spontaneous recollections, 2) most memorable experiences, 3) most enjoyable experiences, 4) changes in knowledge and disposition, and 5)

links and connections with experiences at home and in the school environment. The research team jointly discussed their interpretations of the group's responses to the semi-structured interview questions, and assessed the overall impact of the children's experiences in terms of their learning.

OUTCOMES AND FINDINGS

Our analysis of the data sets across the various museum programs, resulted in the identification of seven key outcomes. These outcomes relate to the learning outcomes of children in the museum settings, the experiences they had, and the transfer of these experiences as seen in the children's school and home-based environments.

The diversity of children's interests and memorable recall - Perhaps the most striking aspect of children's self-report about their museum experiences was the diverse, highly individualistic, and idiosyncratic nature of each child's recollections, interests and learning. We examined the responses of children visiting each of the four museums (two groups per museum; $n_{\text{total}} = 8$ per museum) and, in almost every instance, children's individual spontaneous recollections, most memorable and enjoyable experiences, and accounts of learning were unique and idiosyncratic in nature. This is despite the fact that children within each of the four classes were, for the most part, provided with common programmatic and exhibition-based experiences during the two hours of each of their museum visits. Initially, we held a concern that because children were interviewed together in their groups they may be strongly influenced by the responses of other group members, and merely repeat issues stated by others (Stewart & Shamdasani, 1990). This effect appeared not to be an issue in children's reporting of their museum-based experiences as they predominantly reported different experiences. The diversity of children's interest and recall are exemplified below using the specific case of the natural and social history museum although the diversity of reported experience and learning was seen across all groups visiting the various museums.

Diversity of children's spontaneous recall

Children's spontaneous recall of their museum experiences was very diverse. At the commencement of each interview, children were asked to recall any aspects of their visits to the museum, without stimulus or prompting from the interviewer. Below are two excerpts

supporting the assertion that the salient, spontaneously recalled memories were predominantly unique and idiosyncratic for each child.

Group 7

Interviewer: *What do you remember from your three visits to the museum this term?*

Madeline: *The smelly fridge... `Cause it was stinky!*

Grace: *I remember from my first visit to the museum sitting and watching the turtle video with my uncle [her uncle was featured in the video].*

Haley: *I remember on the third visit... the smelly fridge with all the dead animals in it.*

Annabelle: *The big whales!... `Cause I see them when I go heaps of times to the museum.*

Group 8

Interviewer: *What do you remember the most about your three visits to the museum?*

Sam: *The 'find the dinosaurs' sheet... the shark.*

Flynn: *The big lift [a large interior elevator in the museum].*

Oran: *The Megalania [an exhibit containing a robotic prehistoric reptile].*

Max: *The helicopter tree [a tree in the grounds of the museum whose leaves would spin like the rotor-blades of a helicopter as they fell].*

Diversity of children's most enjoyable and memorable experiences

An examination of children's assertions about what they liked best about their museum experiences showed a diversity of responses. Children were encouraged to talk about their experiences without specific contextual prompts from the interviewers. However, at the point where the conversation diminished, the interviewer introduced photos of sections of the museum/galleries to prompt further recall. Again, children across all groups cited a multiplicity of experiences, as exemplified by the following excerpt from the interview with group 7.

Group 7

Interviewer: *Which experiences that you had in the museum did you like the best? Why?*

Haley: *I liked getting on the bus and going to the museum.*

Madeline: *I liked the bus ride too `cause when he was driving, he did a U-turn and he bumped into the side pole. [recalled the bus accident]... And I liked singing 'the wheels on the bus go round and round' [at the prompt of the bus driver].*

Madeline: *I liked the army tank... `cause it had all that thing on it! The painting on it [the painting of "Mephistopheles" – a "devil" on a WW1 German army tank in the museum collection].*

Interviewer: *Grace, what did you like best about the museum?*

Grace: *I like watching how they moved the dinosaurs to the new museum... I liked it `cause it's scary for people to see dinosaurs coming down the street on a truck. [direct reference to facilitator-led talk in the theatre].*


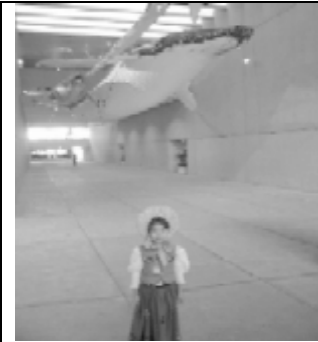


Interviewer: *How about you, Annabelle?*

Annabelle: *I liked the slide show in the theatre.*

Interviewer: *What did you like the most?*

Annabelle: *I liked it all!*

During the final visit to the museum, children were given the opportunity to have their photograph taken in front of their favorite exhibit seen during the course of their museum visits. This component of the visit was designed allow children to freely express their desires to experience again exhibits or galleries they enjoyed the most, and also to turn control of the museum visit over to the children. Children’s favorite exhibit photos served as an additional source of information to document children’s preferences for exhibits and experiences. The set of photographs below (see Figures 1a, 1b, 1c, & 1d) exemplifies the diverse nature of children’s museum experiences that was evident across the eight groups identified for detailed investigation in the study.

			
<i>Figure 1a.</i> Madeline’s favorite exhibit photo. In front of the horse-drawn buggy	<i>Figure 1b.</i> Annabelle’s favorite exhibit photo. In front of the whales	<i>Figure 1c.</i> Haley’s favorite exhibit photo. In front of the giant dinosaurs	<i>Figure 1d.</i> Grace’s favorite exhibit photo. In front of the Queensland 1901 exhibit

Figures 1a, b, c, & d. Group 7 children’s “favorite exhibit” photographs taken at the natural and social history museum. *Photos by QUTMC.*

Like all other groups in the study, children in group 7 selected a broad and diverse range of exhibits as their favorite. While this group’s selection was drawn from experiences encountered across all three visits to the natural and social history museum, recall of experiences from all three visits was not universally demonstrated in other museum venues and will be the subject of discussion later in this paper.

These case exemplars reinforce the tenets of constructivist learning theories that the nature of learning and human experience is highly idiosyncratic and individualistic (Mintzes, Wandersee, & Novak, 1997). Moreover, they illustrate that children in this study responded to the museum programs in different ways as a function of their own prior knowledge, interests, and socio-cultural backgrounds and, consequently, no two children's recollections, or impacts from the museum experiences, were entirely the same. The key message for program developers is that children will respond *cognitively, aesthetically, motivationally, and collaboratively* to a diversity of objects and exhibit elements incorporated in the museum experiences in different ways. Thus, exposing children to a wide range of experiences will have wide ranging impacts on children's learning in museum settings.

Recall of large-scale exhibits - Large-scale exhibits appeared to be readily recalled by children in all museum settings. This outcome was also affirmed in our earlier research work (Piscitelli & Anderson, 2002) where we found children frequently reported remembering large-scale exhibits from their previous museum experiences. In this study, this phenomenon was particularly notable when large objects/exhibits were associated with kinesthetic and/or tactile experiences. During the course of our observations of children in-gallery in all four museum settings, we noted that large-scale objects and exhibits were seen to have a strong attracting and holding power for children. Furthermore, our interviews with buddy groups revealed numerous incidents of children describing experiences with large-scale exhibits. Children's recollections of these exhibits were identified during each of the interviews with groups who had visited the various museums in the study. Children very frequently recalled large-scale animal models, such as life-sized whales and dinosaurs from the natural and social history museum. Children recalled science center experiences in which they collaboratively loaded plastic balls via ramps, pulleys, pipes, and elevators to activate a giant "rocket" that periodically simulated a "launch" via the release of a cage filled with balls. They also recalled a number of large-scale exhibits from the art-social history museum, including a giant magnet wall that could be actively manipulated and a giant-size multimedia interactive exhibit shaped like a gigantic electric iron.

Further examination of the children's transcripts showed that in many instances, but not exclusively, their recollections were associated with kinesthetic and/or tactile experiences with exhibits. The two excerpts below illustrate recollections from group 3 at the art gallery,

where the four-year old group shared a series of interactions in the sculpture garden (Figure 2).

Group 3

Interviewer: *What do you remember from your visits to the art gallery?*

Adam: *We hopped on the blue sculpture and went on the other side of the top, and slid down on it.*

Ingrid: *Jack, Adam, and me slid [sic] down it, but Bella wasn't there. We climbed up it, but it was kind of slippery.*

Interviewer: *That was fun. That's kind of unusual that you would be allowed to climb on a sculpture, isn't it?*

Ingrid: *It was big!*

Jack: *It was outside!*

Interviewer: *Would you be allowed to climb on the ones inside?*

ALL: *No!*

Ingrid: *'Cause they're littler.*

Adam: *'Cause if you climb on the ones inside you'd smash the pictures.*

Jack: *'Cause they're delicate!*

Adam: *There was an outside sculpture... it had this kind of red thing and a yellow arrow.*

Jack: *And Adam said, get me over, and I runned [sic] around in circles.*

Interviewer: *And there was this big square and little bench...*

Jack: *Like a cubby house!*

Ingrid: *It was like the blue sculpture, but it was a little bit bigger and a little bit different.*

Interviewer: *What else did you see, Jack?*

Jack: *Well... we saw this sculpture and it was these two people sitting there and they were in the nude.*

From the preceding transcript, it is evident that kinaesthetic experiences with large-scale sculptures were enjoyable, recalled in great detail, and had a strong educational impact for children in keeping with our epistemology of learning. Children's discussions of the physical and social experiences encountered during their museum visits indicated that they viewed their experiences with the outdoor sculptures in the same way as their everyday experiences with out-door play equipment. To these children, such experiences are a readily identifiable aspect of their everyday culture of outdoor play. Thus, these experiences provided a highly familiar context in which to explore and learn, but also a framework which could be readily retrieved and described from memory. Moreover, museum experiences that are in some way connected with familiar socio-cultural episodes appear to be powerful mediators of museum-based learning.



Figure 2. Buddy groups on the outdoor sculpture. Photo by QUTMC.

Experiences embedded in the familiar medium of story - Children frequently recalled, and described in detail, museum experiences that were embedded in the medium of story. In this study, several experiential aspects of children's visits to the art gallery and the art-social history museum focused on children sitting in front of works of art as a whole class-group and participating in a facilitator-led discussion, viewing and critiquing art. The discussion embodied Feldman's (1970) approach to art criticism, involving four levels: 1) Description: *Attending to what is seen*; 2) Analysis: *Identifying how the elements are put together*; 3) Interpretation: *Giving meaning to the artwork*; and 4) Judgment: *Providing a personal opinion about the work*. Open-ended discussion directed children to look closely at the work and contribute their thoughts about the intent of the artist. We noted that these kinds of "story-telling" experiences were frequently recalled and discussed by the children in their group interviews. Below is an excerpt from the interview with group 5 whose visits took place at the art-social history museum. In this excerpt, children recalled from memory, without the aid of any image or reproduction, aspects of their discussions in front of the "Kombie" artwork, [1957-1999, Mike Rossow (1999)] (Figure 3).



Figure 3. 1957-1999, Mike Rossow (1999). Photo by QUTMC, with permission from the artist.

Group 5

Ainsley: *And downstairs there's a big painting of a ... kom...*

Interviewer: *Of a Kombie? ... Tell us more about that one.*

Ainsley: *It was really colorful.*

Bree: *The Kombie was huge! [showed with outstretched arms]*

Ainsley: *And it was so big! [showed with arms]*

Bree: *It had lots of windows... on top of each other.*

Thomas: *And it was huge!*

Interviewer: *Anything else about the Kombie?*

Bree: *The person was under the Kombie.*

Interviewer: *What was he doing, do you think?*

Bree: *Maybe he was trying to fix the car and someone started the car and he said, oh, I'm gonna get runned over [sic].*

Thomas: *And he say, uh-oh, I need a taxi.*

Children readily described the “Kombie” in terms of the “stories” the artwork had evoked during viewing. It is perhaps not surprising that museum experiences embedded within the medium of story appear to be readily recalled and discussed by children. The experience of hearing stories, either read from books or told by adult caregivers would be a very common, familiar, and enjoyable part of a child’s everyday culture. Thus, these sorts of museum experiences are familiar and readily identifiable for children in terms of their intrinsic rewards and demonstrate the importance of tapping into the familiar socio-cultural aspects of children’s everyday experience to mediate learning. We cite the example of children’s “story-

telling” experience with “Kombie” as an exemplar, but emphasize that episodes with similar effects were seen in “story-telling” episodes in all museum settings.

The saliency of live facilitator-led theatre-based experiences - Children readily recalled and described at length their live, facilitator-led, lecture theatre-based programmatic experiences. This was evident across all museum institutions, except the art-social history museum where no such activity was scheduled. The explanation for vivid recall of these types of experiences may also lie with the “power of story” explanation described previously. Common to all of these experiences was a facilitator-led discussion featuring interesting or unusual subject matter. For example, at the science centre, the “Unexpected Science” show presented several kinds of counter-intuitive science demonstrations and engaging discussions. At the natural and social history museum, a facilitator talked about the history of the museum and the natural environment. This theatre-situated talk was accompanied by many interesting slides showing field research and collection of animal bones, and humorous images of moving the giant model dinosaur exhibits from their previous home to the current museum location. At the art gallery, children met the curator of Indigenous Art for a presentation and hands-on learning experience with artifacts. The curator’s discussion of art practices provided many examples of materials and techniques used in historical and contemporary artist communities and children were able to handle original objects under supervision. In all instances, facilitators delivered engaging and interesting stories relating to the themes of their museums. These personally delivered, engaging stories possess similarities to the culturally familiar experience of adult-led discussion time in classrooms. The excerpt below is from group 3 who provide a vivid recollection of their time with the curator of Indigenous Art in the art gallery theatre (Figure 4).

Group 3

Jack: *We learned about Aboriginals... about how they write on bark.*

Ingrid: *Oh... yeah... This is what the sword [woomera] was like... They needed a big sword and they used to swing it over their back.*

Interviewer: *Who told you that?*

Ingrid: *The curator... It was so long... and heavy!... The handle was black... She [curator] showed us some baskets ... and the big long Aboriginal spears!*

Interviewer: *What else did we learn, Adam?*

Adam: *We learned about Aboriginal paintings. We learned...*

Jack: *We were learning about Aboriginal people in the paintings. You could tell by the curvy kind of shapes that they were the people in the paintings sitting down singing.*

Ingrid: *And the mountain ones... those kinds of shapes.*

From this, and many similar excerpts in our data sets, we conclude that the facilitator-led narrative discussions in the gallery theatre were highly memorable for the children. Again we see this demonstrates the importance for program developers of tapping into the familiar socio-cultural aspects of children's everyday experience to mediate learning.



Figure 4. Children attending to a live, facilitator-led, theatre-based experience about Indigenous art and culture.

Photo by QUTMC.

Tenuous links and connections within the school environment - One of the objectives of the study was to examine the extent to which children linked and made connections with their museum experience and their experiences back in the classroom. The research team's philosophy and mission, communicated to the participating teachers, was that they should explore ways that the children's museum experiences could be linked to all forms of their enacted classroom-based curriculum (Anderson & Lucas, 2001; Wolins, Jensen, & Ulzheimer, 1992). The pre- and in-between-visit classroom sessions were conducted collaboratively by a member of the research team and the classroom teacher. In all instances, the experiential sessions were uniform across the classes in scope and quality but differed in

the content presented. However, there were differences in the ways classroom teachers at the four schools incorporated and capitalized on children's museum experiences. The pre- and in-between-visit sessions focused on reviewing children's past visits and preparing children for their next visit. Preparation typically took the form of orientation to new galleries, using photographs as stimulus materials, and the introduction of some theory-based activity relevant to the museums children were visiting. For example, School B's interlinking classroom lesson between visit #1 & visit #2 focused on developing children's knowledge of "portrait", "landscape", "still-life", and "abstract" artworks in preparation for their visit to the gallery during which they would focus on paintings.

Based on the analysis of our data sets, links with the children's classroom-based experiences were identifiable, but for the most part were not prominently linked in children's minds with the museum, nor with the classroom-based curriculum that teachers enacted. We found only a few examples where children recalled or discussed interlinking classroom sessions. Thus, there is some evidence to suggest that children may compartmentalize their experiences and learning as being museum-situated and rarely readily connected their museum experience with the linked classroom-based activities. Examples of successful linking were sourced from Schools B and C, who visited arts-based museums and engaged in classroom experiences where specific and directly linked content, process, and vocabulary were introduced prior to a museum visit. Groups from Schools A and D, visiting the science center and the natural and social history museum, did not discuss their interlinking classroom sessions.

In the case of School B, in addition to the interlinking sessions described above, a member of the research team co-facilitated an in-class session with the school's art specialist teacher between visit #2 and visit #3, where the concept of three-dimensional sculpture was introduced. During this session, photographs and real artworks were viewed and discussed, and art vocabulary was introduced and practiced. Children also had the opportunity to explore the properties of clay and create their own three-dimensional sculpture. These experiences provided an orientation to visit #3 to the art gallery, which focused on sculpture. Following the third and final visit to the gallery, children were given the opportunity in-class to mould clay sculptures in response to their museum visit experience. The excerpt from an interview with Megan, from Group 4, illustrates her level of recall and engagement with both the museum and the connected in-class experiences centred on sculpture.

Group 4

Interviewer: *Let's talk about all the things we remember about going to the Art Gallery.*

Megan: *I've got two. The angel, and you know that thing that goes ... up, down, across [used her finger to "draw in the air" the shape of the sculpture, Monument which was suspended mid-air outside the art gallery] and then has a circle, and a circle in the middle too.*

Interviewer: *So why do you remember those two, do you think?*

Megan: *'Cause they're my favorite! And I couldn't make two things [in art class], or it won't fit in the plastic bag, so I just did the angel.*

Children in this group were heard, in-gallery during visit #2, correctly using art terminology which had been presented in their interlinking classroom-based session. The gallery experiences with direct links to children's classroom experiences, both before and following visit #3, appear to have had a strong effect on children's recall, saliency, and ability to discuss their museum experiences. However, children's recall of gallery visits #1 and #2, and the earlier interlinking classroom sessions appeared not to be raised during the interview in the context of children's recall of their overall museum experiences.

We suspect that the success of Schools B and C to effectively integrate the museum experiences with the classroom curriculum lies with making the links explicit and accessible for children. In these instances, the classroom-based episodes employed a variety of experiences including hands-on tactile activity, explicit reference to children's common museum encounters, and linking classroom-based sessions to the subsequent museum visits within the multi-visit program. We note, however, that the class teachers were not always able to make links to the school curriculum, and at times required assistance and support from the research team and museum education staff. The evidence, from this study, that children compartmentalize their knowledge is somewhat tenuous and requires further investigation in regard to the impact of school visits to museums.

Making links and connections with museum experiences at home - Although not widely prevalent in our term 2 data sets, several instances of children's learning through museum experiences, expressed in their home-based settings and leisure time, were identified from those children who visited the science center and natural and social history museum. Excerpts from groups 1 and 8, below, show how children's museum-based experiences were recontextualized in their home environments (Anderson, Lucas, & Ginns, 2003).

Group 1

Interviewer: *Have you done anything at home or at school that has anything to do with what we have been learning at the Sciencentre?*

Brooke: *I have!*

Interviewer: *Brook, tell me about what you have been doing.*

Brooke: *Arrm... I got a cup and put the string around it.*

Interviewer: *Did you do that at home?*

Brooke: *Arrr, yeah – you swing it around and it didn't go everywhere! It [the water in the cup] stayed!*

Interviewer: *Now, why did the water stay in the cup?*

Brooke: *'Cause when you spin it around and around and when you spin it really fast it doesn't come out! It [the water] doesn't have time to come out.*

Interviewer: *Okay, so you did an experiment at home like you saw Sarah [demonstrator] do in the theatre?*

Holden: *Yeah. I tried to do that too but it was too heavy, 'cause I must have put too much water in.*

Interviewer: *What happened?*

Holden: *Well, when I tried to spin it then the string broke.*

Interviewer: *Has anyone else done something at home or school?*

Chris: *Blowing bubbles at home.*

Group 8

Interviewer: *Have you been doing anything at home or school that has to do with what we're learning about at the museum?*

Max: *At home I've been digging up a few stuff... [pause] rocks.*

Sam: *I have a digging area. I've been digging... I might dig up an interesting rock one day.*

Oran: *Once when I went to [group mate's house] and we found these funny sorts of rocks in his digging area.*

Flynn: *I liked it when Jodie [Paleo technician] came over to show us all those fossils.*

These and other home-based episodes have the common feature that they mirrored adult facilitators or museum education officers' behaviors the children had observed in the museums settings. These self-reported imitative behaviors, seen in the museum and replicated by children in their home settings, are examples of the young children's ready adaptation of museum-based culture mediated through their own everyday activities. The imitative behaviors held the common characteristics that they were engaging, hands-on, and interesting. Moreover, the behaviors were likely very familiar kinds of kinesthetic and tactile experiences that are often encountered in the socio-cultural world of these children. Specifically, children would be familiar with the "swinging" objects of some description, or "digging" in the garden or sandpit as part of their regular play experiences. We also identified other reported home-based behaviors among these children such as making collections and

building personal play “museums”. We see the involvement of social and cultural mediators as being part of an effective repertoire of tools to assist children learn and develop deeper understandings of the museum messages in and beyond the walls of the museum itself.

Recall of visits as a function of context rich/decontextualized experiences - With one or two exceptions, children’s recall of experiences at the art-gallery and the science center were largely contextualized in terms of their third and final visit of term 2, while recall of experiences at the natural and social history museum and at the art-social history museum were drawn from experiences across all three visits. Groups 3 and 4 discussed their art gallery experiences primarily in terms of the third visit. This was also the case for groups 1 and 2 who visited the science center, however, children’s experiences at the interactive children’s gallery, Science Spot, on visit #2 were also described by a number of the children during their interviews.

By contrast, children’s experiences at the natural and social history museum and the art-social history museum were exemplified by rich description across all three visits. The explanation for this is likely to be complex and result from a myriad of variables within the design of the programs and the characteristics of the institutions themselves. However, it was very evident that the children who visited the natural and social history museum and the art-social history museum were excited by many of the exhibitions that held either direct or indirect experiential relevance for them. For example, the natural and social history museum held many exhibits, such as preserved animals, transportation vehicles, and dinosaurs, all of which children could readily culturally identify through their toys, picture and story books, popular media, and classroom environment. The art social-history museum contained exhibits and exhibitions that were of direct cultural relevance to the community in which the museum was situated. For example, displays of the mining history of the town and images of the local air force base, with which children could connect the stories and/or life experiences of their parents and caregivers.

Absent from the art gallery and science center were familiar concepts or experiences, either contemporary or historic, with which children could make strong links. The identified exceptions within these two museum settings were the sculpture garden at the gallery and the young children’s interactive space at the science center, both of which allowed children to engage in familiar play-based activities. Such connections with common or familiar life

experiences are vital links to children's enculturation and subsequent learning in museum environments. Perhaps the key message for teachers and museums educators is that there is a need to be aware of ways and strategies for helping children to see connections with their life experiences when encountering galleries that appear, on the surface, to be devoid of readily accessible, culturally familiar links for children.

CONCLUSIONS

This study is significant because it presents additional insights into the ways young children experience and interpret museums. We have presented evidence that museum experiences embedded within children's familiar culture and contexts are powerful mediators of memory, enjoyment, and learning in these settings. Our conjecture is that exhibits and programmatic museum experiences which provide context and links with children's own culture, that is, their customs, beliefs, and values that they hold, will provide greater impact and meaning than exhibits and experiences which are decontextualized in nature. In particular, experiences that are embedded in the medium of story, play, and objects that can be readily identified by children, are examples of such powerful mediators. The implications for museum educators are to integrate and mediate child-based socio-cultural strategies into their programs for young children.

REFERENCES

Anderson, D., & Lucas, K.B. (2001). A wider perspective on museum learning: Principles for developing effective post-visit activities for enhancing students' learning. In S. Errington, S. Stockmayer, & B. Honeyman (Eds.), *Using museums to popularise science and technology* (pp. 131-141). London: Commonwealth Secretariat.

Anderson, D., Lucas, K.B., & Ginns, I.S. (2003). Theoretical perspectives on learning in an informal setting. *Journal of Research in Science Teaching*, 40(2), pp TBA

Bruner, J., (1996). *The culture of education*. Cambridge, Massachusetts: Harvard University Press.

Csikszentmihalyi, M., & Hermanson, K. (1995). Intrinsic motivation in museums: What makes visitors want to learn? *Museum News*, 74(3) 34-7, 59-61.

Doering, Z. H. (1999) "Strangers, guests or clients? Visitor experiences in museums", *Curator*, 42 (2), 74 – 87.

Falk, J.H., & Dierking, L.D. (2000). *Learning from museums: Visitor experiences and the making of meaning*. New York, NY: Alta Mira Press.

Feldman, E.B., (1970). *Becoming human through art: Aesthetic experience in the school*. New Jersey, Englewood Cliffs: Prentice Hall.

Gergen, K.J. (1995). Social construction and the educational process. In L.P. Steffe & J. Gale (Eds.), *Constructivism in education* (pp. 17-39). Hillsdale, NJ: Lawrence Earlbaum Associates.

Hein, G. (1998). *Learning in the museum*. London: Routledge.

Housen, A. (1992). Validating a measure of aesthetic development for museums and schools. *ILVS Review*, 2(2), 213-237.

Jacob, E. (1992). Culture, contest and cognition. In M. D. LeCompte, W. L. Milroy, & J. Priessley (Eds.), *The handbook of qualitative research in education*. New York, NY: Academic Press.

Jeffrey-Clay, K. R. (1998). Constructivism in museums: How museums create meaningful learning environments. *Journal of museum education*, 23(1) 3-7.

Kelly, L., Savage G., Landman, P., & Tonkin, S. (2002a). *Energised, engaged, everywhere: Older Australians and Museums*. Sydney: Australian Museum & National Museum of Australia.

Kelly, L., Bartlett, A., & Gordon, P. (2002b). *Indigenous Youth and Museums*. Sydney: Australian Museum.

Kindler, A. (1998). Aesthetic development and learning in art museums: A challenge to enjoy. *Journal of Museum Education*, 22(2&3), 12-16.

Lave, J. (1988). *Cognition in practice : mind, mathematics, and culture in everyday life*. New York: Cambridge University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Litwak, J. M. (1993). Enhancing museum learning by facilitating the visitor social agenda. In D. Thompson, A. Benefield, H. Shettel & R. Williams (Eds.), *Visitor Studies 1992: Theory, research and practice (Vol. 5)*. Jacksonville, AL: Visitor Studies Association.

Mintzes, J.J., Wandersee, J.H., & Novak, J.D. (1997). Meaningful learning in science. The human constructivist perspective. In G.D. Phye (Ed.), *Handbook of academic learning: Construction of knowledge* (pp. 405-447). San Diego, CA: Academic Press.

Paris, S. (1998). Situated motivation and informal learning. *Journal of Museum Education*, 22(2 & 3), 22-26.

Piscitelli, B.A., & Anderson, D. (2002). Young children's perspectives of museum settings and experiences. *Museum Management & Curatorship*, (19)3, 269-282.

Piscitelli, B.A., McArdle, F., & Weier, K. (1999). *Beyond "Look and Learn": Investigating, implementing and evaluating interactive learning strategies for young children in museums*. Unpublished Final Report QUT- Industry Collaborative Research Project. Queensland University of Technology, Brisbane, Australia.

Rogoff, B. (1990). *Apprenticeship in thinking: cognitive development in social context*. New York, NY: Oxford University Press.

Schauble, L., Leinhardt, G., & Martin, L. (1998). A framework for organizing a cumulative research agenda in informal learning contexts. *Journal of Museum Education*, 22(2 & 3), 3-8.

Stake, R.E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Stewart, D.W., & Shamdasani, P.N. (1990). *Focus group: Theory and practice*. London: Sage.

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wolins, I.S., Jensen, N., & Ulzheimer, R. (1992). Children's memories of museum field trips: A qualitative study. *Journal of Museum Education*, 17(2), 17-27.