
YOUNG CHILDREN'S LEARNING IN MUSEUM SETTINGS

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Background

In the 1980s, museum and visitor research studies were regarded as being in their infancy (Feher, 1990). The intervening years have seen considerable growth and development in this field of research, although it can be regarded as having been in a formative stage throughout the past two decades. By the middle of the 1990s, there was widespread acceptance among researchers of the cognitive, affective and social aspects of the learning experiences of visitors in museums and similar institutions (Raphling & Serrell, 1993; Rennie & McClafferty, 1996; Rennie, 1994; Roberts, 1992), and Falk & Dierking (1992) had drawn attention to the physical, social and personal contexts in which learning occurs. The highly stimulating, novel and interactive physical and social environments of museums have been linked to ineffective learning outcomes by visiting school students in some studies (Anderson & Lucas, 1997; Kubota & Olstad 1991). Others studies of the 1990s period have demonstrated that students enjoy visits to museums tremendously and that increased interest and enjoyment of post-visit activities constitute extremely valuable learning outcomes (Anderson, 1998, 1999; Ayres & Lelear, 1998; Ramey-Gassert et al., 1994), that persist over time (Anderson, 1999; Rennie, 1994; Wolins, Jensen & Ulzheimer, 1992).

With a few notable exceptions (Andrews & Asia, 1979; Borun, Chambers & Cleghorn, 1996; Kindler & Darras, 1997; McClafferty, 2000; McClafferty & Rennie, 1997; Piscitelli, McArdle, & Weier, 1999; Wolins et al., 1992) there is an absence in the literature of studies which examine very young children's perspectives and museum experiences. This is somewhat surprising given that young children constitute a significant part of museum visitorship by virtue of their inclusion as part of the family visitor demographic. The impact of museums on the lives and learning of young children has been largely ignored. A survey of the literature pertaining to young children's museum experiences leads us to several conclusions. First, there is a notable lack of investigation concerning the

museum experience of very young children, and hence there is currently limited understanding of children's perspectives of these settings. Second, investigating and collecting data from young children pertaining to their learning and museum experiences is difficult by virtue of their limited ability to communicate, difficulty in self-reflecting on their past experiences, and reliability issues associated with data collection from adult investigators (Hatch, 1990; Piscitelli, et al., 1999). Third, positive experiences of museums appear to be an important factor in future visitation to such settings (Andrews & Asia, 1979; Kindler & Darras, 1997).

It was also evident, from our relationship with the museum community in Queensland, Australia, that there have been fluctuations in the number of young visitors over the past several years as well as a decline in school visitors. Furthermore, there are no known studies and few policy documents on the position of young children in museum culture, despite the fact that children are enthusiastic museum visitors. Given these general conclusions, it would appear that there is a need for a thorough investigation of children's experiences and perceptions of their museum encounters. Such research would inform museum communities about the experiential aspects which children find most rewarding, and assist in the developmental aspects of exhibitions and programs which have educational and experiential impact for young visitors.

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The QUT Museums Collaborative

In 1997, museum educators and administrators joined university researchers to form a collaborative team to examine the experiences of young children visiting museums. The team comprised staff from Queensland University of Technology (QUT), the Queensland Art Gallery (art museum), the Queensland Museum (natural and social history museum), the Queensland Sciencecentre (interactive science and technology centre) and Global Arts Link (visual arts and social history museum). From the collaborative efforts of this group, a baseline study was conducted in 1998 with funding from each of the partners

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(Piscitelli, et al., 1999). In the process of conducting that study, it became clear that immense learning potential existed in museums but many opportunities were lost due to a variety of factors such as poor interaction, large group size, insufficient time, infrequent visits and lack of cooperation between schools and museums. Consequently, the team developed a set of questions and an innovative, systematic approach to gathering information about young children's learning in various museum environments.

In March 2000, the QUT Museums Collaborative was formed and comprised the aforementioned museum partners plus a wider group of researchers from the university, whose expertise and interest lay within area of visitors studies. Funding for the Collaborative was provided through the Australian Research Council (ARC), the museum partners, and the university for a larger three-year study that aims to provide the first comprehensive international data on the experiences of young children in museums, using a highly innovative procedure and approach. The project is designed to advance basic knowledge of children's learning in museums incorporating investigative techniques, with a view to maximising the learning potential of young children visiting museums.

The team is in the initial stages of implementing and monitoring a community-museum research and training program. In so doing, it is envisaged that children will have heightened learning experiences and will build sound relationships with museums to support lifelong learning. Outcomes of the project are also expected to challenge current constructions of child learning in school education. Five key aims were established for the collaborative research project including: (1) to use innovative procedures and technologies to examine and assess young children's understanding of museum exhibits and environments; (2) to examine the impact of high quality repeated visits to museums on young children's learning; (3) to identify the personal, social and contextual factors that affect young children's informal and interactive museum-based learning; (4) to develop and implement new and innovative community and museum programs to sustain high quality outcomes for children's museum-based learning; and (5) to explain the ways in which young children become enculturated into the world of museums, how and what they learn, and the values they (and their families and schools) ascribe to their museum-based experiences.

Research Plan, Methods, and Techniques

The broad theoretical framework in which this study of young children's interactive and informal learning in museums is situated lies primarily within the human and social constructivist domains (Ausubel, Novak, & Hanesian, 1978; Driver, 1993; Gergen, 1995; Lave, 1988; Lave & Wenger, 1991; Mintzes & Wandersee, 1998; Mintzes, Wandersee, & Novak, 1997). These views of learning posit that subsequent changes in knowledge and understanding are produced through the individual's exposure to successive experiences, which are interpreted in the light of their own prior knowledge and understanding. Thus an individual's knowledge and understanding is in a continual state of change as new experiences, mediated through social contexts, are encountered and interpreted by the learner.

We also view learning as both a process and a product that encompasses several dimensions, including socio-cultural, cognitive, aesthetic, motivational, and collaborative. Cognitive perspectives encompass the belief that knowledge is constructed through interaction with objects and people (Hein, 1995; Jacob, 1992; Jeffrey-Clay, 1998). Aesthetic theories focus on the affective, emotional and pleasurable 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. Motivational aspects of learning (Paris, 1998, Csikzentmihalyi & Hermanson, 1995) describe visitors' use of a variety of 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 own learning, as well as 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 an essential component of cognitive, socio-cultural and motivational views on learning (Litwak, 1993). A second dimension of collaborative learning involves institutional collaboration for the benefit of learners, as in school-museum links or family-museum links (Gardner, 1991, Piscitelli, 1988). In the study, consideration will be given to each of the above learning theories as lenses for high-

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lighting personal characteristics, working styles, intrinsic motivation, and socially mediated approaches to children's learning in museums. Our analysis focuses attention on the teaching-learning experiences afforded in museums. We target aspects of each theory in order to build up a composite picture of the learning taking place.

Overall project structure

For the purposes of this study, "school" includes child care centres, kindergartens, preschools and primary schools. The participants will be volunteers from inner-urban Brisbane and Ipswich, and will represent a broad socioeconomic cross-section of the community. The project involves three concurrent, interrelated studies to be undertaken over a three-year period, concentrating on the experiences young children aged 4 to 8 years, from a range of multicultural and socioeconomic backgrounds in southeast Queensland. The project is structured to examine four components of learning: the individual (the young child), the setting (museum environment); the curriculum (the exhibitor's and curator's intentions); and the instructor (the museum and its program).

Study 1: Quality and frequency of young children's museum visits

In this study, we will explore the impact of regular/frequent museum visits on young children. Questions in the child and adult forms will be in four categories: personal preferences (e.g., likes, dislikes); visiting habits (e.g.,

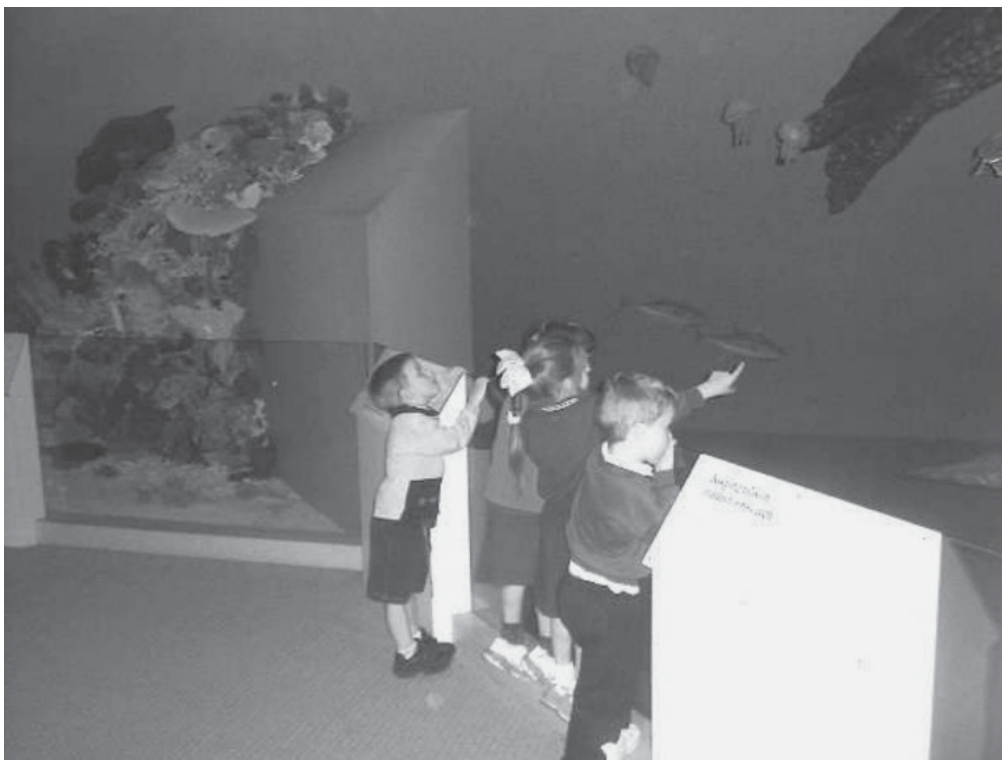
duration, weekday/weekend, portion of day's activities); cultural values (e.g., support for arts, environment, science); and views about learning (cognitive, aesthetic, motivational, collaborative). The researchers will track four classes of 30 children ($n=120$), their parent/s, and teachers through a series of museum visits to evaluate outcomes of the visits and document changes in personal and group responses to these learning sites. A control group of 120 children and their caregivers (not engaged in the new visitor programs) will be randomly selected from the museum lists and invited to participate.

Statistical analysis of the survey data will be ongoing, and will tabulate respondents' age, gender, preferences for exhibits, frequency of visits, family participation, values toward the arts and sciences, and views about learning. Qualitative (written and/or recorded) responses will be analysed, having regard to the theoretical positions outlined previously, and categorised to identify emerging themes and patterns in data.

Study 2: Learning in museums

In this study, we will audiotape and videotape children's in-gallery conversation and behaviors and follow-up interview eight target groups (two from each target school) of four children ($n=32$) who are participating in different types of museums experiences during Year 2. We will document and analyse the welcome experience, adult-child interaction, children's responses to the museum and

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Children engaging at the Coral Reef Diorama at the Queensland Museum.

its exhibits, and children's insights. Audio, video, and interview data will be analysed with sensitivity to the various learning perspectives documented above (cognitive, sociocultural, aesthetic, motivational and collaborative). Audio data will be analysed categorically to obtain frequencies and distributions of different types of talk and qualitatively by conversational unit to establish style, theme, focus, intent and content of the discourse. Our task will be to report on children's learning by way of the central theoretical positions stated previously. Videotape will be analysed with a particular emphasis on non-verbal interactions and communicative contacts of the children with each other and with the guide and teacher/parent. Audio and video data will be compared for cohesion of descriptions and explanations of children's learning. All observation data (field notes, videotape and photographic records) will be thematically coded with attention to gender, personal interest and the links to audio-recorded conversations. Triangulation of data sets and museum/university researcher perspectives will be a central part of the data analysis process in this study.

Study 3: Museum partnerships with families and schools

In Study 3 we will build sustainable systems to support young children's learning within museums and local communities (including families and schools). Three systemic inquiries will be undertaken:

- a) intra-system study of internal museum policies and practices (e.g., policy and planning documents such as strategic, operational and financial plans);
- b) inter-system study of the four museums' collaborative efforts for enhancing visitor learning (e.g., partnership strategy, cooperative approaches to program development) and
- c) studies of museum/school/community links (e.g., case studies of individuals within the project).

Interventions (new program designs) will be developed and piloted in late 2000 and implemented in the second year (2001) to augment improvement in the delivery of learning services to young children. These interventions will be examined for their impact on various audiences, including children, schools, families and museum staff.

The four museums (the industry partners), four schools, and 120 young children/families involved in the study are the same participants described in Studies 1 & 2. We will collect data on:

- a) Internal museum policies and practices—(in Years

1 and 3) including strategic financial and operational plans as they apply to visitor services. Records of environmental designs, front-end planning and administrative decisions relating to programs for young children will be compiled;

- b) Inter-museum cooperation—Specific data-gathering tools to document change will be developed by the team in the first year of the project to suit the expressed needs of each partner museum. Interviews will be conducted with museum staff (paid and voluntary) in Years 1 and 3. Rating scales will be administered in Years 1 and 3 to gauge the effectiveness of the training program for the staff cohort. Staff involved in delivery of programs will also be asked to maintain a brief diary of their practices in Year 2;

- c) Community links—Teachers and parents will be asked to rate (in Years 1 and 3) the effectiveness of the museums program relative to their needs and to indicate dimensions of the program (individual, setting, curriculum instruction) needing special attention to maximise the learning experience for children. Perceptions of the museum focus, their children's responses to museum visits, durability of discussion on museum content and experiences and other relevant data on changes in their museum visiting habits will be documented. Parents and teachers will be asked to maintain a brief diary in Year 2 of their experience of touring their children through the museums. In analysing the data

sets, particular attention will be given to documenting changes in strategic approaches to curriculum design and implementation and to developing understandings about young children's learning in museums. Patterns in the culture of museum/school/community partnerships will be recorded.

Emerging and Anticipated Outcomes

In general terms we see seven key outcome for the three year study. (1) New information and insights on young children's learning in museum settings that may challenge current understandings of informal learning in settings such as schools; (2) Greater use of museums by children and families as sites for learning and development; (3) Manuals of operation for enhanced visitor learning programs in museums; (4) Partnership programs within and across museums that better link different staff skills and create more integrated exhibitions and education programs; (5) Realisation and better use by schools of museums as learning sites; (6) Increase in the skills of museum

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(volunteer and paid) staff in regard to program design, curriculum implementation and research monitoring/research-based decision-making; and (7) Redefinition of the relationship of museums with children, schools and communities.

As of September, 2000 all the studies data collection protocols have been developed. Of emerging significance and interest are the findings from the pilot of an instrument called the Child Focused Survey (CFS). The CFS was designed and developed specifically for the purposes of identifying young children's perspectives of museum exhibits and environments, including their past experiences, personal values concerning museum experience, and past visiting habits. The CFS protocol comprised three sections: a free-choice drawing activity in which children were asked to draw about any aspect of museums that they wished; a semi-structured interview in which researchers probed children's recollections of their past museum ex-

periences; and finally, a series of 4-point Likert scales which probed children's perspectives of the nature and character of museums settings.

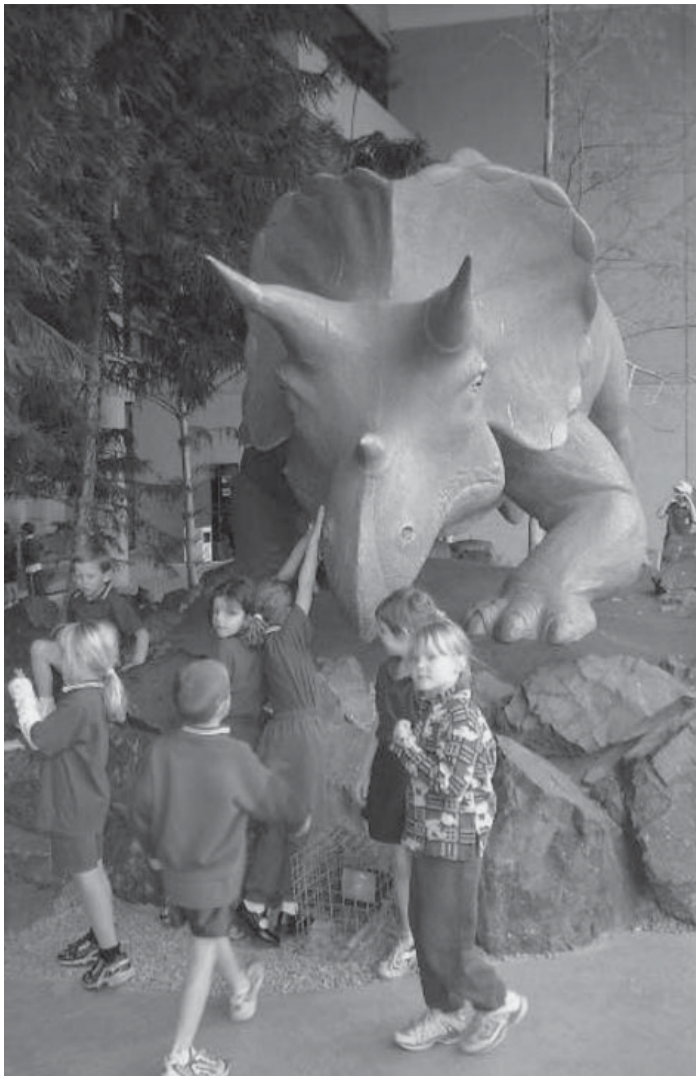
The survey was administered to a total of four classes (preschool and lower primary) in two different schools in a major Australian metropolitan city, comprising a total of 77 children (43 males, 34 females). The children in this study lived in close proximity to three of our industry partners—Queensland Museum, Queensland Sciencecentre, and Queensland Art Gallery. Hence, the vast majority of the children's past museum experience were developed from visits to these settings. The Queensland 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, noninteractive displays. The Queensland Sciencecentre galleries portrayed a diversity of science topics: light, sound, mechanics, electricity and magnetism, and an interactive play gallery for children called Science Spot. Most exhibits were stand-alone, "hands-on," and phenomenon-based, with few readily accessible contextual links to real-world applications of the scientific principles they attempted to demonstrate. The Queensland 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 children each year and focused on introducing them to the discipline, traditions, and pleasure of art.

Children's responses arising from the interviews, Likert scales, and the main contents of their drawings were categorized into groups. The groups were formed around common responses and common attributes of their drawings and cross-tabulated by variable of types of museums they had previously visited. The pilot of the CFS is significant because it presents insights into the perspectives children hold about museums and the memories that are salient to them. We see several interesting issues emerging from this study that may be both supported and extrapolated from other studies and theoretical stances.

First, it was clear from our conversations with all of the children who had visited museums that their experiences were overwhelmingly positive. This was further affirmed in the analysis of the Likert-scale data relating to children's perceptual dimension of learning and affect. Our data demonstrated that children regarded museums as places that were happy, exciting, and provided opportunities to learn and gain many ideas.

Second, it seems that children's spontaneous recollec-

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Children playing in the Dinosaur Garden at the Queensland Museum.

tions of museum experiences and their free choice drawing relating to museums were predominantly drawn from their experiences in the Queensland Museum. Furthermore, the common thread connecting young children's experiential recall appears to centre about exhibits and objects that were large, e.g., dinosaurs, large-scale dioramas and exhibits, and full-scale transportation vehicles. This finding is supported by Cone and Kendall's (1978) study of family behavior in the Science Museum of Minnesota, and Kindler and Darras's (1997) study. One of the conclusions drawn from Cone et al.'s (1978) study was that large-scale exhibits (dioramas and the like) had strong holding and attracting power for family groups during their museum visits, and furthermore were later the most remembered exhibits of their museum experiences. Kindler et al.'s (1997) study indicated that children had strong associations of museums and notions of large-scale or big physical attributes and exhibits.

Third, of interest to the researchers and the museum community, is the fact that children's salient recollections of their past museum visits centered on experiences which appeared to be noninteractive in nature, and directed toward the large-scale exhibits in the Queensland Museum. Indeed, statistically significant differences were identified ($p < .001$) in children's positive perspective concerning the Queensland Museum, compared with those who had visited either the art gallery and/or the interactive science and technology center.

This finding appears to be counter-intuitive since much of the literature on visitors' experiences suggests that exhibits which are multi-sensory, hands-on, and interactive are key attributes for visitor enjoyment and memorability of museum-based experiences (Anderson & Lucas, 1997; Duterroil, 1975; Falk & Dierking, 1992; Field, 1975; Peart, 1984; Wright, 1980). In our opinion, neither the art gallery nor the interactive science and technology center exhibitions provided context or links to children's everyday life experience. However, the exhibits and displays of the Queensland Museum, intentionally or otherwise, had many links to children's past experiences.

Our conjecture is that exhibits and museum experiences which provide context and links with children's own prior knowledge and past experience seem to rate more positively in a range of perceptual dimensions than exhibits and experiences which are decontextualized in nature. For example, it is likely that children had previously seen pictures of the animals portrayed in the Queensland Museum in books or on TV. Likewise, many of the chil-

dren would have pre-existing knowledge and understandings of the various large-scale transportation vehicles and dinosaurs on display. This finding is entirely consistent with traditional and contemporary views of constructivism (Anderson, 2000, 1999; Ausubel, et al., 1978; Mintzes & Wandersee, 1998; Mintzes et al., 1997), but has, however, not been previously demonstrated with a museum audience of this age group. Our conjectures are also supported by Vallance (1995), who describes the difficulties that visitors have in connecting and making meaning of their experiences in art museums. Vallance questions the traditional practice of art museums in the way they deliberately portray objects in the absence of context and advocates a need for these types of museums to provide connections with visitors' prior knowledge to make the overall experience more rewarding.

The clear message emergent from this study is that museums will better serve their audiences by providing readily accessible contexts and links for young visitors to

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understand the collections and exhibits. The challenge for museums and museum educators lies in understanding their young visitor audience in terms of the knowledge, understandings, and interests that they bring with them to their museum experiences. Furthermore, it would seem that it is not merely sufficient to provide contextual links and connections embedded within the messages of exhibitions. Rather, these links must be easily recognisable by young visitors. It

is from the starting point of making the connection between exhibit and young visitor that more detailed messages are able to be communicated and, in turn, remembered.

Significance of the QUT Museums Collaborative Study

The study is providing empirical evidence of a local transformation of museum culture to accommodate the characteristics and interests of young children in science, art, technology, aesthetics, and history. Through this study, and the enhanced communication between staff in different areas of the museum, we will add important data to the international museum sector in terms of attracting, maintaining and evolving programs to suit the interests and knowledge of a large cohort of museum visitors.

The significance of this project lies in the collaborative design and focus around children and their learning, the capacity to redress lost learning opportunities in museums that were realised during preliminary studies, and

the potential of challenging existing views of children's learning and the assessment of their learning outcomes. The unique combination of members in this team allows for new insights on informal learning that may have direct benefit to school education. There is also potential economic benefit to Australian museums applying models of development and education derived from the project, thereby attracting larger numbers of children and their schools and families. We expect, through establishment of high-quality, sustainable educative programs within museums, there will be increased informal, interactive learning opportunities, enduring outcomes for children, and more effective partnerships among museums and between museums, schools and families.

We also expect that staff within the museums will gain significant collaboration and research skills, thereby sustaining and further developing informal learning opportunities in museums. The project provides a model of inter-institutional cooperation to improve the design and research of educational program innovations and will produce training manuals that may be applied in other museum settings. With a focus on young children (one of the most neglected research populations), the QUT-Museums Collaborative Research Team will develop reliable parameters for building affordable, sustainable programs for this audience. It is anticipated that the outcomes of this project will also have relevance for other audience sectors (e.g., secondary schools; aged; disabled) due to its emphasis on quality of interactions within the museum.

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Dr David Anderson is the Senior Research Associate for the QUT Museums Collaborative. His research over the past 11 years has focused on describing visitors' learning emergent from museum experiences and identifying ways in which these museum experiences can be improved and maximised. David has assisted numerous museums and science centres internationally in all forms of exhibit and program development through research and evaluation practice.

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