Adult learning experiences from an aquarium visit: The on-site and longitudinal roles of personal agendas and social interactions in family groups

by

ADRIANA BRISEÑO-GARZÓN

B.Sc., National Autonomous University of Mexico, 1999
M.Sc., School of Graduate Studies in Agricultural Sciences, 2001

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Abstract

The overall and long-lasting impact of learning science from informal situations and environments has been deeply recognised. Also, it has been acknowledged that expanding and deepening our understandings of the nature and dynamics of the learning process in the informal setting is crucial for the development and implementation of rich and enjoyable educational opportunities for all the audiences that visit such settings.

This qualitative study investigates how and what the adult members of family groups learn in and from a visit to the Vancouver Aquarium Marine Science Centre, by examining the role of their personal agendas and their social interactions. Using on-site and follow-up open-ended, semi-structured interviews, as well as on-site observations, parents'/guardians' perceptions about their families' experience at the aquarium were analysed.

Interpretive data analysis suggests that the adult members of family groups learn as a result of the visit to the aquarium, and that their learning is cognitive, social, and affective in nature. The contact with living creatures elicits emotional responses and connections with past experiences, and promotes cognitive and affective gains in adults, who also gain awareness and understandings about their family members as a result of the collective experience.

Also, personal pre-defined and emerging agendas play a significant role in the learning experience at the individual and group levels, both during the visit and longitudinally. Parents/guardians bring mainly recreation, learning and social agendas to the aquarium setting. However, multiple forces influence the construction and continuous negotiation of such dynamic agendas, such as prior experiences, and intrinsic and extrinsic factors. In the long term, adults connect their experience at the aquarium with other relevant contexts such as the home and the work place, and show evidence of long term factual knowledge.
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Dedication

To my Alejandro, with whom I have shared this and many other amazing journeys that are always full of excitement and satisfaction.
Chapter 1: Introduction

Much of the awareness and effort in the field of science education is focused on formal learning environments like the structured classroom setting. Nonetheless, the classroom is not the only setting where educational goals can be accomplished and meaningful learning occurs. People learn also from experiences in informal situations and environments, such as the home, museums, field trips, or in simple every day experiences; in fact, Gerber, Cavalo and Marek (2001) affirm that most learning experiences actually take place outside of formal classroom settings. However, despite the growing popularity of informal settings all over the world, and the growing body of research centred on the learning behaviours of school and non-school visitors to such settings, more research is still needed in order to broaden and deepen our understanding of how and what people learn in informal settings.

1.1 The area of research: aquariums as learning settings for family groups

The overall and long-lasting impact of learning science in informal ways and particularly as a result of experiences in informal settings has been widely recognised. Furthermore, it has been acknowledged that museums and similar settings serve important roles in the science education infrastructure of a community. These institutions serve as public leisure experiences; as educational events for school groups, families, tourists, and the general public; as research institutions; and as historic and natural reservoirs (Falk, Koran & Dierking, 1986).

Regardless of the educational goals, mission, vision, and structure of the different types of informal settings, all museum and similar settings have displays and aids to their

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1 Traditionally, the term 'museum' has been applied to denote settings such as natural history museums, aquariums, science centres, zoos, botanic gardens, and the like. However, a distinction has been made to differentiate the settings that display inanimate exhibits ('museums') and those that display living creatures ('similar settings').
interpretation, such as labels and facilitators, and all are places where visitors have freedom of choice (Rennie & Johnston, 2004). Furthermore, the way in which visitors experience a visit to an informal setting is the result of a combination of elements such as personal history, personal interests and motivations, predetermined agendas, physical space, social situations and interactions, prior experiences, and random factors (Falk & Dierking, 2000; Falk, et al., 1986).

Also, today’s science museums and similar settings are far more than just the exhibits they present in their galleries; there are lectures, special events, workshops, outreach programs, and classes, just to name some of the activities these places offer to their different audiences. Amongst these audiences, families are particularly relevant for museums and the like since family groups constitute approximately 60% of all visitors (Blud, 1990; Diamond, 1986; Dierking & Falk, 1994; Falk, 1998; McManus, 1987). Accordingly, adults are an important part of the informal setting visiting population (Blud, 1990; Borun, 2002; Diamond, 1986; McManus, 1994).

Most visitors perceive informal environments as possessing interesting, stimulating, and important ideas/things that are worth seeing or learning about; for families, the informal environment represents a place where to share interesting, fun, and educational experiences in a perceived safe and friendly setting. Family groups have continuous access to informal experiences, from which multiple and diverse long-lasting learning opportunities can arise.

Aquariums in particular, provide visitors with engaging experiences that include live animals, immersive habitats, and staff-facilitated sessions and presentations, experiences that cannot easily be obtained elsewhere in society (Adelman, Falk & James, 2000; Herrmann & Plude, 1995). Visitors go to aquariums with a desire to fulfill curiosity and needs for fun and intellectual stimulation (Adelman et al., 2000). Aquarium experiences, thus, have the potential to bridge learning opportunities for family groups regardless of their individual and collective learning styles, interests and motivations, educational level, and socio-cultural background.
Considering that aquariums hold a huge variety of educational resources, their potential to offer learning experiences not only for the children, but for the adult members of the visiting family groups, is certainly vast.

Therefore, expanding and deepening our understandings of the factors that frame and shape a learning experience at the aquarium setting, and the role of such experience in the construction of meanings and understandings in the long term, is fundamental in order for exhibit and program developers, educators, and aquarium researchers to provide rich and enjoyable educational options for all the members of family groups.

1.2 Situating the research

This research study in the field of science education in informal environments emerges from the researcher’s own interests and academic and professional backgrounds in natural sciences and natural sciences communication. The researcher holds a 4 year Bachelor degree in Biology and a Master of Science in Agricultural Entomology, and has 7 years of professional experience in the field of agricultural biotechnology awareness and communication. Amongst the researcher’s professional activities were the development and evaluation of museum exhibitions, as well as the implementation of training programs for museum interpreters. It was after these experiences that the researcher fully appreciated the rich potential of the involvement and active participation of professionals with scientific backgrounds in the development and implementation of educational resources and practices. Such contributions are especially promising in informal environments, where learners of all ages are provided with multiple opportunities to learn about and from science.
1.2.1 The problem

Visitor studies in the 1980s made important contributions to the understanding of the social behaviour of groups, particularly families, in museum and similar settings. Research focused mainly on what group members ‘do’, and in recent years the focus of investigation and inquiry has changed to what group members ‘say’ and how they support and take part in each others’ learning. Additionally, the importance of social factors associated with informal experiences has been underscored by prior studies (Anderson, 2003; Blud, 1990; Borun, Chambers & Cleghorn, 1996; Diamond, 1986; Hilke, 1987; McManus, 1987).

However, most recent research in informal settings has focused on the learning outcomes of children as family members, or for adult visitors as individuals, yet little is known about the nature, character, and development through time of the educational outcomes of parents as a result of experiencing a visit to aquariums with their family group and interacting with their children, and about the factors that frame and shape their learning experience at the informal environment. Furthermore, most informal setting research has been conducted in museums and science centres, whereas few studies have been conducted in aquarium settings where families are exposed to displays with particular characteristics and messages.

Amongst the framing and shaping factors of informal setting experiences, it has been recognised that prior agendas or set of motivations, expectations, and desires with which visitors enter an informal setting (Moussouri, 1997), are particularly relevant in defining what and how they learn from the experience. It has been also asserted that agendas are likely to be dynamic and adjustable to the ongoing situation. Nevertheless, no attempts have been made to date to investigate the roles of individual and collective agendas in the learning experience of the adult members of family groups, and the dynamics and evolution of these agendas through and after a visit to an aquarium.
Also, it has been asserted (Csikszentmihalyi & Hermanson, 1995; Rennie & Johnston, 2004) that the learning experience derived from a visit to an informal setting continues well after the visit has been completed, and that the meanings that visitors assign to what was experienced in the venue arise when a link is made between the informal setting and visitors’ lives.

Learning science in and from informal settings does not only occur in the cognitive domain, but also impacts the emotional-affective, aesthetic, and social domains. Also, learning related to an informal setting can be evidenced in other contexts even months after the visit. Considering these points, the problem is then to expand our empirical understandings of what and how adults visiting aquariums as part of a family group learn from this collective experience. Moreover, the problem is to better comprehend the nature, the dynamics, and the role of individual and collective agendas in the on-site and long-term learning experience of the adult members of family groups.

1.2.2 Purpose of the study

This study aims to establish a greater empirical understanding of how and what people, as naturally active lifelong learners (Roschelle, 1995), learn in and from the informal environment. Particularly, the objectives are to better comprehend: a) the nature and character of adults’ learning when visiting the Vancouver Aquarium as part of a family group; b) the role and dynamics of parents'/guardians' agendas in their on-site learning experience, as well as in the weeks following the aquarium experience; and c) the long term effect of a visit to an aquarium on the adult members of family groups, and its connections with other contexts such as the home or the workplace.
1.2.3 **Significance of the study**

Gaining understandings of the nature and dynamics of the learning process in the aquarium free-choice setting and investigating how adults experience aquarium visits as part of a social unit is important to design exhibits and programs with maximal learning potential for all family members. Conducted in a setting where little research has been carried out, this study explores issues that have not yet been addressed. Therefore, this study adds to the body of research that informs museum and aquarium educational practices all over the world, and particularly contributes to creating better learning opportunities for the thousands of families that annually visit the Vancouver Aquarium.

1.2.4 **Methodological approach**

This study employed a qualitative methodology in order to investigate the ways in which families experience an aquarium visit as a social and dynamic unit, through the critical examination of parents'/guardians' impressions, interpretations, and recollections. A case study approach (Merriam, 1998; Stake, 2000; Yin, 2003) was used to richly and deeply describe the experiences of 13 family groups at the Vancouver Aquarium. With this objective, semi-structured, open-ended interviews were used as main tools for data collection; also, as means for data triangulation, on-site unobtrusive observations were carried out. Data analysis included transcription, coding, and interpretation of the information.

1.3 **Organization of the thesis**

Chapter 2 provides a review of the literature relevant for this study. It first discusses the epistemology of learning that served as the theoretical framework within which this study was carried out. It also includes a section on the nature of learning in informal environments and the
factors that influence and ultimately define the way in which visitors learn in these places. The importance of the family as a social and learning unit, as well as the current insights on adult and family learning in museum settings with a special emphasis on the characteristics of parent-child interactions, are also reviewed. This second chapter additionally focuses on the role of agendas in family groups’ experiences in informal settings. Finally, the nature of museum memories, the long term impact of museum visits, and the nature of long-term museum learning are explored.

A rich description of the methodology and methods used for data collection and data analysis are included in Chapter 3. The research questions, epistemological underpinnings, and research design are outlined. Additionally, issues of validity and reliability are included. This chapter details the sampling strategies employed for the study, the procedures for the recruitment of participants, and the participants’ socio-demographics. It also comprises an account of the setting where the study was implemented – The Vancouver Aquarium Marine Science Centre. The procedures for data collection and analysis, ethics, and methodological limitations of the study are also addressed.

Chapter 4 includes the results of the analysis of the raw data, as well as the discussion of such results. This chapter is organised in three sections. The first section includes an analysis of the nature and character of parents'/guardians’ learning within their family group context, and also includes the analysis of the roles parents assumed during the visit and the impression the exhibits made on them. In the second section the researcher deals with family’s agendas and their role in shaping the learning experience for the adults; day planning and on-site strategies, factors influencing the adults’ prior agendas, on-site factors framing the visit, and emerging agendas for future activities are also discussed in this section. The long term impact of the aquarium visit and its connection to other contexts in the lives of the adult members of the participant families is focused upon in the third and last section; this discussion also includes memories of the visit and agendas for future activities developed as a result of the visit to the Vancouver Aquarium.
Finally, in Chapter 5 the author reports the significant findings of this study to the current bodies of knowledge in the field of learning in informal settings. The limitations of the study are identified, and the implications of the salient findings of this study for further research and the Vancouver Aquarium are presented. Lastly, recommendations for future studies are proposed.
Chapter 2: Literature Review

2.1 Overview

The first section of this review of the literature focuses upon defining the nature of learning. Four characteristics of learning are discussed and pointed out as critical aspects of the learning process in informal environments: it is active and dynamic; it is socially mediated and contextual; it is multi-dimensional; and it is continuous and lifelong.

This chapter also details the relevant literature in the area of learning in informal settings, and highlights the fact that informal environments expose both children and adults to a variety of learning experiences. Prior experiences, prior understandings, and personal meanings are considered crucial factors that strongly influence the way in which visitors experience museums and similar settings.

Furthermore, the nature and character of family learning in such environments is discussed, with special emphasis on parent-child interactions, and family agendas as mediators and modulators of the learning experience. Finally, the effects of time on collective learning and the long-term impact of museums visits on families are also examined.

2.2 The nature of learning

The nature and character of learning has been discussed extensively for decades by educators, psychologists, sociologists, and philosophers. Different schools and theories of learning have influenced the way in which teaching and educational research have been conducted. Our theoretical frameworks are constantly being shaped by current research and insights about how people learn both in formal and in informal environments.
Hein (1998) describes theories of learning as being organised on a continuum with two contrasting extremes. At the one end, learning is considered as a transmission-absorption process by which people add small bits of knowledge linearly with time and experience. From this perspective, learning does not involve any discovery from the learner who is only required to internalise or incorporate the material. In the other extreme, learning is regarded as a constructive process where learners personally or socially actively make sense of the world as a function of prior experiences (Driver & Easley, 1978; Glaserfeld, 1993).

The role of prior knowledge is considered an important variable from a constructivist view of the learning process (Ausubel, Novak & Hanesian, 1978; Feher & Rice, 1985; Hein, 1995; Jarvis, 1992; Merriam & Heuer, 1996; Mintzes & Wandersee, 1998; Roschelle, 1995). It has been asserted that the creation of new understandings and attitudes depends on the integration of the learner’s prior experiences with new experiences afforded by the physical and sociocultural context of, for example, a museum visit (Falk & Adelman, 2003; Roschelle, 1995). Even when preconceptions derived from prior experiences can play a potent role in inhibiting meaningful learning and retention of scientific facts, concepts, and principles (Ausubel, 2000), in learners of all ages prior conceptions are required to learn (Roschelle, 1995).

From this constructivist perspective, the products of learning are not discrete entities but rather a network of interconnected information and emotions that can be assembled and disassembled. This “cognitive framework” is rearranged and reshaped when new elements are considered and connected (Ausubel, 1967, 2000; Gunstone & White, 1992). The new elements that may trigger reconnections and reorganisation of the existing framework will typically have personal and idiosyncratic significance (Falk & Dierking, 1997; Hein, 1995), and will trigger restructuring rather than replacement of the cognitive framework.
2.2.1 Learning is an active and dynamic process

The continuous rearrangement of our cognitive frameworks due to the incorporation of new concepts and ideas is not a passive phenomenon, nor does it take place on an arbitrary basis (Ausubel, 1967, 2000). A learning experience requires engagement and, to some extent, mental, physical, or social activity on the part of the learner (Rennie & Johnston, 2004). This experience does not have a meaning by itself, but the prompted learner assigns meaning to it. In other words, meanings are made from experiences (Merriam & Heuer, 1996).

Ausubel (1967), Driver and Easley (1978), and Glaserfeld (1993) consider knowledge to be actively constructed and dependent on practical experience and the application of ideas to action, and is not detached from its circumstances and cannot be separated from exploration or discovery. From this constructivist viewpoint, knowledge is the result of an active construct that learners work on through the interaction with their physical and social environments, and through the dynamic and continuous reorganisation of their own cognitive structures.

2.2.2 Learning is socially mediated and contextual

Learning not only is active and dynamic, but it also involves a constant and reciprocal interaction between the mind, the environment, and the social situations in which it occurs (Cobb, 1994; Lave & Wenger, 1991; Roschelle, 1995; Vygotsky, 1978; Winn, 2002). For Roschelle (1995), “conversations shape the form and the content of the concepts that learners construct” (p. 40). Therefore, the contextual aspect of thinking and acting are critical in the learning process (Cobb, 1994; Driver, Asoko, Leach, Mortimer, & Scott, 1994; Glaserfeld, 1992). Meanings are derived from the dynamic interplay between individuals and their society and are the result of a process that involves reflection, evaluation, and judgment within a social and physical context (Merriam & Heuer, 1996). Social and culturally mediated experiences are
of major significance. However, learners possess also personal perspectives (i.e. personality, feelings, ways of reacting, learning styles, and sensory preferences), that shape the way in which they construct knowledge and understandings in particular social milieus (Mezirow, 1994; O’Loughlin, 1992; Roschelle, 1995).

Bredo (1997) and O’Loughlin (1992) view learning as an evolutionary process that is collaborative and meaningfully related to the activities of others, thus placing emphasis on the social origin of the mind and its processes. For Lave and Wenger (1991) and Glaserfeld (1992), learning is a participatory process of self-organization and construction that takes place as the individuals interact with other members of the community in a particular environment.

According to Ausubel (2000), Cobb (1994), Driver et al. (1994), and Merriam and Heuer (1996), learning should be viewed as both a process of individual construction and a process of enculturation by which individuals develop a sense of cultural identity that in Mezirow’s (1994) perspective encompasses social norms, ideologies, language, and social theories.

2.2.3 Learning is multi-dimensional

Under this social constructivist paradigm, learning can be viewed more widely than just encompassing the cognitive domain. Learning in the broad sense, not only consists of outcomes such as the construction of scientific concepts and the application of such ideas. Merriam and Heuer (1996) and Schauble et al. (2002) regard learning as a process and a product that involves the development and change in attitude, motivation, and interest, expanded aesthetic and kinaesthetic experiences and appreciation, socially mediated conversations and interactions, formation and refinement of critical standards, and the growth of personal identity. Rennie and Johnston (2004) argue that changes or impacts on people's behaviour and knowledge involve learning. Likewise, Merriam and Heuer (1996) affirm that meaningful or significant learning
may influence an individual’s attitude, behaviour, way of thinking, and personality.

From this standpoint, the affective domain of learning is considered to be as important as the cognitive domain, despite the fact that affect has been often neglected in formal science education (Hodson, 1998; Wellington, 1990). Wellington (1990) has even claimed that this disregard might contribute to reduced uptake of the sciences, shortages of scientists and technologists in industry, and gender division particularly in the physical sciences. Both the cognitive variables and the affective variables are interrelated, and the development and encouragement of positive science related attitudes could lead to improvement in the achievement of attitudinal and cognitive goals (Schibeci, 1989).

2.2.4 Learning is continuous and lifelong

Falk and Dierking (2000) propose a Contextual Model of Learning in which learning is seen as an adaptive process that involves three overlapping contexts: the personal, the sociocultural, and the physical, which are closely bound together. The personal context includes the learner’s own background, previous experiences, interests, social skills, and current understandings. The social context refers to the interactions as well as the social and cultural features associated with the learning experience. The physical context refers to the physical aspects of the environment. A fourth dimension for this model is time, since learning occurs throughout the learners’ lives. According to this model, “learning can be viewed as the never-ending integration and interaction of the three contexts over time, to make meaning” (Falk & Dierking, 2000, p. 11).

Ausubel (2000) stresses that time and age level influence cognitive capacity and processes and thus aging directly shapes learning, retention, and thinking. This means that despite the fact that learning is a lifelong process, its dynamics and characteristics may vary as
learners mature. Learning is then the dynamic, continuing, and continuous process of transforming conscious experiences into knowledge, skills, attitudes, values, and beliefs; it is making sense of experience through time, space, and society (Jarvis, 1992).

2.2.5 Summary

The continuous shifts in the theories about how people learn have always shaped educational practice and research. Constructivism is one of these views. According to its proponents (Ausubel, 1967; Driver & Easley, 1978; Glaserfeld, 1993; Jarvis, 1992), learning is an active, dynamic, and constructive process by which learners make sense of the world. From this perspective, the creation of new understandings and behaviours is a function of the learner’s prior experiences, in a physical and sociocultural context. Learning is, at the same time a product: a network of interrelated information, emotions, meanings, and attitudes that can be assembled and disassembled with time and experience (Ausubel, 1967, 2000).

Social constructivism stresses the importance of the social aspect of thinking, acting, and meaning making (Cobb, 1994; Driver et al., 1994; Glaserfeld, 1992). Meanings are made in context and are a consequence of the dynamic relationships between individuals and their society. Furthermore, under a social constructivist paradigm, learning is regarded as multidimensional, not only encompassing the cognitive but also the affective, aesthetic, and kinaesthetic domains (Merriam & Heuer, 1996; Schauble et al., 2002). The context in which learning takes place is viewed as a critical element in the learning process (Lave & Wenger, 1991). Time is also crucial in the learning process, as learning takes place continuously throughout the learner’s life (Jarvis, 1992).
2.3 Learning in informal environments

Investigating how and what people learn in informal environments is informed by the researcher’s definition of learning. Traditionally, literature regarding learning in museums has lacked clarity in the theoretical framework underpinning data collection and analysis, and explicit definitions of what is meant by the term “learning” have been missing from much of the published research on learning in museums and similar settings (Anderson, Lucas, & Ginns, 2003). Since the middle of the 90’s decade, however, special attention has been put to the cognitive, affective, and social aspects of learning experiences of visitors to informal environments (Rennie & McClafferty, 1996), and many researchers have adopted a social constructivist definition of learning.

Falk and Dierking's (2000) Contextual Model of Learning and Anderson et al. (2003) recognise the importance of visitors' prior knowledge, alternative conceptions, and the idiosyncratic nature of the construction of meanings from experiences at informal settings. The role of the social interactions has also been acknowledged and even though in varying degrees, the collective experience has been considered as critical in visitors' learning (Anderson, 2003; Blud, 1990; Dierking & Falk, 1994; McManus, 1994; Packer & Ballantyne, 2005). It has been established that even for solitary visitors, watching and listening to others socially mediates the visit experience (Rennie & Jonhston, 2004), and Blud (1990) affirms that the interaction between visitors may be as important as the interactions between the visitor and the exhibits.

However, a dichotomy exists among the research conducted to investigate how people learn in informal environments. On the one hand, researchers have focused on proving that learning takes place in these settings. On the other hand, studies have been conducted to examine the nature of such learning. Each of these two lines of research employ different and particular
methodological approaches; the first one is traditionally addressed with quantitative strategies and the second one normally uses qualitative methods.

Falk and Dierking (2000) assert that proving that people learn in informal settings is not an easy task, but it is possible to accomplish by using appropriate strategies. Methodologies that consider that in informal environments learning occurs at the large scale—very generalised level of knowledge—and at the smallest idiosyncratic scale, are more adequate than approaches that intend to assess any given focused learning objective, as do traditional assessment tools used in formal environments. Falk and Dierking (2000) and Roschelle (1995) further suggest that as opposed to the formal setting, the learning of concepts occurs, but it is likely to happen less frequently in museums and similar settings since visitors enter these institutions with a great heterogeneity of prior knowledge, interests, and expectations; visitors are exposed to a great variety and amount of information and are free to choose to select and control their own learning, and the visitation times are relatively short. Accordingly, it is not likely that deep conceptual change takes place as a result of a single or short series of visits (Roschelle, 1995).

Boggs (1977) investigated the learning outcomes of adult museum visitors at the Ohio Historical Center by observing and interviewing 112 casual visitors. He found that affective learning was somewhat more prevalent than cognitive learning, but adults were frequently able to recall or identify isolated facts of history gleaned from exhibits, and to assign meaning to some exhibits on the basis of personal experience. Most of the participants, however, showed affective gains such as satisfaction, pleasure, and enjoyment derived from the visit.

Adelman et al. (2000) conducted a study at the National Aquarium in Baltimore (NAIB), involving a total of 306 participants. Making use of face-to-face interviews before and after the visit, personal meaning mapping (a concept map based methodology), tracking, and follow up interviews, the researchers investigated visitors' incoming and exiting conservation knowledge, attitudes, and behaviours, and the long-term impact of the aquarium visit on individuals'
conservation knowledge, attitudes, and behaviours. Overall, they found that the NAIB positively influenced and enriched visitors’ conservation-related experience, awareness, and general knowledge; right after their visit, visitors were significantly more able to elaborate on and support their thoughts about conservation and showed evidence of stronger emotional responses to conservation-related issues.

2.3.1 The informal setting experience

It has been established that choosing to visit a museum or a similar setting is a focused, intrinsically motivated act, and that such experiences facilitate some degree of learning in visitors, although this learning is typically highly personal and unique (Rennie & Johnston, 2004). Researchers agree that informal settings support rich and consistent learning that allows individuals to construct personal meanings about the world (Falk & Dierking, 2000; McManus, 1993; Rennie & Johnston, 2004).

According to Falk et al. (1986) and Wellington (1990), informal learning environments offer complex experiences that are typified by one or more of the following characteristics: voluntary and free-choice (attendance and goals are defined by visitors), haphazard and unstructured, open-ended, learner-led and learner centred, multi-outcome, social experiences and interactions are fundamental, undirected and unlegislated, nonevaluative and noncompetitive, and attend to a highly heterogeneous population.

What is more, according to Wellington (1990) and Gerber et al. (2001), enjoyable and entertaining informal experiences contain the same fundamental elements that may be present in effective formal learning situations, such as cognitive challenges, social interaction, enthusiasm, and excitement. Rennie and Johnston (2004) stress that for a learning experience to take place, it
requires mental, physical, or social engagement on the part of the learner; museums and similar
settings are places where such events constantly occur.

Wellington (1990) and Csikszentmihalyi and Hermanson (1995) assert that achieving
educational objectives in the affective domain could have a great influence on higher-order
cognitive outcomes. Informal environments have been acknowledged for their potential to make
major contributions to the affective domain of learning, such as the development of interest,
enthusiasm, motivation, eagerness to learn, awareness, and general openness and alertness (Falk
& Dierking, 2000; Wellington, 1990). The extent to which motivation influences the pursuit of
knowledge is also a fundamental variable to consider when studying learning in informal settings
(Dierking & Falk, 1994; Herrmann & Plude, 1995), since people’s memories about past events
are not only embedded within physical and social settings, but are often associated with feelings
and attitudes.

Moreover, according to Wellington (1990), museums and the like contribute to the
cognitive domain of learning in two major ways: directly, by providing new knowledge that
certain things occur under particular circumstances; and indirectly, by producing memories and
experiences which may ultimately lead to understanding. However, the multifaceted nature and
character of learning in conjunction with the complexity and diversity of informal learning
situations makes the assessment process a very difficult task.

Likewise, interactive centres can scaffold visitors in the development of manipulative
skills, manual dexterity, hand-to-eye coordination, and so forth (Wellington, 1990). Museums are
a central element of the educational efforts that focus on learners’ active participation through
the interaction with objects. In informal settings, learning is facilitated through the observation
and manipulation of objects, the opportunities to learn are based on the learners’ interests and
motivations, education includes discovery and construction of meaning, and visitors take
responsibility for their own actions (Hein, 1998).
Leont’ev (1981) argues that thought develops from practical, object-oriented activity or labor, and Vygotsky (1978) wrote extensively on the notion that tools could enrich and broaden both the scope of the activity and the thoughts of the learner. Museums and science centres are places where objects are fundamental elements and the visitors’ experience is built upon such objects.

In an informal setting, considering both sensory-motor and conceptual aspects is relevant in order to gain understandings about how people learn in and from the visit experience. Learners adapt to the actions of others in the course of ongoing negotiations (Cobb, 1994). In museums and the like, visitors engage in a constant and dynamic process of negotiation that encompasses the logistic, educational, and emotional aspects of the visit; in this social activity, individuals function already with shared understandings and on the base of prior experiences and knowledge (Borun et al., 1996; Cobb, 1994; Dierking & Falk, 1994; Gerber et al., 2001; Ramey-Gassert, 1994).

2.3.2 Prior experiences, understandings and personal meanings

References and meanings associated with the exhibit content may originate not only from the experiences with the exhibits themselves, but also from visitors’ previous experience, emotions, memories, and personal lives (Boggs, 1977; Csikszentmihalyi & Hermanson, 1995; Doering & Pekarik, 1996; Rennie & Johnston, 2004). In particular, families bring a rich background of prior knowledge and experience to their visits (Borun et al., 1996). Falk et al. (1986) concur that what visitors bring to an exhibit is the major determinant of what they will take away; prior knowledge and experience are critical factors in determining what visitors choose to look at or learn from a particular exhibit. However, despite the importance of prior
knowledge in the learning process, as described in Section 2.2, relatively few studies have been
directed to authenticate its role in the cognitive outcomes of a museum visit.

Falk and Dierking (2000) suggest that visitors to informal settings learn when they
assimilate events and observations in mental categories of personal significance determined by
events in their lives before and after the visit. Furthermore, according to Schauble et al. (2002)
"social interaction and cultural symbols are crucial for the adaptation and appropriation of
knowledge, values and expressions” (p. 425).

One of the accomplishments of museums and similar settings has been to relate science
and technology to the things that most people see and use (Wellington, 1990). Piscitelli and
Anderson (2001) argue that exhibits and museum experiences that provide context and links with
children’s own past experiences and prior knowledge are perceived more positively by young
audiences than those which are decontextualised in nature.

Studies conducted by Anderson, Piscitelli, Weier, Everett, and Tayler (2002) and Falk
and Adelman (2003) have shown that learners’ past experiences and knowledge mediate and
shape the learning experience. Anderson et al. (2002) conducted a study on the nature of the
learning of 32 young children. Students aged 4 to 6 were interviewed about their past
experiences at four different museum environments. The researchers report that children’s
recollections, interests, and learning outcomes derived from past museum visits are very diverse,
individualistic, and idiosyncratic in nature. They conclude that when museum experiences are
connected with socio-cultural episodes that children are familiar with, they appear to be powerful
mediators of museum based learning. This study also found some evidence that children’s
museum experiences are re-contextualised in their home environments.

Falk and Adelman (2003) on the other hand, conducted a study with data from a previous
investigation at the National Aquarium in Baltimore (Adelman et al., 2000). One hundred

2 A natural and social history museum, an art gallery, a science centre, and an art/social history museum.
visitors from a total of 306 participants in the study were included in this secondary analysis. Individuals were grouped according to their entry understanding and attitudes, using qualitative categories, in order to investigate whether grouping visitors according to their prior conceptions and motivations makes it possible to discern more readily the nature of changes in visitors' knowledge and attitudes. Results show that gains in knowledge were not evenly distributed across all visitors. For instance, regardless of entering knowledge, only individuals possessing moderate to extensive interest showed significant gains in knowledge. These findings suggest that grouping visitors into categories that consider entry knowledge and motivations yields an enhanced view of the impact of informal settings.

2.3.3 Summary

Recent research on visitor learning in informal environments has focused on the cognitive, affective, and social domains of the museum experience. The significance of visitors' prior knowledge, alternative conceptions, and the important role of social interactions has been acknowledged extensively (Dierking & Falk, 1994; McManus, 1994; Rennie & Johnston, 2004). Quantitative and qualitative approaches have been used respectively to assess learning and elucidate its nature in informal environments. Difficulties have arisen from the consideration that museum learning takes place at both large scale and at the most particular idiosyncratic scale (Falk & Dierking, 2000), and that many factors can influence learning in informal settings. However, it has been asserted that museums and the like support and enhance learning by which individuals construct personal meanings about the world, and that such learning has the potential to persist over time and shape the meaning derived from subsequent events in life (Falk & Dierking, 2000; McManus, 1993; Rennie & Johnston, 2004).
Learners’ prior experiences, understandings, and personal meanings have been comprehensively considered as mediators and determinants of the outcomes from an informal setting visit, and the educational results are regarded to be highly personal and variable across visitors (Anderson et al., 2002; Falk & Adelman, 2003; Falk et al., 1986). However, few studies have attempted to further expand our understanding of the role of past experiences and prior understandings in shaping the learning experience in the informal environment.

2.4 Families as social and learning units

Researchers of families agree that a major function of the family is to support learning among its members (Bobbitt & Paolucci, 1975; Crowley et al., 2001; Schibeci, 1989); this process involves the social construction of meanings. Learning within the family environment is likely to be crucial in an individual’s educational experience; the role of the home as a learning centre and model has been pointed out by many researchers and educators (Bobbitt & Paolucci, 1975; Borun, 2002; Crowley et al., 2001; Ellenbogen, Luke & Dierking, 2004; Falk, 1998; McManus, 1994; Schibeci, 1989; Stehlik, 2003). Keeves (1975) and Schibeci (1989) suggest that factors outside of schools have a strong influence on students’ behaviours and educational outcomes, and identify three types of educational environments: the home, the school, and the peer group, as representing the major non-personal variables which influence student achievement. Parents shape and support children’s scientific thinking in everyday, discretionary activity. Still, little research has addressed such claims (Crowley et al., 2001).

Children experience a whole world of learning before they encounter formal schooling: they walk, talk, comprehend, and communicate with others (Stehlik, 2003). What the young child learns about the world into which it is born, it learns from its significant kinship relations. The family is the basic unit of socialisation where individuals learn the language, rules, mores,
styles, customs, and ways of the society into which they are born (Kane, 1987). Cultural learning begins at birth, is mostly non-verbal, and is 90% unconscious (Khoshkhesal, 1995). The home is the place where socialization and social renewal begins; according to Biggs and Telfer (1987) and Kane (1987), what we do within the family and the home we create is of major importance at both the personal and the social levels.

The family is amongst the learning environments that are not always associated with formal education strategies, structures, or techniques. Rather, it is associated with informal, self-directed, and incidental learning, concerning both children and adults. According to Merriam and Heuer (1996) most education for social change occurs not through formal education, but informally, almost furtively.

Steiner (1997, 2003) recognised that education continues and develops beyond the school and that there is a need to incorporate understanding of adult development in the approach to child development. He also asserted that learning is a lifelong process that is not limited to childhood or adolescence. According to Steiner, further development is possible and involves more than merely cognitive formal operations; cognitive, emotional, and social learning occurs throughout life in a constantly unfolding process (Merriam & Heuer, 1996; Steiner, 1997).

The family in fact is a valid environment for adult learning to take place. Experiencing community and a sense of belonging can provide a catalyst for adult learning to develop (Stehlik, 2003). The fact that psychological growth is possible throughout life implies that parents will still have opportunities to nurture it. The tasks entailed by parenthood may in themselves stimulate the parents' own cognitive, emotional, and social growth.

Research on socio-cognitive conflict has focused on peer interaction rather than child-adult interaction; it has been established that social interaction can enhance cognitive progress in children, and that children learn by comparing and sharing their own view with the views of other people (Biggs & Telfer, 1987; Khoshkhesal, 1995). For children, the meaning is not
validated by logical argument but by consensus, and social approval is necessary in order to accommodate contradictory views (Biggs & Telfer, 1987; Khoshkhesal, 1995).

However, Hatch (1990) points out that when a child is engaged in problem-solving with an adult, the consensus process can be challenged by the adult’s perceived superior status as a knowledgeable person. Whether or not the adult individual experiences a cognitive conflict as a result of this type of child-adult interaction, or how this could impact on adult learning, is yet to be explored.

Few studies have been conducted to investigate whether adults experience a cognitive conflict while interacting with children in informal environments and even less is known about how adults may benefit from such interactions. It is reasonable to think that in informal settings socio-cognitive conflicts might be encouraged, since people usually visit such places in groups and engage in free discussions (Anderson & Nashon, in press), and since according to Biggs and Telfer (1987), experience helps adults to discriminate better and to know how to learn.

2.4.1 Families in the informal setting

A large number of people visit museums and similar settings as members of some kind of group, and child-adult groups are the most common; family groups form approximately 60% of all visitors to these settings (Blud, 1990; Diamond, 1986; Dierking & Falk, 1994; Falk, 1998; McManus, 1987; Yalowitz, 2004). Most of the studies conducted in the field of family groups in museum settings define a family group as a social group containing at least one child and one adult, although families can vary enormously in structure and size.

According to McManus (1994), families are intergenerational social units that, within the museum setting, behave in consistently different ways compared with other visitors. For instance, Sandifer’s (1997) observations of 47 visitors at the Reuben Fleet Science Center
indicate that regardless of the day of the visit, families spend more time than nonfamilies in individual exhibitions and in the science centre as a whole. In addition, each family brings its unique culture, shared knowledge, values, experiences, and expectations to the museum. The museum in turn, enriches the family’s culture through multiple learning experiences (Borun, 2002).

An informal setting can be seen as an attractive destination for a family outing, since it is usually perceived as an easy, relaxing environment for social activity within the family (McManus, 1994). Families go to museums and similar settings with multiple goals: they seek a social experience for the group and are also interested in a valuable learning experience for the children (Borun, 2002).

Given that visitors value the social aspect of their visits to a museum (Borun, 2002; Hilke, 1987; McManus, 1987), informal environments are considered as social and cultural contexts for learning where all members of the family can find a focus of fascination (Hooper-Greenhill, 1994). In these environments both children and adults can look for and find meaning and connection in a personally relevant way (Falk & Dierking, 2000; Hooper-Greenhill, 1994). Borun (2002) asserts that family members can share the associations stimulated by objects immediately or long after the museum visit.

McManus (1988) claims that the social aspect of a visit is at the very core of the experience and is a fundamental source of satisfaction in museum visiting. Furthermore, the social context permeates the communicative situation in the museum since both group composition and quality of social interaction within groups affect, independently, the way in which visitors take information from the exhibit and negotiate meanings. Social group structure affects the strength with which people work to make meanings.

Social interaction in the informal setting takes place as a reciprocal activity, in which all members of the group participate and benefit. Nevertheless, information exchange between
family members not only takes place at the moment of experiencing a given situation, but can take place any time in the days, weeks, or even months following the museum experience (Borun, 2002; Borun et al., 1996). In later episodes of information exchange, museum-related information can re-emerge in diverse situations and thus can be re-contextualised in meaningful ways.

2.4.2 Parent-child interactions in informal settings

Informal setting experiences enrich the family culture by contributing immediate and potential learning experiences (Borun et al., 1996). These venues offer visitors socially, physically, intellectually, and emotionally rich events.

An important component of social interaction is the identity of the person with whom one interacts, since people tailor their behaviour to suit companions (McManus, 1987). Within the museum setting, interactions between parents and children can range from playful to very restricted or from haphazard to rather directed (Diamond, 1986), but regularly parents aid children’s learning by modifying the sensory feedback from the manipulation of exhibits. Families generally behave in a co-operative and co-ordinated way within the informal setting, hence the information each person is exposed to is at the same time strongly influenced by the other members of the group (Hilke & Balling, 1989; McManus 1994). Personal information-gathering attitudes are pursued in the presence of other family members as well.

Children naturally strive to gain experience about the world, and parents assist this process by seeking, providing, and choosing safe, non-threatening experiences and environments to explore. Also, ethological and descriptive observations of casual visitors to museums suggest that teaching takes place amongst family groups. Verbal (i.e. “telling”, “describing”, or “posing questions”) and nonverbal (i.e. “showing”, “reading”, or “manipulating”) patterns of behaviour
described by Borun et al. (1996) and Diamond (1986), indicate that learning processes take place amongst family members during museum visits.

According to Hilke and Balling (1989), family groups display learning-support strategies during the museum experience such as acquiring, disseminating, or transferring and relating exhibit information with prior or future experiences. Families maintain a high focus on the exhibits and engage in behaviours that support the acquisition and exchange of information. Their study indicates that parents are likely to let their children choose the exhibits to which the family would attend.

Differences in behavioural patterns of the members of a family group have been documented by Diamond (1986) and McManus (1994). For instance, fathers and mothers are the family members that more frequently look at graphics, read, show, and tell, whereas sons and daughters are the ones who approach the exhibits first and manipulate them the most. Moreover, according to Diamond's observations, parents tend to convey more symbolic information, whereas children tend to transmit information about the location, operation, and description of the exhibit phenomena, and also control the pace of family visits. Novelty and curiosity are likely to influence the behaviour of children. Also, teaching in the informal setting is a reciprocal activity with different family members teaching at different times in different situations (Diamond, 1986).

In addition, McManus (1988), who studied family groups in the British Museum, suggests that among the groups containing children in museums, family groups are those who have the longest conversations and are more likely to interact with an exhibit for a longer time, as opposed to child peer groups and teacher-pupil groups whose visits and conversations are briefer. She claims that friendly and intimate groups are better able to negotiate differences in opinion and explore a topic during discussion.
Blud (1990) investigated learning in the Science Museum of London from a social-psychological perspective. She observed and interviewed 24 child-adult dyads in three target exhibits; half of the pairs were asked to interact with certain exhibits individually (without discussion), and the other half were asked to interact with the target exhibits together (discussion encouraged). All the dyad members were then interviewed individually. Results suggest that the role of social interaction is significant in promoting children's learning in such groups, since children performing under the social condition demonstrated significantly superior understanding compared to children in the individual condition. The study also indicates that interactive exhibits stimulate a constructive exchange between adult and child, and that there are significant gender biases in performance both in children and adults.

Hilke (1987) points out that family conversations at exhibits tend to involve associations and comparisons to past events and individual experiences. These conversations may reinforce past episodes as well as family history, thus developing a shared understanding among the family members. Hilke and Balling (1989) report that most information exchange occurs in a spontaneous way, as members share the salient aspects of the experience, and in this process both parents and children give and receive information to an equal degree.

McManus (1987) studied the conversations of 614 visitor groups at the British Museum. She recorded eight variables to describe group size and type, social behaviour, and visitor interaction with the exhibit message. Results show that groups containing children are very likely to engage in playful activities and in long conversational periods. In these groups children are not likely to engage in reading whereas adults read for short periods. On the other hand, only-adults groups show different behaviours during the museum visit; adult groups usually do not engage in manipulating exhibits and are more likely to read for longer intervals but their conversations are brief.
The family, hence, works collectively to build what McManus (1994) calls a “family perception” of the exchanges within the museum experience. At the same time, each individual family member forms his/her own conceptions and perceptions of the encounter. Such conceptions are mediated and defined by the social identity of the family.

2.4.3 Adult learning within family groups in informal environments

Adults are an important part of the museum visiting population (Blud, 1990; Borun, 2002; Diamond, 1986; McManus, 1994); they play a crucial role as decision makers in defining the family’s dynamics and activities (Heimlich, Diem & Farrell, 1996). Despite the fact that adult visitors attend informal settings for primarily social reasons (see Section 2.5), it has been established that adults learn cognitively as a result of a museum visit (Adelman et al., 2000; Boggs, 1977; McManus, 1993), and that teaching takes place as a fundamental aspect of the spontaneous interactions between family members in science museums (Diamond, 1986).

However, given that most family experiences at informal environments are free choice in nature, it is difficult to assess and build a case for adult conceptual learning in informal science settings as part of a family group. Doubtless, the adult members make use of museums and similar settings to facilitate family learning, but traditional quantitative approaches for elucidating the family experience have tended to inhibit the understanding of the nature of this learning at the personal level (Dierking & Falk, 1994), despite the fact that according to Combs (1999), when adult visitors make a conscious choice to learn without the pressure of producing results, learning becomes a leisure activity.

Efforts have been made, nonetheless, to elucidate the way in which families learn collectively. Hilke (1987) asserts that families visit museums and the like as social entities where its members are accustomed to interacting and learning together; they share a broad set of
personal and cooperative learning strategies that facilitate the acquisition and exchange of exhibit information.

Borun et al. (1996) conducted a study at the *Philadelphia/Camden Informal Science Education Collaborative*[^1] with the objective of identifying and measuring family learning in science museums. The researchers observed, audiotaped, and videotaped 129 families and interviewed some groups at the end of their visits. They categorised the behaviours and identified three learning levels: identifying, describing and interpreting, and applying. Researchers conducted a quantitative analysis and determined that there is a close relationship between particular behaviours (i.e. telling, reading, or manipulating) and learning, and that the individual’s learning experience is enhanced and shaped by input from other family members. The group effect is crucial for the family learning experience.

Moreover, Diamond (1986) studied the behaviour of 28 family groups at the *Exploratorium* and the *Lawrence Hall of Science*. The interactions among group members and the nature of the responses were coded and quantitatively analysed in order to determine the extent in which the behaviours differed and how they influenced other group members’ behaviour. Teaching strategies were identified in verbal and nonverbal patterns of behaviour (i.e. showing and telling), and previous experience was pointed out as a critical element in the learning experience. It was concluded also that social interactions are important in stimulating learning at exhibits and that families commonly relate the exhibit to similar phenomena outside the museum that are within the experience and memories of the listener (usually the children).

The fact that parents seem to make use of exhibit graphics for teaching purposes and to supplement their own knowledge of an exhibit (Diamond, 1986), suggests that parents may be experiencing cognitive shifts and conceptual changes, even if attempts to understand the graphics

[^1]: The PISEC consists of four institutions: the *Franklin Institute Science Museum*, the *New Jersey State Aquarium*, *The Academy of Natural Sciences* and the *Philadelphia Zoological Garden*.  
30
are not successful. When reading aloud for their children or coming up with explanations and descriptions, parents could be going through cognitive changes themselves. Nevertheless, more research is needed to clarify the nature and character of parents’ learning in the informal setting.

Heimlich et al. (1996) and Stehlik (2003) stress that as adults we are continually confronted with new situations that require us to question ourselves and our understanding of the world in order to make meaning of it, by making use of an extensive array of experiences and lifelong constructed knowledge. This process is a strong motivator to learn throughout life. Furthermore, identity is formed through a process of learning and meaning making.

Crowley et al. (2001) explored the role that parents play in structuring children’s everyday scientific reasoning and in facilitating the construction of children’s everyday scientific theories. Researchers videotaped and recorded family interactions at the Children’s Discovery Museum in San Jose, California and compared the activity of 91 targeted children that used the exhibit on their own, in peer groups, or in parent-child groups. They found that children’s scientific reasoning processes are more advanced when parents and children jointly engage in scientific thinking, and that parents and children engage in meaningful explanatory conversations whereas peer groups of children do not evidently engage in such dialogue. They conclude that children who engaged in shared scientific thinking with their parents have greater opportunity to learn.

Borun (2002) ascertains that for understanding museum-based learning it is crucial to recognise that there are children and adults simultaneously engaged in a novel learning experience, and that the museum exhibit is the mediator of the exchange of information and reactions among group members. This information, whereas coming directly from the objects on display or being an association to prior knowledge that is triggered by these objects, places both adults and children as learners. However, most studies regarding learning in informal
environments have focused on children, whereas adult learning has been neglected in museum research.

2.4.4 Summary

Learning within the family environment is fundamental in an individual’s educational experience, and many researchers have acknowledged the role of the family as the basic unit of socialisation and learning (Borun, 2002; Ellenbogen et al., 2004; McManus, 1994; Schibeci, 1989; Stehlik, 2003). It has also been asserted that social interactions enhance cognitive progress in children through the sharing and negotiation of understandings and views (Biggs & Telfer, 1987; Khoshkhesal, 1995).

Families are amongst the most common informal setting visitors, constituting approximately 60% of all visitors (Blud, 1990; Diamond, 1986; Dierking & Falk, 1994; McManus, 1987; Yalowitz, 2004). These groups share a unique culture, knowledge, values, experiences and expectations, and according to McManus (1988), families value highly the social aspect of a museum visit.

Behaviouristic studies have concluded that teaching takes place in family groups (Borun et al., 1996; Diamond, 1986; Hilke & Balling, 1989; McManus, 1994), and differences in behavioural patterns amongst family members have also been described.

However, whereas it has been established that children gain experience through the assistance of their parents, and that social interaction in the museum setting takes place as a reciprocal activity, the role of parent-child interactions in the development and formation of knowledge in the informal setting is still not well understood, and almost nothing is known about how adults may benefit from collaborative learning in informal environments.
2.5 Family agendas in informal settings

Observing and understanding how families spend their time during a museum visit is critical to comprehending and evaluating the informal environment experience, especially considering its free choice nature (Dierking & Falk, 1994). Families arrive at these settings with a set of desires, motivations, needs, and expectations for what the visit will offer; this is referred to as an agenda (Moussouri, 2003). Diamond (1986) reports that family groups choose the exhibitions they want to explore in a rather idiosyncratic way that is a reflection of a set of pre-established desires and interests.

Visitors to museums and similar settings have agendas that include a wide variety of elements such as the duration of the visit and goals. It has been acknowledged that agendas strongly determine what visitors do and talk about within the venue and this leads to think that agendas have a direct influence on the depth and quality of the learning outcomes of a museum experience (Anderson, Piscitelli, Weier & Everett, 2003; Falk & Dierking, 2000; Falk, Moussouri & Coulson, 1998; Moussouri, 1997, 2003;).

Visitor agendas are shaped by diverse factors including prior knowledge, experience, motivation, interest, socio-demographics⁴, and so forth. Choosing to visit a particular setting and having an agenda for that visit involves imagination and desire, a mix of past experiences, conceptualization of the type of setting, reports of particular exhibitions, and personal preferences (Pekarik, Doering & Karns, 1999). Thus, it is reasonable to argue that each member of a group possesses a personal agenda before and during the experience of a free-choice environment. Moussouri (1997) proposes that agendas can be conceived as having two dimensions: motivations and strategies. According to her, motivations encompass reasons for visiting a museum such as education, social event, life cycle, place, and practical issues.

⁴ Social class, age group, occupation, and gender.
Strategies during the visit on the other hand, can be classified as unfocused, moderately focused, and focused in any particular exhibit/exhibition.

In general terms, the family as a group seeks pleasure or enjoyment when visiting an informal environment, along with hopes for an educational or informative experience (McManus, 1994); in these cases, a dual agenda has been previously established. However, according to Hilke (1987), families visit museums and similar settings foremost to have a good family outing, relegating everything else to secondary goals; in these cases the primary agenda of satisfaction and enjoyment has to be fulfilled in order for the other agendas, learning included, to take place.

Personal and group agendas influence and model each other since they operate simultaneously (Moussouri, 2003). Hilke (1987) states that family behaviour at the informal setting, “actually reflects a complex, well-balanced interweaving of personal and cooperative agendas to learn” (p. 15). Agendas, hence, are continuously negotiated and reshaped during the course of the visit. However, Anderson, Piscitelli, et al.’s (2003) findings suggest that children’s agendas have the potential to profoundly affect the learning experience of the group, in that the personal agendas of the youngest visitors need to be fulfilled for the visit to result in increased learning outcomes. Yet, few systematic investigations have attempted to investigate the impact of visitor agendas on learning outcomes from museum visits (Falk et al., 1998; Moussouri, 2003).

McManus (1994) reports that families seek enjoyment not only from the exhibits displayed in museums and similar settings, but also from the experience of functioning as an intimate social unit in a public space the family has freely chosen to visit, since this seems to strengthen family ties. When parents have the perception that informal environments can offer an educational experience, they are likely to set the tone of the visit so that children would
appreciate the venue in a particular way and would behave and attend according to a schema communicated to them by their parents (McManus, 1994).

Prentice, Davies, and Beeho (1997) implemented an on-street survey to 875 randomly selected adult respondents, in order to investigate peoples' motivations for visiting and not-visiting museums in Edinburgh. They found that socio-demographics are potentially useful as predictors of a person's motivations to visit museums. They also found that amongst museum visitors, ‘having a general day out’, ‘getting away from routine’, ‘spend time with family and friends’, ‘broaden one’s general knowledge’, and ‘satisfying one’s curiosity’ are the most common reasons for visiting museums. As well, their results indicate that ‘spending time with family and friends’ is significantly more important for those museum visitors aged 31-50 years; among this age group, visitors with a child at home are even more likely than others to rate this motivation as very important (44% of museum visitors with a child at home cited this reason as very important).

Falk et al. (1998) investigated the effect of agendas on visitors' learning. By using two novel assessment tools, the researchers worked with 40 adults visiting one of the exhibitions at the Smithsonian Institution's National Museum of Natural History. They report that visitors' pre-visit agendas directly influence their in-museum behaviour and learning, and that most museum visitors bring an educational or entertainment agenda. The nature of visitor's motivation significantly affects how and what is learnt\(^5\). However, high entertainment motivation and high education motivation revealed greater learning. Strategies, on the other hand, affect the length of the visit. This study shows that most visitors see no apparent conflict between fun and learning.

Moussouri (2003) studied the interplay between the family and the museum agendas. She observed and interviewed 29 family groups at the Museum of Science and Industry in

\(^5\) The researchers identify six categories of motivation: place, education, life-cycle, social event, entertainment, and practical issues.
Manchester and found that five factors determine the family agenda: family profile, socio-cultural patterns, personal context, social context, and the exhibition itself. Her analysis shows that family members are actively involved in planning their visit route and routine and that they renegotiate and refine their agenda as the visit evolves. Visitor’s recollections are clearly related to their agenda as well as to the educational background of their family and prior understandings.

Additionally, in Adelman et al.’s study (2000) at the National Aquarium in Baltimore (NAIB) 100 casual visitors were asked, amongst other things, their reasons for visiting NAIB. The researchers report that 61% of the participants gave reasons related to a sense of place (liked aquariums, venue’s reputation, outing recommended by others); 33% gave educational reasons (wanted to see fish and wildlife, described their visit as connected to their personal interests and hobbies or considered important for their children to see things that they have not seen before and be exposed to new experiences); 29% mentioned practical reasons (being in town for a couple of days or having time to kill); 29% also considered social motivations as very important; and only 8% gave entertainment reasons (look around, have fun).

2.5.1 Agenda types

Visitors enter informal environments with a broad range of interests, backgrounds, and motivations, but in general terms people visit these places to participate actively, engage their senses, socialise with family and friends, acquire information, have fun, and relax through a memorable encounter that removes them from the everyday world (Combs, 1999; Hood & Roberts, 1994; Prentice et al., 1997). It has been acknowledged that visitors value the learning experience of visiting museum settings where learning is spontaneous and is not associated to external rewards—it is intrinsically motivated (Csikszentmihalyi & Hermanson, 1995).
Such intrinsic motivations are highly related to novelty, curiosity, and personal interests, that at the same time, are partly universal and partly the result of individual experiences and history (Csikszentmihalyi & Hermanson, 1995). Because interest and motivation are crucial for understanding how people learn in the museum gallery, researchers have made efforts to categorise the different types of agendas that visitors bring to the informal setting.

Moussouri (1997) suggests that visitor’s agendas can be classified as place (destination is emblematic of a locale), education (aesthetic, informational, or cultural content), life-cycle (reproducing past experiences), social event (family day out), entertainment (have fun), and practical issues (weather, proximity).

Combs (1999) conducted a qualitative exploratory study using focus groups at the *J. Paul Getty Museum* to investigate people’s motivations to engage in a museum experience. With the participation of 97 visitors in 16 groups, she categorised motivations as recreation (escape from everyday life, day trip, relax), beauty (joy, appreciation), amusement (fun), social (create memories), history (fantasy, go back in time), education (guided experience), and learning (self growth). Both recreation and learning motivations were cited as the most popular reasons for visiting the venue.

On the other hand, Pekarik et al. (1999) investigated the experiences 2,828 visitors found satisfying in nine *Smithsonian* museums, through interviews and surveys. Their report of research in progress shows that visitor’s expected experiences can be classified as object experiences (seeing the real thing, seeing rare/valuable things, being moved by beauty), cognitive experiences (gaining information or knowledge, expanding understandings), introspective experiences (recalling past experiences, feeling connections, imagining places), and social experiences (spending time with family/friends, see one’s children learning new things). The relative importance of each of these categories varied according to the type of museum. Zoo visitors, for instance, valued the object and social over the cognitive and introspective
experience. Natural history museum visitors valued the object and cognitive over the introspective and social experience.

2.5.2 Summary

Visitors' expectations, desires and needs in relation to a museum visit are known as agendas. Agendas are crucial in defining the way in which the visit is experienced, and thus the depth and quality of learning outcomes from museum visits (Anderson, Piscitelli, et al., 2003; Falk & Dierking, 2000; Falk et al., 1998; Moussouri, 1997, 2003).

Agendas are influenced by factors such as prior knowledge and experience, motivation, interest, and socio-demographics. In family groups there is usually a social agenda generally composed of enjoyment and educational expectations (McManus, 1994), as well as an individual agenda for each member. In the course of a museum visit agendas are constantly negotiated and adapted (Moussouri, 2003).

Regardless of their classification, recreational and learning agendas seem to be the most popular amongst informal setting visitors. Yet, few investigations have explored the impact of family agendas on the learning outcomes from an informal environment experience. Furthermore, there are no reports on whether what families describe as their agendas (declared agenda) actually match with how families experience the informal setting (observed agenda).

2.6 Longitudinal impact of informal setting visits on family groups

The cumulative and ongoing nature of learning means that the significant impact of an informal setting visit can occur sometime after the experience. Visitors could develop and show learning from their visit over time, in the form of changes in attitudes, behaviour, and/or knowledge. Given that learning is contextualised, for the visit to have any long term impact, time
is needed to allow learning to find relevance and be adapted or linked from the context of the museum setting to other relevant contexts in the visitor's life (Rennie & Johnston, 2004) (see Section 2.3.1).

Ellenbogen’s ethnographic study (2002) showed that many of the conversations that begin in the museum continue in other contexts such as the home, and that families are likely to talk about a museum experience in the following days or even weeks. The researcher followed a family before, during, and after their museum visits, and found an interconnectedness between the visits and other family activities.

Most of the studies that have been conducted to assess learning as a result of an informal environment experience deal with the short-term assessments of learning (Falk & Dierking, 1997). Such procedures imply asking visitors to recall their experiences after an elapsed period, usually only minutes or at most days after the visit, and commonly look for very specific, narrowly focused narration of facts and concepts (Falk & Dierking, 1997).

The above is coherent when we consider learning as a product, a concrete and measurable gain in information about a given subject (which can rather be considered as memory). Memories, according to Falk and Dierking (1997), in particular the types of memories associated with a museum experience (who were present in the visit, what people did, what they observed, and so forth), are not sufficient evidence of learning, since learning implies more than recalling past events. People construct understandings of the world not from a single experience or source, but from a variety of sources over long periods of time (Adelman et al., 2000; Anderson, Lucas, Ginns & Dierking, 2000; Falk & Adelman, 2003). Learning must involve the use of these memories to solve real-world problems, to connect important ideas or any other higher order function (Falk & Dierking, 1997).

Other factors such as content knowledge aids memory through a number of mechanisms. According to Siegler (1998), as learners learn and think about a topic, information about such a
topic and others that are associated with it can be quickly retrieved. This process helps people remember effectively from infancy onward. Content knowledge influences how much and what learners remember, and also affects the efficiency of execution of basic processes and the learning of new strategies to remember (such as metacognitive strategies) (Siegler, 1998).

2.6.1 Memories of informal environments

According to Herrmann and Plude (1995), the acquisition and retention of memories of museum visits result from the uniqueness of the experience, which not only involves novel and multi-sensory content but also encompasses personal emotions and feelings and collective experiences. These authors contend that museum memories may include also philosophic content concerning one’s relationship with the topics exhibited. As a result, a museum memory is like autobiographical or episodic memory (Conway, 2002; Terry, 2000) in that it can include mental records of the physical environment, social interactions that took place during the visit, emotional responses elicited during the visit, a record of the prior and on-site motivations, and reflections on prior knowledge and experiences (Herrmann & Plude, 1995).

Semantic memory, conversely, is our store of general knowledge—it is more like dictionary or encyclopedic knowledge and thus can be tested against socially accepted body of facts; semantic or declarative memories are concept-based and can be connected so that new knowledge can be built. There is a developmental process in the transfer from episodic to semantic memories. Once knowledge has been assimilated into semantic memory, the time and context of the experience become irrelevant and can be forgotten with no effect on the memory trace (McManus, 1993). McManus (1993) asserts that most of the memories and recollections described in informal environment research are episodic or autobiographical memories.
The formation and use of memories can be affected by active and passive factors. Active factors include the physical and social environments and mental engagement, and passive factors include psychological and emotive states (Herrmann & Plude, 1995). Socio-environmental factors are of particular relevance in facilitating remembering in the future, whereas the passive factors have a direct effect on a person’s disposition to learn since attitudes, emotions, and motivations determine which particular stimuli will be the focus of attention, and therefore, likely to be assimilated.

Besides remembering particular episodes of an informal setting visit, visitors also are likely to connect such experience to their lives. Adelman et al. (2000) report that 6 to 8 weeks following their visit to NAIB, 33 visitors were able to provide general and particular examples of connections they made between their lives and their aquarium experience. Twenty four percent were motivated to visit other aquariums, zoos, museums and parks; 21% discussed specific connections between their recent NAIB visit and their personal and family lives; 18% mentioned they had told other people about their experience; 18% mentioned specific things they had seen on TV or in the media that made them think about their recent visit to the aquarium. Some visitors also mentioned having their pictures developed as a link to the NAIB experience.

2.6.2 Long-term informal setting learning

Some studies (Anderson, 2003; Falk & Dierking, 1997; Stevenson, 1991) show that learning may continue well past the museum visit. Much of what an individual comes to discover about what he or she has learned as a consequence of a museum visit only becomes apparent weeks, months, or years after the experience (Falk & Dierking, 1997; Wellington, 1990).

Stevenson (1991) investigated the long-term memories of family groups at the Science Museum, London. He conducted exit interviews, follow-up questionnaires some weeks after the
visit, and follow-up interviews 6 months after the visit. Three hundred and eighty three visitors took part in the initial phase of the study. The results show that at the end of the visit all participants were able to recall exhibits and give details; some weeks after the visit a wide range of exhibits was recalled, and 6 months after the visit both thoughts and feelings were evoked. Nearly half of the memories were classified as elaborated and clear, though 60% of them were descriptive in nature. Participants declared to have related the museum experience to other activities and 99% said they talked to someone about the exhibit after the visit had been completed. Stevenson (1991) concluded even when most memories of the museum visit were descriptive and episodic in nature, the follow-up interviews also elicited information which indicated that memories had been processed subsequently, thus suggesting the formation of semantic memories. However, his report does not provide further information about what led him to reach such a conclusion.

McManus (1993) studied the memories of visitors to the Birmingham Museum and Art Gallery in an exploratory, neutral and uncued manner. Participants were contacted by mail and were asked to submit their comments on a particular exhibition. A total of 28 replies were analysed to show that the average duration of memories was 7 months. Half of all memories related to objects or things, other memories related to episodes and experiences, and others to feelings; summary memories were also identified and refer to memories that show evidence of a process of intellectual judgement or rationalization. This category gave evidence of meta-cognition (awareness of one’s own thinking) and the processing of memories about the experience of visiting the museum.

In a study conducted by Falk and Dierking (1997), 128 subjects were able to recall school field trips taken during early years of their school education when interviewed years after the experience; subjects readily recalled where and when they went and with whom, how they got there, and at least some details of what they did. The most frequently recalled field trips were to
natural sites and nature centres, farms, historical sites, zoos or aquariums, and natural history museums. Age seems not to influence the type of recollection; the strength or scope of memories does not decline over time. In this study, 77% of the recollections were categorised as content/subject related, and 55% were feelings related, thus suggesting long-term recollection of cognitive information and showing that children focus on the content/subject matter aspects of the trip and not only on the novelty of the setting. In addition, participants admitted to having thought about the field trip experience after it was completed.

Adelman et al. (2000) found that when interviewed 6 to 8 weeks after visiting the National Aquarium in Baltimore, visitors continued to perceive the main messages conveyed at the venue. These messages include preservation of the environment, conservation, diversity of wildlife, respect/appreciation, and balance/interconnectedness. Overall, in the long-term the message of diversity of wildlife was significantly more present in visitor’s memory than it was at the end of their experience at the aquarium, suggesting that time played an important role in visitors’ perceptions and appreciations of marine life.

Anderson (2003) investigated the nature and character of visitors’ long-term memories associated with their experiences at World Expositions (Expos). The analysis of the interviews conducted with 50 respondents 15 to 17 years after their visit experiences, show that memories of the social context were the most dominant and vivid of all memories, and that memories were overwhelmingly dominated and mediated by the socio-cultural identity of the individual at the time of the visit. Socio-cultural identity acted as a powerful enabler, permitting visitors to see, perceive, and remember particular aspects of the expos. Anderson (2003) concluded that who you are largely determines what you are able to see and perceive, and what you eventually recall after the experience. He asserted that visitors’ agendas in conjunction with their cultural identity at the time of the experience, defined their behaviour and attention at the time of the visit, as well as their recollections many years later.
The above synthesis of research reveals that experiences at informal environments result in highly significant and persistent memories that point to learning across a number of domains, namely the cognitive, affective, and emotional domains. Visits to museums and similar settings result in highly salient and indelible memories that are evidence of learning across a wide range of topics and venue types. They also support the notion that visitors’ social contexts are important and memorable elements of their experiences in informal environments.

Perception, attention, and memory are interconnected and play a central role in the vivid reconstruction of past events. People do remember casual visits to museums after long periods, but the range of memories can be very wide and they are often highly personal. Also, the role of time and place as contextual frames for the evocation of memories in the long term has been suggested.

2.6.3 Summary

Given that learning is an ongoing process, impacts from an informal setting visit are likely to take place sometime after the experience in the form of changes in attitude, behaviour, and/or knowledge. Nonetheless, most of the attempts to assess learning in informal environments have taken a short-term approach (Falk & Dierking, 1997).

Recalling past events is not sufficient evidence of learning. Learning involves the use of memories to solve problems, connect ideas, and so forth. Most of the memories and recollections described in informal environment research are autobiographical or episodic memories (Anderson, 2003; Conway, 2002; McManus, 1993; Stevenson, 1991), but ambiguous information exists on whether semantic memories can be derived from informal experiences in the long-term.
2.7 Synopsis of the research and future needs

Family learning research in informal settings has consolidated as a discipline over the last two decades (Ellenbogen et al., 2004). However, much of the family research focuses on the individuals that constitute a family group and their direct experiences as visitors. Ellenbogen et al. (2004) suggest that families are to be considered as social units with mixed ages, shared systems of past experiences, beliefs, and values, but also as part of a community of practice with which families share meanings, processes, symbols, values, vocabulary, and understandings.

The growing body of literature has made some contributions to our understanding of the way in which families learn in and from museums and similar settings. An important part of the existing research deals with the behaviours and patterns of interactions of family members (Diamond, 1986; Hilke & Balling, 1985; McManus, 1987). Others have focused on families’ conversations during museum visits (Ash, 2003; Diamond, 1986). However, some points are yet to be addressed:

- Few studies have investigated the issue of agendas and long-term impact of informal setting visitation on family groups (Moussouri, 2003; Stevenson, 2001). More qualitative research is needed to gradually and deeply complete the picture of how families experience and learn in and from museums and similar settings. There is a need to extend family research over time and contexts and also to explore the agendas and resources family groups bring with them to an informal setting, with particular emphasis on the adult members of such groups. This information will help us investigate the way in which families develop meanings out of an informal environment experience.

- There is almost no research about how and what adults learn as part of a family group and as a result of the parent-child interactions, despite the fact that adults are an important fraction of the informal setting visiting population and they, more often than children, suggest a
family outing to museum settings and are the societal decision makers (Heimlich et al., 1996). Diamond’s observations (1986) indicate that adults collaborating with children show no difference in performance on a post-visit test than adults responding individually; however, no further research that considers an alternative methodological approach has been conducted to address these conclusions.

- Almost all the research in and about informal settings has been conducted in museums and science centres. However, zoos and aquariums are places with particular characteristics that situate visitors in specific learning situations. These are places where people connect with nature in ways that would be impossible for most of us outside an institution such as these (Yalowitz, 2004). Being able to observe a live animal can have a concrete educational benefit (Balling, Falk & Aronson, 1992); the live animal experience, which is at the core of the aquarium visit, may act as a vehicle for visitors to learn about, care about, and want to conserve animals and their habitats. Yet, few studies of learning, particularly in family contexts, have been undertaken in these kinds of settings.

In Canada and the United States, each day millions of visitors enjoy their local zoos and aquariums (American Association of Zoological Parks and Aquariums, AAZPA6). These institutions carry on educational programs for teachers and students, and it has been established that the public trusts the conservation message of these settings (AAZPA, 2004), making them particularly valuable educational environments. Collectively, zoos and aquariums have an enormous social, cultural, educational, and economic impact on the North American public.

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6 http://www.aza.org/
Chapter 3: Methodology

Despite the last twenty years of research efforts which have lead to an exponential increase in studies investigating learning in and arising from visitors' experiences in informal settings, some significant gaps still exist in the literature, as evidenced in Section 2.7. This study addressed some important issues that had not yet been examined or effectively been investigated in previous research studies. The issues of how adults learn as part of a family group and as a result of the parent-child interactions in informal environments; the role and nature of social and individual agendas in the learning experience of family groups; and family learning over time and contexts resulting from a visit to the Vancouver Aquarium, were explored.

The research design that framed this study was established with the goals of describing and understanding family group experiences at the aquarium setting, since little research has focused on science learning in and emergent from these types of informal environments where visitors are in close touch with living creatures.

3.1 Overview

This chapter deals with the methodological considerations of the study, through which the research questions were fruitfully answered. A justification of the methodology and methods that were employed is offered, as well as an account of the data collection and data analysis procedures. Also, a description of the context of the visitor experience –The Vancouver Aquarium Marine Science Centre, is provided in order to situate the meanings visitors derived from their experiences. Finally, this chapter closes with some remarks about ethical considerations and limitations of the study.
3.1.1 Research questions

1) What is the nature and character of parents'/guardians’ learning within a family group context, while visiting an aquarium?

2) Do family groups visit aquariums with predefined agendas? In what ways do these agendas affect group learning?

3) How and to what extent is the adults’ knowledge and understanding related to the aquarium visit connected or evidenced beyond the visit?

3.2 Epistemological underpinnings

This study was situated within a social constructivist theoretical framework. This viewpoint sees learning as an active and dynamic process by which learners individually and socially construct and adapt meanings (Ausubel, 1967, 2000; Cobb, 1994; Lave & Wegner, 1991; Staver, 1998; Vygotsky, 1978). Learning was regarded also as a framework of interconnected information and emotions that is constantly and actively being reshaped and reorganised when new experiences, situations, and information are gradually and incrementally incorporated (Ausubel, 1967; Gunstone & White, 1992).

In this research study then, learning was seen as both a process and a product that are dynamically and actively constructed by the learner (Section 2.2.1). Learning was considered an individual construct that is intrinsically mediated and modulated by the social context of the learner (Section 2.2.2). In this framework, personal significance, prior understanding, the physical place, social interactions, and time are amongst the seminal elements that shape and mediate learning (Falk & Dierking, 2000; Hein, 1998; Schauble et al., 2002) (Section 2.3.2).

Additionally, the definition of learning employed in this study was broad in the sense that it encompassed more than the cognitive aspect of learning; instead, changes in attitude,
motivation, and interest, expanded aesthetic and kinaesthetic experiences and appreciation, socially mediated conversations and interactions, formation and refinement of critical standards, and the growth of personal identity were also considered as learning outcomes (Piscitelli & Anderson, 2000; Schauble et al., 2002) (Section 2.2.3).

Learning in and emergent from informal situations was conceived to be a function of the continuous and continuing interaction of the social, physical, and personal contexts of visitors, as proposed by Falk and Dierking’s (2000) Contextual Model of Learning. Learning in these environments was also seen as multi-faceted and highly dependent on the social factors surrounding the experience.

Agendas or the set of personal and social desires, needs, and expectations for what a visit to an informal setting will offer (Moussouri, 2003), were also considered to play a crucial role in framing the experience, thus determining the nature and character of the learning outcomes. Furthermore, it was acknowledged that given the cumulative and continuing nature of learning, the ongoing impact of experiences in informal settings can manifest some time after the visit, and that this long term impact is contextualised by the visitors when they find relevance in the experience and link it to other relevant contexts in their lives (Rennie & Johnston, 2004).

3.3 Points to address

As evidenced in Chapter 2, few reported studies have addressed the question of whether a family visit to a free-choice learning environment is successful at stimulating science learning in the adult members of the group. Furthermore, little research in museum settings and almost no studies carried out at aquariums have been conducted that consider adults as active learners, an issue that is relevant because adult members of family groups are crucial decision makers as well as key stakeholders (see Section 2.4).
Also, this study explored the nature and character of family agendas, as well as their roles in the learning experience of the adult members of the groups (see Section 2.5). The ongoing dynamics of agenda negotiation and implementation, and their impact on long term connections to other contexts, were also investigated.

Most studies with a focus on informal environments have been conducted in museum settings, whereas there are few reported studies conducted at aquariums (see Section 2.7). Aquariums, however, are popular settings amongst family groups, and have particular characteristics that differentiate them from traditional museums.

Hence, the aim of the study was to gain some understandings of the ways in which aquarium visits impact on family groups’ learning by means of the exploration of the group experiences and interactions through the examination of the views and perceptions of the adult members of the groups. Furthermore, this examination situated the aquarium experience within the context of visitors’ self reported pre-visit declarations (agendas) and post-visit impact (learning outcomes) in the weeks following the experience.

3.4 Methodology

To answer the research questions previously stated, a qualitative approach was employed that allowed the exploration and understanding of human perceptions, thoughts, and feelings. Qualitative methodologies were required to enhance and deepen understandings of the way in which families experience an aquarium visit and how the interactions amongst members lead to learning in the long term. This study did not seek to statistically generalise findings and outcomes, but rather to increase knowledge and appreciation of the learning process in the informal context by deeply examining and interpreting particular cases.
One of the key tenets of qualitative research is the view that reality is constructed by individuals interacting with their social worlds, and implies a direct involvement with experience (Merriam, 1998). Amongst the multitude of methodologies used in qualitative research, interpretive case studies are one way to gain an in-depth understanding of a situation and meaning for those involved (Merriam, 1998), through the researcher’s interpretations of such individual mental and emotional constructions.

Embedded in a social constructivist epistemology of learning and an interpretive qualitative research paradigm, an interpretive case study approach was used in order to understand, describe, and illustrate the nature and character of the aquarium experiences and outcomes of the adult members of 13 family groups.

3.4.1 Interpretive case study approach

Different authors have defined case study as a research process (Yin, 2003), as a unit of study (Stake, 2000), or as an end product (Merriam, 1998). Case studies are also considered of value for refining theory and suggesting complexities for further investigation, as well as helping to establish the limits of generalisability; they can also serve as means for reflecting on human experience (Merriam, 1998; Stake, 2000). For the purpose of this study, the term ‘case study’ was used to define and delimit both the process and object of study, involving reflection on personal experiences. As a unit of study, the family or ‘the case’ was considered to be bounded, finite, complex, functioning and specific, and embedded in a particular context (Yin, 2003).

This case study can be considered particularistic (it focused on a particular phenomenon), descriptive (the end product was a rich description of the phenomenon under study) and heuristic (it provided some light on the understanding of the phenomenon under study) (Merriam, 1998). Moreover, following with Merriam’s definition of case study (1998), this research study
investigated complex social units (i.e. families) with the objective of understanding the learning experience of family groups in an aquarium setting.

The case study approach addresses the question of what can specially be learned from the single case (Stake, 2000) and is defined by interest in individual cases. The focus of research in this study was on the individual and bounded system which is defined by the term ‘family’. Through this approach it was possible to understand the meanings constructed by each one of the participant families and how they, as a group with intrinsic interest and working parts, made sense of the aquarium experience.

Multiple case study or collective case study (Merriam, 1998), involves collecting and analyzing data from several cases. In this study, 13 cases were individually explored to answer the research questions. Each case was what Stake (2000) identifies as an instrumental case study, since their exploration provided rich and complementary insights into the issue of family learning in informal environments. This study can also be considered as what Merriam (1998) calls a sociological case study because rather than focusing on an individual, special interest was put in the social institution of the family and the roles family members played in the collective learning experience.

A descriptive-interpretive case study approach (Merriam, 1998) was used. This methodology implied interpretation and reflection on the part of the researcher, who accounted for the cases’ own stories according to her criteria of representation. Also, the researcher ultimately defined what was to be included in this thesis, or any other emerging documents.

This design was meaningful and useful for the study because from what family members revealed as their experiences and perceptions, it was possible to obtain insights on the nature and character of the learning dynamics amongst family groups visiting an aquarium, both on-site and in other relevant contexts for the visitors.
3.5 Research design

Framed by an interpretive case study paradigm, this study explored the aquarium experiences of the adult members of 13 family groups via self report methods on three separate occasions for each of the participant families: one before the visit to the Vancouver aquarium (PREV), a second one right after the experience (POSTV), and a third one 2 to 3 weeks after the visit (FLWUP). Also, on-site unobtrusive observations (OBSV) were carried out as means for data triangulation during the participants’ visit to the aquarium (Figure 3.1).

![research design diagram](image)

**Figure 3.1.** Diagram of the research design employed for data collection during this study

The analyses of the cases lead to a detailed interpretation of adult learning experiences resulting from a visit to the aquarium within a family group context. Details of the data collection and analyses methods are provided in the sections below.

3.6 Methods

Two key methods of data collection were required to qualitatively elicit and describe the visitors’ experiences during and after the visit to the Vancouver Aquarium: interviews and observations. The analysis procedures consisted of coding, data management, and interpretation. The following sections describe each one of these methods.
3.6.1 Interviews

In this study, face to face semi-structured interviews were used as the main research method (Bernard, 1994; Kvale, 1996). Semi-structured interviews were suitable for this kind of study because they permitted a dynamic rapport between interviewer and interviewee, and they provided a greater breadth of data given their qualitative nature (Fontana & Frey, 2000). This flexibility allowed the possibility to probe diverse issues, and the choice to react with further questions as a function of visitors' responses. Given the nature of this study, responses could not be predicted nor anticipated, so semi-structured interviews were particularly suitable.

Where specific information was desired from all the respondents, such as demographic and general information about participants, a highly structured section was implemented. The largest part of the interviews, however, was guided by a list of questions or issues to be explored where neither the exact wording nor the order of the questions was determined ahead of time. In other words, questions were flexibly worded and the order of the questions did not remain fixed.

Also, semi-structured phone interviews were used as follow-up instruments (Shuy, 2003). This interviewing method had the advantage of being less time and effort demanding for interviewees, since they were interviewed at a place and time convenient for them.

3.6.2 Observations

Unobtrusive on-site observations 7 were also conducted while participant families visited the Vancouver Aquarium, because observations represented firsthand encounters with the way in which visitors experienced the aquarium visit. Observations were necessary in order to triangulate emerging findings, since in conjunction with interviewing and document analysis

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7 For unobtrusive observations the researcher was out of the reach of participants in the public setting of the aquarium.
they substantiated the findings by allowing a holistic interpretation (Merriam, 1998). As an observer, the researcher used her own knowledge and experience to interpret what was observed and this information was used to triangulate the accounts of the interviews.

3.7 Validity and reliability

The researcher decided the criteria of interpretation. It is acknowledged that criteria for selecting and interpreting content are many, and that all these are subjective to choices and personal meanings, and values of events and relationships. As Stake (2000) states, the whole story may exceed anyone’s knowing and telling. Clarifying assumptions, worldview, theoretical orientation, and other researcher’s biases contributed to improve the internal validity\(^8\) of this research study.

However, the principal strategy for enhancing the internal validity of this qualitative case work was triangulation. This means the use of different and multiple perceptions or sources of data and methods to clarify meanings and verify the observations and interpretations (Merriam, 1998; Stake, 2000). Triangulation allowed a better understanding of the situations under study. Also, peer examination was helpful in increasing validity.

Human perception is very selective, subjective, and therefore partially unreliable (Merriam, 1998). Reliability, or the extent to which findings can be replicated (Merriam, 1998), is generally problematic in qualitative research since human behaviour is never static. The strategies described above also help to increase reliability.

On the other hand, external validity or the extent to which the findings of one study can be applied to other situations, or how generalisable they are (Merriam, 1998), was enhanced by the inclusion of multiple cases, that, according to Merriam (1998), is a common strategy for

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\(^8\) Internal validity refers to how research findings match reality (Merriam, 1998).
enhancing the external validity or generalisability of the findings. Also, rich descriptions could help readers determine how closely their circumstances match the research situation. Nevertheless, the goal of this study was to describe and elucidate particular cases, and not to generalise replicable findings that account for the experiences of all types of families in all aquarium contexts.

3.8 Procedures

Data collection took place from January 22 to January 31, 2005 at the Vancouver Aquarium facility, in a total of 8 days. The first two of a series of three interviews with each participant family group were held in private rooms at the Vancouver Aquarium. The follow-up interviews were carried out by phone at a time and place chosen by participants, between February 7 and February 21. All interviews were administered in a relaxed conversational manner and audio taped for subsequent data analysis. The following sections describe the recruitment procedures, as well as particulars of the interviewing process.

3.8.1 Sampling

Given that the objective of the study was to discover, understand, and gain insight, the sample was selected non-randomly and purposefully so that the potential for gaining rich insights about family learning in informal settings was maximised (Merriam, 1998); this means that participants were considered as such because of their special characteristics. A convenience sample (Merriam, 1998) was used, meaning that participants were selected based on time, location, and availability of respondents.

Stake (2000) suggests that variety is an important element in the task of learning about people. In this study, variety was important because investigating the experiences, interactions,
behaviours, and ways of learning of different families optimised richness of the gained insights. However, representativeness was not a goal of the sampling strategy.

Considering that the purpose of the study was to gain some deep understandings of how aquarium visits effect family learning through a critical examination of parents’ self report of their family members’ experiences, the attributes necessary for inclusion in this study were:

- English or Spanish speaking family groups casually visiting the Vancouver Aquarium
- Groups containing at least two adults and one child under 11 years of age

Families having one or more of the following characteristics were excluded from participation:

- Family groups containing only one adult member
- Family groups containing children older than 11 years
- Families speaking languages others than English or Spanish
- Other groups of visitors such as school groups or peer groups

3.8.2 Recruitment of participants

Families were invited to take part in the study by means of an advertisement poster that was visibly placed at the front entrance of the Vancouver Aquarium (Appendix A). This poster contained the title of the research study, a brief description of the recruitment criteria, the research procedures that directly involved the participants, and details of the compensation offered to participants.

At the aquarium site, the researcher was stationed near the front entrance. Upon a family’s acceptance of participation further recruitment was temporarily ceased, and the

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9 Spanish is the researcher’s native language.
10 A group will be considered as a family when composed of intergenerational members sharing blood ties and/or home schooling activities.
accepting family was taken to a quiet room within the venue. There, additional details of the study were provided and a participant consent form was handed to the adult members of the volunteer family to sign. The consent form, included in Appendix B, included the title of the research study, objectives and purpose of the research, data collection procedures, confidentiality issues, compensation information, and contact information for any future inquiry or concerns. The form also stated that participation was entirely voluntary and that participants were free to refuse to participate or withdraw from the study at any time without jeopardy to any member of the family.

Because all the members of the participant families were compensated with half price entries on their current visit plus free admissions for a future visit to the aquarium upon consent of participation, only casual visitors and not members of the Vancouver Aquarium\textsuperscript{11} were invited to take part in the study.

Once the volunteer family group had agreed and given consent of participation, on-site data collection procedures were implemented (PREV, OBSV, and POSTV). Only one volunteer family group was considered at any one time. Once the POSTV interview had been completed, a different family was recruited with the same strategy. Families were asked to provide a contact phone number and preferred time of the day for the follow-up session that took place 2 to 3 weeks after the aquarium experience. Additionally, families that wanted to participate when the researcher was engaged in observation or interviews were not considered as potential subjects.

3.8.3 The participants

Thirteen family groups voluntarily took part in the study. It was judged that the quality of the information obtained from this sample was rich enough to answer the driving research

\textsuperscript{11} Members of the Vancouver Aquarium hold a one year pass previously purchased at a special rate.
questions. The sample consisted of a total of 28 adults and 21 children under 8 years of age who were recruited and interviewed at the Vancouver Aquarium Marine Science Centre (a comprehensive account of the participant family groups can be found in Appendix C). Almost all of the participants were Caucasians and approximately 20% of the adults were born in countries other than Canada. Twelve out of the 13 families lived in Canada; from these, eight families lived in the Lower Main Land (LML) of British Columbia, one lived in Vernon, and three other family groups lived in cities such as Edmonton, Toronto, and Yellowknife. One family lived in Portland, US.

Prior experience of aquarium settings was common among the adult participants. Twenty out of the 28 adults declared to have visited aquariums as children both with family and on school trips. All but one family are frequent visitors to aquariums, and about 70% of the adults had been to the Vancouver Aquarium before the study was implemented.

The age of the 21 children that constituted the 13 family groups ranged from 1 year 7 months to 8 years of age. Only six out of the 13 family groups had been to the Vancouver Aquarium with their children before the day of the study. Four families had not previously visited this venue, and for three of the family groups this was the first experience ever in aquariums for their respective children.

3.8.4 The setting

The Vancouver Aquarium Marine Science Centre (Figure 3.3) was chosen as the site for research because it is a popular informal learning environment amongst local and foreign visitors. The aquarium offers visitors of all ages a wide range of activities related to marine life, ecology and conservation, which altogether account for a potentially enriching learning experience for family groups.
The Vancouver Aquarium, officially Canada’s first public aquarium, opened on June 15, 1956, and has since received 30,000,000 visitors from all over the world. Over the last year, the aquarium received 900,000 visitors. It is a self-supporting, non-profit association dedicated to effecting the conservation of aquatic life through display and interpretation, education programs, research programs, and direct environmental action. The Vancouver Aquarium runs diverse education programs both for family and school groups.

Located in Stanley Park, Vancouver, the aquarium is open to visitors from around the world all year round and is the home to 60,000 aquatic creatures. Currently, the aquarium consists of six indoor galleries, five exhibits in an outdoor area, a children’s gallery, and underwater viewing tanks, in 9,000 m$^2$ (100,000 ft$^2$). The visitor’s map can be found in Appendix D. The Vancouver Aquarium also operates interpretive shows and special programs for all audiences.

3.8.5 Data collection

Data collection procedures involved one session at the beginning of the visit (PREV interview) that lasted 5 to 10 min, one session after the visit (POSTV interview) that lasted 30 to 40 min, and one last telephonic session 2 to 3 weeks after the aquarium experience (FLWUP interview) that lasted 10 to 15 min. All interviews were open-ended and semi-structured. The interview guide can be found in Appendix E. During the on-site interviews, the whole family was present, and even though the questions were mainly geared to the adult members, the children provided information at some points of the interviews. The FLWUP interviews on the other hand, involved only the one adult for each of the participant families that volunteered to take the researcher’s call.
The goal of the PREV interview, was to obtain general and demographic data of the respondents, as well as their personal and group history as aquarium visitors, motivation and interests for visiting the aquarium that day, planning, expectations, parents’ roles, and family dynamics. Also, participants were informed that they would be observed at some points of the visit.

The unobtrusive observations conducted as the participant families visited the aquarium consisted of monitoring the groups at some points of their visit, by keeping out of their visual field so they would not perceive the presence of the researcher, but still being able to record behaviours, critical incidents, family interactions, and generalities about the visit (i.e. order in which the galleries were visited, time spent in exhibits, time spent at the aquarium). During the observations, field notes were taken to document critical incidents as they were taking place. Observations were necessary to gain some knowledge of the context and episodes that were further explored in the subsequent interviews. The information recorded as a result of observations also served to address the question of whether the declared agendas matched with what families actually did.

As soon as the family completed their visit, the POSTV interview was implemented. This session had the objective of gaining understanding about the families’ perceptions of the experience, memorability of the exhibits, outcomes of the visit, parents’ learning within a family group context, roles and family dynamics, emerging interests, and factors shaping the groups’ experience at the aquarium.

Two to three weeks after the visit, a FLWUP phone interview was held with one adult member of each participant family. Adelman et al. (2000) assert that there is some time period immediately after a museum experience when additional experiences are likely to significantly enhance learning that was initiated in the informal setting. It was considered that a 2 to 3 week
period would give participants sufficient time to frame their experience at the Vancouver Aquarium in other contexts relevant for them.

This third session addressed whether the aquarium experience was evidenced in other contexts such as the home, school, and workplace, and how those connections were made. Also, the construction of new agendas as a result of the visit and the development of related interests were explored.

3.8.6 Data analysis

Data analyses were the processes of making sense out of the data (Merriam, 1998). These processes involved consolidating, reducing, and interpreting what people said in light of the current literature and the theoretical framework of this study. At this point, connections were made between data from observations and data collected from interviews.

The three sets of interviews for each of the 13 participant families, plus the field notes from on-site observations and interviews were fully transcribed, forming the raw data set. The coding system used in the transcripts is as follows: M (Mother), F (Father), GM (Grandmother), GF (Grandfather), and AB (the researcher). Each participant was assigned a number that corresponds to the order in which his/her family was recruited at the Vancouver Aquarium. For instance, the Father in the fourth recruited family is F4, the Grandmother in the twelfth recruited family is GM12, and so forth. Family groups were assigned identity codes such as G1, G2, G3... G13, according to the order in which the groups took part in the study. Also, the identity of participants was protected by the use of pseudonyms.

Once transcribed, all interview data were categorised and coded. Conceptual categories that captured the relevant characteristics of the interviews’ contents were established. These categories reflected the purpose of the research, and were mutually exclusive, exhaustive, and
conceptually congruent (Merriam, 1998), thus allowing answers to each of the three research questions to be found from the raw data set. As Merriam (1998) suggests, categories or themes were constructed in a way that captured some recurring patterns across data. The content analysis involved the coding of the raw data through the lens of these categories in all 13 cases.

The coding strategy considered the families as the cases. This means that the matching answers of the adults in each family group were considered as only one occurrence for that particular conceptual category. All the different answers provided by a family group per conceptual category were taken into account for the analysis.

Case studies, as considered in this study, are intensive and holistic descriptions and analyses of single units or bounded systems (Merriam, 1998, Stake, 2000). The first level of analysis once the information was coded was a thick descriptive account (Peshkin, 1993), but because this was a multiple case study, the analysis involved two steps: a) the cross-case analysis of all the cases, and b) the deeper examination of a sub-sample of individual cases to exemplify and illustrate each of the relevant outcomes of the study. These two layers of analysis are important because what was to be said about all cases was different from what was to be said about a single particular case, since each case was considered to bear important particular features.

Cross-analysis was necessary in order to suggest variation and commonalities, as well as consistencies and inconsistencies derived from the different methods of data collection. Learning from a particular case was related to how the case was like and unlike other cases (i.e. comparisons) (Stake, 2000). As Yin (1994) proposes, attempts were made to construct a general explanation to fit each of the individual cases, even though the cases varied in their details. As well, the cases used to construct sub-categories that point to relevant and particular findings were chosen considering their specific richness and uniqueness. Since a new case without commonality cannot be understood, but yet a new case without distinction would not be noticed,
the analysis of findings encompassed comparisons to pinpoint commonalities and particularities across the cases.

Stake (1995) asserts that results from case studies tend to be generalisable to the extent that readers can find similarities between reported cases, but the studies are not intended to develop grand generalisations. Accordingly, some generalisations were made in that similarities were pointed out, even though the goal of this case study design was to optimise the understandings of the case, rather than generalisation beyond.

3.9 Ethics and limitations

Case study research shares an intense interest in personal views and circumstances. Thus, those whose lives and expressions are portrayed risk exposure. Even though the objective of the study was the description and understanding of the aquarium experience from the participants’ perspectives, this was considered to be a low risk research study because no sensitive or deeply personal information was disclosed, and participation in the research study was harmonious with the participants’ normal Vancouver Aquarium experience. Furthermore, the identity of participants was protected by means of pseudonyms and coding numbers.

Another ethical consideration regarded letting the participants know that the information disclosed during the interviews would serve as platform for future research, publication of papers in journals, or presentations at conferences. This information was clearly stated in the consent form that all participants received and signed.

The potential for limiting factors such as expectancy and distortion effects during the interviewing process is recognised (Bernard, 1994). Expectancy effects refer to participants telling the researcher what they believe the interviewer wants to hear from them (‘right

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12 This is sometimes referred to as the emic, or insider’s perspective, as opposed to the etic, or outsider’s view (Merriam, 1998).
answers’), and the distortion effects refer to the researcher listening and interpreting what she/he wants to hear from the participants (‘bias’).

One of the greatest limitations of case studies like this one is the risk of oversimplification or exaggeration of particular situations, which could lead to erroneous conclusions about the ‘actual state of affairs’ (Merriam, 1998). This risk was latent at two levels: a) participants’ comments and behaviours, and b) researchers’ subjective interpretation and evaluation of those comments and behaviours.

Being a case study, this research was intrinsically limited by the sensitivity and integrity of the investigator, since the researcher was the primary instrument of data collection and analysis. It was a subjective work that was constantly under the influence of human error and interpretation. The risk of bias in the selection of material to be analysed and in the criteria of interpretation, and the limitations that this may involve, are duly acknowledged.
Chapter 4: Results and Analysis

The results are presented and analysed in three sections, corresponding to each of the research questions that guided and framed this study.

RESEARCH QUESTION 1: What is the nature and character of parents'/guardians' learning within a family group context, while visiting an aquarium?

The way in which parents described their visit to the aquarium, the roles that they assumed during the visit, as well as their personal impression of particular exhibits, were considered in order to address this question. Sections 4.1 to 4.3 deal with these issues, and Section 4.4 focuses on adult learning within the context of a visit to the aquarium.

4.1 Description of the experience

The most prevalent macroscopic themes that emerged when the adults in the participating families talked about their experiences in the aquarium are summarised in Table 4.1.

Table 4.1. Parents' macroscopic themes describing the experience at the aquarium

<table>
<thead>
<tr>
<th>Description of the experience</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contentment and satisfaction as a result of the visit</td>
<td>13</td>
</tr>
<tr>
<td>Valuable as a social experience for all the family members</td>
<td>9</td>
</tr>
<tr>
<td>Fun, entertaining for all the family members</td>
<td>8</td>
</tr>
<tr>
<td>Frustration due to not seeing what was expected</td>
<td>8</td>
</tr>
<tr>
<td>Valuable to be in touch with nature</td>
<td>7</td>
</tr>
<tr>
<td>Labels of the exhibits made a good impression in the adults</td>
<td>4</td>
</tr>
<tr>
<td>Concern for the well-being of the animals</td>
<td>3</td>
</tr>
<tr>
<td>Learning experience for the children</td>
<td>2</td>
</tr>
<tr>
<td>Pleased with the quality of displays and lay out</td>
<td>2</td>
</tr>
</tbody>
</table>
The adults of all of the families participating in this study described their experience in the aquarium as satisfying or pleasant; they all showed enthusiasm and contentment regarding their families’ experience at the aquarium. Also, the adults of eight of the cases described it as fun and entertaining. Although only two of the families described it explicitly as a learning or interesting experience, four mentioned that the information provided in labels had made a good impression for them. Additionally, nine out of the 13 families described the visit to the aquarium as special or valuable due to the fact that they have shared their children’s enjoyment, and the adults of one half of the families stated that being in touch with nature was by itself, a valuable experience.

The overall lay out and quality of the displays was also appreciated in two of the participant families. It was notable that most of the adults that had visited the Vancouver Aquarium as children but had not visited since that time were highly amazed by the current layout, and the novel displays and exhibits; in six of the families at least one adult member commented on how the venue had changed since their last visit.

Additionally, some concerns and disappointments were acknowledged. The adults of three of the families expressed interest and empathy for the health and well-being of the animals, and the adults of eight families expressed frustration resulting from recent changes in the displays or from not having the opportunity to see the exhibits they wanted to see.

4.2 Parents’ roles

In order to understand what was the nature and character of parents'/guardians’ learning within a family group context while visiting the Vancouver Aquarium, the roles that the adult members of the participant families assumed during their aquarium experience were investigated.
The roles that parents played during the visit to the aquarium were diverse – a finding that is consistent with Diamond’s (1986) assertions about the diversity of parent-child interaction within the museum setting. Parents talked to their children in a lot of different ways, they pointed out interesting things, engaged in social activities, helped their children manipulate interactive exhibits, watched out for the behavioural conduct of their children, and so on.

These behaviours are consistent with Hilke’s (1987) assertion that the behaviour of families visiting informal environments is mainly dominated by strategies of information ‘pickup’ and exchange. Parents also provided support, guidance, and had a direct and defining role on shaping the visit of their family group. Furthermore, it is likely that the different roles that parents adopted during the visit could have largely impacted the extent to which they, as individuals, experienced the aquarium.

When asked in the PREV about the roles they expected to play, it became clear that parents expected to take on more than one role while visiting the aquarium with their families. For example:

AB: When you visit places like this, a museum or an aquarium, what is your role during the visit? How do you behave with your children?
M4: Well, it’s like there is certain amount of teaching going on, and certain amount of enlightenment when it comes to other creatures on the planet; you are teaching them respect. And making sure there is safety, that they are not running around and are being respectful of other people, too
F4: And making sure they see what they want to see
M4: Yeah

However, what parents declared before the visit as the roles they would take on, did not necessarily match the roles they declared they had adopted once the visit was completed. In other
words, there were discrepancies between the declared roles and the observed roles parents played when visiting the Vancouver Aquarium.

All the answers parents provided to the question of the roles they intended to adopt, the roles they perceived they had adopted, as well as the on-site observations were coded in the categories shown in Table A of Appendix F. Tables B, C and D show the information provided by each of the families during the pre-visit interview (PREV), the post-visit interview (POSTV) and the on-site observations (OBSV), respectively.

The following discussion provides a detailed qualitative description of the roles parents claimed to adopt, the roles they were observed to adopt, and their perceived roles. The discussion is divided in two tiers (Table 4.2). The first one explores the consistencies and inconsistencies of these claims, observations, and perceptions through the analysis of five large categories of roles that parents played during the family visit to the aquarium. The second tier provides details of these large categories across the PREV, OBSV and POSTV.

Table 4.2. Levels of analysis of the roles parents adopted during a family visit to the aquarium

<table>
<thead>
<tr>
<th>TIER 1 (Categories)</th>
<th>TIER 2 (Details)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Educate the children</strong></td>
<td>Explain, educational talk, talk</td>
</tr>
<tr>
<td></td>
<td>Answer questions</td>
</tr>
<tr>
<td></td>
<td>Expose the children to the information and reinforce the experience</td>
</tr>
<tr>
<td></td>
<td>Point out interesting things</td>
</tr>
<tr>
<td></td>
<td>Play talk</td>
</tr>
<tr>
<td></td>
<td>Read aloud for the children</td>
</tr>
<tr>
<td></td>
<td>Ask the children questions</td>
</tr>
<tr>
<td></td>
<td>Facilitate connections to prior experiences</td>
</tr>
<tr>
<td></td>
<td>Keep it simple</td>
</tr>
<tr>
<td></td>
<td>Teach respect for the environment</td>
</tr>
<tr>
<td></td>
<td>Talk about what parents already knew</td>
</tr>
<tr>
<td><strong>Educate themselves</strong></td>
<td>Read labels for themselves</td>
</tr>
<tr>
<td></td>
<td>Observe/interact with exhibits by themselves</td>
</tr>
<tr>
<td></td>
<td>Ask questions to interpreters</td>
</tr>
</tbody>
</table>
| Let the children lead the visit | Let the children lead/develop their own interests  
|                               | Let the children explore |
| Take the lead of the visit    | Guide the children through the aquarium  
|                               | Adults lead  
|                               | Adults negotiate where to go |
| Assist the children during the visit | Make sure children see what they want to see  
|                                   | Behaviour supervision  
|                                   | Logistics  
|                                   | Help the children interact/explore  
|                                   | Make sure the children stop and look carefully  
|                                   | Play with the children |

4.2.1 Tier 1: Categories of parents’ roles

As a result of the answers parents provided regarding their claimed and perceived roles, as well as the on-site observations, five main kinds of parent/guardian roles were identified: educate the children; educate themselves; let the children lead the visit; take the lead of the visit; and assist the children during the visit.

The analysis of the data set shows that the parents of 10 of the 13 families claimed, perceived, and were observed educating their children. However, the adults of three of the 13 families did not perceive to have assumed such a role during the visit, even when they claimed and were observed doing so (Figure 4.1).

![Figure 4.1. Parents’ claimed, observed, and perceived roles: Educate their children (explain, talk, answer, point out, read aloud, and expose them to information)](image)
Although only the parents of three families claimed that they would like to educate themselves during the visit, the adults of 12 of the participant families were observed reading, observing, interacting, or asking questions to the interpreters without the presence of their children (Figure 4.2). Nonetheless, none of the families perceived that they had taken up educating roles for themselves. These observations suggest that the adults in the study educated themselves more than they claimed or perceived.

![Figure 4.2. Parents' claimed, observed, and perceived roles: Educate themselves (read, observe/interact, ask questions to interpreters)](image)

On the other hand, out of the seven families that claimed that their children would take the lead of the visit, only five were actually observed doing so and only two out of these five families perceived this occurrence, as stated during the POSTV. Five families who did not claim that their children would lead them throughout the aquarium in either of the interviews, were observed being led by their children at some points of their visit, and one family only perceived, although they were not observed, being led by the children (Figure 4.3).

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Figure 4.3. Parents' claimed, observed, and perceived roles: Let the children lead the visit (let them explore, develop their own interests)

What is more, the adults of only one family claimed during the PREV that they would guide or lead their children during the visit. Not only were they observed doing so, but the adults of another eight families were also observed leading the visit of their family groups or negotiating how to conduct the visit without consulting the minors within their families (Figure 4.4).

Figure 4.4. Parents' claimed, observed, and perceived roles: Lead the visit (direct the visit, negotiate where to go without consulting the children)

Regarding the role of parents assisting their children during the visit, the adults of the five different families that claimed they would do so were observed actually assisting their children during the visit to the aquarium. However, only the adults of two out of these five families also
perceived their role as care givers after the visit. The adults of another seven families were observed facilitating the experience and supporting their children as the visit went on, but the adults of only three of these seven families perceived that (Figure 4.5).

![Venn Diagram](image)

**Figure 4.5.** Parents' claimed, observed, and perceived roles: Assist the children (behaviour, logistics, help them interact/reach/find the exhibits, play with them)

The above analysis shows that parents'/guardians' claims about their roles during the visit to the aquarium were not always consistent with their own perceptions or with their observed roles. There are, however, topics that showed more inconsistencies than others. The matter of children's education, for instance, was where the most consistencies were found across the PREV, POSTV, and OBSV, despite the fact that parents were not explicitly asked whether they expected to or had educated their children. These results are consistent with Crowley et al.'s (2001) claim that parents play an instrumental role in structuring children's learning experiences.

It became clear as well, that parents did not perceive themselves as learners, even when according to Stehlik (2003) adults' understandings are continuously challenged by novel situations and experiences and are active lifelong learners. Parents did not perceive themselves as leaders of the group either. However, they were observed both educating themselves and leading their groups throughout their visit. It was evident that parents held a child-centred view of the aquarium experience, thus placing more emphasis on their children's experience than on their own experience as individuals.
4.2.2 Tier 2: Subcategories

The category ‘Educate the children’ includes actions such as explain, talk, answer, point out, and read aloud. All these actions involve some sort of talking; nonetheless, given the nature of the unobtrusive observations it is not possible to assert what particular kinds of talking the families engaged in during their visit to the aquarium, or how often it took place. It is just possible to state that information exchange actually happened; according to Hilke (1987) information pickup and exchange are effective strategies for learning.

The adults of 10 families claimed that they would engage in educational talk with their children. Yet, only the adults of seven families perceived they had engaged in that kind of talking. The OBSV indicate that all of the families engaged in conversations constantly during their visits. These observations fit into what Borun et al. (1996) and Diamond (1986) describe as indicators of learning (i.e. showing and telling).

The adults of six of the families claimed they would answer their children’s questions, but only two of them subsequently perceived to have done so during the visit. Also, only the adults of one family claimed interest in asking questions to their children during the visit; this is interesting since according to Doise (1978), suggesting a different point of view, promoting debate and argument, and expressing doubt about a child’s point of view are very common and effective strategies adopted by adults to help the children learn.

Also, the parents of six families perceived they had pointed out interesting things to their children during the POSTV, whereas the adults of only three families claimed that to be one of their roles at the PREV. The OBSV show that the adults of all the families engaged in “pointing and showing” with their children throughout their respective visits, yet another indicator of learning (Borun et al., 1996).
The adults of only one family claimed during the PREV, that they would promote connections with previous experiences, such as watching documentaries on TV, and the adults of only two families perceived they had done so during the visit. This could seem contradictory to Diamond’s (1986) and Hilke’s (1987) observations that family conversations at exhibits are highly likely to involve associations to past events and information, but the reader is reminded that these are claims and perceptions, and not observations.

Only the adults of two of the families claimed they would read aloud for their children, whereas at the end of the visit, six of the families declared to have read labels for their children – families that had at least one child of 5 years of age or older. The OBSV confirmed that the adults of five families actually read aloud for the minors.

Concerning the category ‘Educate themselves’, regardless of the prominent role that parents played during the visit to the aquarium, the adults of only three families claimed they would educate themselves as part of their role as parents, and none of them touched on this issue during the POSTV.

AB: What kind of talking do you do with them?
F4: We maybe try to explain where things do come from and what they are and...
M4: But the problem is that we have to be educated as well, so hopefully there is going to be some sort of information

However, the OBSV suggest that parents educated themselves more than they realised; parents were observed reading labels as well as observing and interacting with exhibits without their children, in nine out of the 13 families. Furthermore, in two families, adults asked questions to the interpreters of the aquarium. As a result, the OBSV indicate that not only were the parents interested in learning and educating themselves, but that they learned and got educated. The
OBSV are consistent with Diamond’s (1986) and McManus’ (1994) assertions that while in a museum gallery, parents are the family members that more frequently than their children look at graphics, read, show, and tell.

In the ‘Let the children lead’ category, during the PREV the adults of five families claimed that they would let their children lead the visit, and two more claimed they would let the children explore. Only three families perceived they had let their children lead and develop their own interests; on the contrary, the OBSV indicate that in at least 10 of the families the children took on a leading role at some point of the visit. Nonetheless, in at least seven of the families, the adults negotiated with the children how to move along the venue, at some points of the visit.

Regarding the ‘Take the lead of the visit’ category, it was notable that in the PREV only the adults in one family claimed themselves as leaders of the group, and none of the families perceived their role as guides in the POSTV. However, the OBSV show that not only did the adults take the lead of their groups with relatively high frequency, but also that in many families the adults negotiated with other adults on how to conduct their visit without including their children in the negotiation at some point of their visits. Based on the OBSV, it is worth noting that in nine of the families, the adults lead their families towards major areas or galleries, whereas the children took on the lead when deciding what exhibits to look at within those galleries. This observation is consistent with Hilke and Balling’s (1989) assertion that children are likely to choose the exhibits to which the family would attend.

The ‘Assist the children during the visit’ category includes aspects such as behaviour management, logistics and making sure the children see what they want to see. The OBSV identified some assisting roles that parents took on during the visit to the aquarium that were not claimed nor perceived by them in any of the on-site interviews. Amongst these observed-only roles, ‘helping the children to reach and make good use of the exhibits’ and ‘engaging in fun activities and games’ stood out as their most common roles in this category.
4.3 Memorable exhibits

Sandifer (1997) asserts that exhibit recall does not necessarily imply understanding or learning, but memories of specific exhibits are likely to allow visitors to make connections between past visits and future events. When asked about the exhibits that stood out for them, parents came up with different recollections of their recent visit to the aquarium. For most of the adults, the Amazon Gallery, Belugas, Sea Otters, and BC Coast were the most memorable displays. They also mentioned Scuba Diving displays, Starfish, Sloths, Tropical Fish, Birds, and Snakes.

Some factors were identified as defining the impression that exhibits made on the participants. In general, personal interests and personal agendas were identified as factors playing an important role in this matter:

[From PREV]
AB: What do you expect your family to obtain from this visit?
F1: Is there a beluga exhibit here? I would like to see the belugas, I have never seen them

[From POSTV]
AB: Were there any special moments for you and your children during the visit?
F1: I liked the beluga exhibit, so I just had that special moment. And the fashion show\textsuperscript{13} they had, it was different

For others, the exhibits were memorable due to novelty or surprise factors; novelty, according to Herrmann and Plude (1995) is one of the elements that make museum memories unique, and according to Csikszentmihalyi and Hermanson (1995) novelty also enhances

\textsuperscript{13} During January 22 and 23 the aquarium hosted a scuba diving fair, that amongst other things, included a catwalk of diving suits.
intrinsic motivation to learn. The enjoyment the animals promoted was also identified as a factor
determining the popularity of exhibits.

4.4 Adult learning

To answer the question of how and what parents learn when visiting an aquarium as part
of a family group, three main categories of learning outcomes were identified from the data set:
cognition, social interactions, and affect. In keeping with the outcomes of Anderson (2003),
Dierking and Falk (1994), and McManus (1994), the collective experience of individual family
groups proved critical to the experience of all family members. The social interactions and
dynamics to which family groups were exposed during their visit to the aquarium framed their
experience at the aquarium and ultimately mediated the learning experience (see Glaserfeld,
1992 and Driver et al., 1994).

4.4.1 Cognition

It was possible to identify three main experiential sources of cognitive learning for the
adults involved in this study: exhibits and labels, live shows, and interactions with staff members
at the Vancouver Aquarium. The adults of all the families showed evidence of enriched
awareness and learning that was predominantly based on explicit factual or declarative
knowledge as a result of their visit to the aquarium, a finding that is consistent with Boggs’
(1977) assertion that adults are likely to learn and recall facts as a result of a museum experience.
Wellington’s (1990) claims that informal settings contribute to the cognitive domain of learning
both by providing new factual knowledge and by promoting memories, were corroborated in this
study, as well as Adelman et al.’s (2000) observations that after visiting an aquarium, visitors
show greater awareness and general knowledge on aquarium related topics. Moreover, these
results appear to be consistent with Falk and Dierking’s (2000) and Wellington’s (1990) assertions that the learning of concepts does not take place very frequently as a result of a museum experience.

According to Tennyson (1992) and Wellington (1990), the content knowledge that contributes to an individual’s knowledge base can be classified in declarative knowledge (knowing that or what), procedural knowledge (knowing how), and contextual knowledge (knowing why, when and where). Almost all of the participant adults were very readily able to explicitly recall facts about the creatures displayed in the aquarium, including information about behaviours, eating habits, habitats, distribution, physical characteristics, locomotion, defence mechanisms, and life cycles of the animals in display, thus suggesting gains in declarative knowledge. Even when this information is not exclusively available at the Vancouver Aquarium, it is very likely to assume that the cognitive gains in these topics took place in the venue, since participants made unequivocal reference to specific information displayed in labels and in shows.

M5: Well, I guess I learned at the tropical zone they have these huge catfish and I didn’t know that they eat fruits and berries, so I guess I learned that

M6: I learned that the sea lions are endangered, but I suppose I could’ve guessed that. That the males are about a thousand kilograms, and that they try to eat a lot of fatty fish. And then there is this Amazon catfish that uses its jaws like to crunch other fish; oh. I wish I could have stayed longer in the exhibits to learn a little bit more, but... Oh, and that the anemones have a kind of velcro, I know it because we touched them in the tidal-pool

M10: That sloths like to sleep and hang off the wall
F10: That fish can get us some scars
AB: Which fish?
M10: Like the lion fish, because there it said they were poisonous, right? Like if you step on them or whatever, their spines are poisonous. So I don’t think I’d ever go near them.

AB: Good, anything else?

M10: The seals and that. I have never realised that they just kind of get themselves wedged into a corner and then it looks like they’re sleeping. . . . But I mean, they have to breathe, they can’t stay there for very long, so

F10: Five minutes. It’s what it said on the sign

M10: Five minutes? Oh

The adults of five families demonstrated learning about conservation-related issues such as environmentally-friendly practices and facts about the disappearance of species in the world. This outcome is particularly consistent with the reported literature on aquarium learning (Adelman et al., 2000).

F11: Well I learned that the Steller sea lion is pretty heavy and very smart

M11: Yeah, and that the people hunting the salmon are competing for the food for him

F11: And that they are disappearing

M11: And they don’t know why, so they are trying to figure that out. And then we realised how much they ate

AB: Is that all from the show?

F11: Yeah, oh yeah

Also, the adults of at least three families showed knowledge gain regarding Latin or common names of marine life, while only one family showed cognitive gains on the topic of adaptation to the habitat in which creatures live. On the other hand, some emerging interests and desires to learn were identified amongst the participants during the POSTV. In six of the families, adults were intrigued by the behaviour of animals, particularly mammals.
M5: I have to say the sea otters, I know it's silly, but I really enjoyed watching them, I think I really would like to see a larger display where you can see them run... I don't know do they run? Do they just swim?

One case was particularly interesting. After not pinpointing any particular interest or reason for visiting the aquarium that day during the PREV, a parent declared to be highly interested in learning about the different habitats of the different animals at the POSTV. He also stated that from his point of view, some of the labels in the venue were not informative enough since there was information missing about the conditions in which sea creatures live or the places where they come from.

F9: I was wondering about the different fish, like they are in different tanks, and they are in different stages, but do they live in different temperatures, too? I was wondering, all those fish, do they come from the same place, or do they come from different areas?

[Later in the same interview]

AB: So tell me more about the labels you read, did you find them interesting? Did you find them useful?

F9: They were pretty good, I mean, for some of the labels you just wish to know where exactly those fish come from. Some of them say the type of environment they need and you see them there. Whereas, some of the labels weren't exactly that informative, like they just tell you the name of the fish

AB: Yeah, a picture maybe and that's it

M9: They don't say where they are from

F9: Exactly. Some of them only show the picture but don't say anything about the water or like the sort of the environment they live in

AB: So, you'd like to learn more about the different environments

F9: Yeah, about all that kind stuff. Like in case you are in touch with a particular kind of water, then you know what kind of fish live there. Otherwise, how would you know, right?

AB: Right, like where in the world could you find those fish
F9: Yeah. Because you don’t know all the fish, you just know their environment, right? That was what I was asking myself.

The above excerpts could be considered as an example of a learner possibly wanting to take the knowledge to a procedural or even a contextual level (Tennyson, 1992), where learners know how to use a given concept and they ‘understand why, when and where to employ specific concepts, rules or principles’ (p. 38). The results of this study provide little evidence of development of intellectual skills that lead to high order learning, such as analysis, synthesis, or evaluation at this stage; these results are consistent with Wellington’s (1990) view of the kind of knowledge to which informal environments contribute. Nevertheless, these skills could develop later and integrate the factual knowledge acquired during this visit to the aquarium.

4.4.2 Social interactions

Adult learning about their family groups was a strong theme emergent from the data set. Not only did adults learn about marine life, but they also learned about their own family members when visiting the aquarium. Across the 13 family groups, the adults learned about their social dynamics in addition to having a pleasant day together in a friendly environment, and enjoying the company of members of their families.

In at least five families, adults declared to have expanded their knowledge about behavioural aspects of their children, such as new appreciations of their attention span and deeper awareness of their personality and ways of conducting themselves in a public space such as the aquarium. The following quote is from an adult family member for whom this was their first visit ever to an aquarium with their 2 year old daughter.
F2: Well, it was clear how she takes a lead. Sometimes you can convince her to move on and see more things but otherwise she just stays where she was.

M2: Her attention span is longer if she is where she wants, but if you try and show her something, then it is short. If you push her, she's like 'no, I want to see this' and then she goes back and sees the things you want to show her on her own and now she gets it. I found this was a new environment for her to walk around. And if I tried to show her a new tank and she wouldn’t want to see it, but then 5 minutes after that she is over it and she’s looking at it on her own.

AB: And discover it by herself.

M2: Discover it by herself, and then she’d had longer moments in terms of having her look what we want to and what’s really happening. She was going quite rapidly at first, but then she started to slow down a bit and look, but when she was running and I wanted to see what’s in the tanks I thought, 'I'll see it after'

Also, the parents of five families became aware of how the youthful nature of their children influences their dynamics as a group. The adult in Family 10 expresses this in the excerpt below:

AB: Do you think you have learned anything about the way in which you as a group interact in these kinds of places? Did you notice anything that you weren’t aware of as a result of the visit?

F10: I think so... One is, as a family group we are certainly becoming more independent, well the kids are, and they are starting to hang out. And then there is their age. We now can come down here and we feel more comfortable with them sticking closer and not needing the short leash... you know what I mean?

AB: Is this all because they are getting older?

M10: Yeah, absolutely

F10: Yeah. I mean, still, it’s true, it’s a dark environment and there is a lot of movement and stuff and I used to be over them, but now every time that we go to a place like this I can go away with a little more understanding of, they can be on themselves, a little bit more, you know?
In three family groups the parents recognised new cognitive developments in their children as a result of the visit, and in two families the adults were able to identify some learning strategies in their children, such as making associations, watching pictures, asking questions, and touching things.

AB: What do you think you have gained from this visit?

M2: I think we just had a good day as a family and I hope the next time I say ‘we’ll go see the fishies’ she’ll know what I mean. I think she just got some new things, she touched things and she saw the big sea lion and she saw him eating

[Later in the same interview]

M2: Well, I think so, because one of the moments that was funny was when she saw the big tank, and she wanted to have a bath because I think she sees water and she wants to get in there and then I said ‘no, no bath’, but then when we were outside and there was this bubble overflow of water she saw that and she said ‘bubble bath’ and she’s been connecting that. I think she is going to say something and I think she is going to remember the water. She’s always loved water too, so let’s see if she wants to have fish in her water

F8: And I think that something that allowed him to enjoy the experience was being able to interact and talk to other people, just being more involved

AB: Was he actually asking questions to the people here at the ‘AquaneWS’?

F8: Yeah, he was, and he was sort of relating the materials to what we knew, and he had the chance to be curious about a lot of stuff so that was kind of neat

When talking to M2 two weeks after the visit to the aquarium (FLWUP), she confirmed that her girl (aged 2) had learned some new words at the aquarium and that she made some interesting progresses such as connecting the word ‘wet’ with water (Section 4.12).

The next case was particularly interesting, since the mother of two children learnt about how much her 5.5 year old boy knew about fish and marine life as the visit went on. Later in the
POSTV she stated that during the visit she became aware of the way in which they, as a group, could negotiate their personal interests and agendas in order to build a common one.

M1: I found out that he knows more about fish than both of us combined!

AB: So what sorts of things was he saying to you?

M1: Well, he recognises fishes, he recognises the frogs too. He watches this show on TV, that cartoon called ‘Stanley’; there is this child and animals. He’s learnt a lot. I had no idea

F1: He also goes to the web sites

M1: Yes, he goes to web sites and plays. I had no idea he knew so much about fish. I remember at one point. I was saying ‘look at that fish’ and he is like ‘no, that is such and such fish’ and I’m like ‘what do you know?’ and he is like ‘well, I just know’ and then I looked and sure enough, it was that fish. Yeah. He did almost all the frogs

[Later in the same interview]

M1: I guess what stood out for me is that some of us did want to do something and some others didn’t and we tried to share. And then we go over the information from the displays and it was like a combined effort. And then of course some of us like more some things than others. Like there was an exhibit that Molly didn’t want to leave

In another family group, the adults were able to identify some of the needs of the daughter they were taking to a free choice environment for the first time.

GM12: We learned that she needs more interaction with little kids

F12: Yeah

GM12: She was really overwhelmed in the kids’ area, because there were too many kids screaming and yelling and it was just too overwhelming for her. I guess it’s that that area isn’t like ‘here do this and here do that’, it was just like little kids going crazy and she’s a little overwhelmed by that
On the whole, the parents in the study learned about their social dynamics and about the other members of their family group. Particularly, adults learned about their children’s developing behaviours, personalities, and ways of learning. Some of them also learned how their interactions are continuously shifting as a function of their children’s age.

4.4.3 Affect

Falk and Dierking (2000) and Wellington (1990) assert that informal settings are recognised as places that play an important role in fostering the affective domain of learning, and Boggs (1977) claims that adult affective learning resulting from a museum visit is somewhat more prevalent than cognitive learning. The appreciation of the diversity and uniqueness of marine life as well as the acknowledgment that the aquarium offers the possibility to explore the otherwise unreachable undersea life, were amongst the most popular affective and emotional outcomes of the visit to the aquarium.

AB: And what do you think you have gained from this visit? As individuals and as a group?

M4: As a group it was just a great family day. As individual, I am always amazed of how on the surface of the earth there is just this small portion of life within our planet. It’s like intellectually I know that, but to see the real thing is always… I mean even looking at the jelly fish. That actually exists on the planet, but I don’t think of that because I am not in the water, you know what I mean?

Also, in four families, the adults showed specific appreciation for the local creatures, confessing that they were not aware of the richness of the local fauna.

M9: And I learned where the large fish come from, and then there are others that come from BC. I didn’t know that so many fish came from BC; I didn’t expect that, so that was interesting for me
Adults did not only show awareness or interest in marine life, but in at least six families, parents demonstrated willingness to respond to this interest by engaging in future activities such as scuba diving or snorkelling. These adults also assigned affective value to the aquarium experience due to the fact of being close to nature and to marine life forms and colors.

In addition, there was evidence of emotional connections to past affective experiences that according to Hilke (1987) are essential for the development of a shared understanding among the family members, and that according to Wellington (1990) could lead to new understandings. These findings support Boggs' (1977) claim that adults are frequently able to assign meaning to museum exhibits on the basis of personal experiences. Emotionally, the visit to the aquarium proved important for the adults of seven of the families, to whom being there had enhanced recollections of positive past experiences such as those during childhood, earlier trips, activities performed in past days, or previous visits to the Vancouver Aquarium. Some examples of the comments parents made during the POSTV are presented below.

F5: I had a wonderful time. It was a great memory refresh... I used to scuba dive all the time, so I love seeing all the water creatures and learning about them

AB: What kinds of things did you learn?

F5: Oh, remember how the things look like. I enjoyed reading the labels. Mostly stuff that I did before

M10: Just a nice experience. And I think it's pretty good for them [the children] to see the things that actually grow and live in the waters around here, especially for us because my husband and I both grew up in Powell River, so we are used to the ocean but we now live in Vernon which is not near the ocean, so it's really nice to give them a little bit of the experience of seeing what they can't see, what lives in the ocean where we grew up so, that's kind of nice

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F10: And plus, I guess thinking about memories, certainly some good memories came back to us 'cause most of the places in the west coast we’ve been to, you know, when going to one point to an other
M10: Oh, I see what you mean
F10: I don’t say all of them, but we have a lot of memories in a lot of those places

The adults also showed strong affect to marine animals, particularly mammals. In three families, such an emotional link developed into a confirmed concern about the well-being and health of the animals on display.

F4: We almost miss the dolphins
M4: But, the one dolphin. How come there is only one dolphin in there? I think that is kind of sad

[Later in the same interview]
M4: And the poor thing keeps swimming round in circles, which bothers me. Maybe that’s what they do, but. Just swimming around in circles
AB: I don’t think they can show normal behaviours in captivity anyways. I don’t really know
M4: Right, right
F4: How could you tell the difference?
M4: You know there is a difference because this one is alone

In three other family groups, this emotional connection with marine life led adults to identify information regarding conservation of species as particularly interesting for them. According to Adelman et al. (2000), aquarium visitors are likely to show strong emotional responses to conservation related issues.

Nurturing the affective domain of learning is an important upshot of visiting the aquarium since according to Wellington (1990), accomplishing educational goals in the affective domain is likely to enhance higher-order cognitive outcomes, and even when little evidence of
such outcomes was found at the moment of implementing this study, higher-order skills could develop in the future once the affective base line was established.

4.5 Summary of Sections 4.1-4.4

All 13 families that took part in this study expressed satisfaction about their experience at the Vancouver Aquarium, and eight groups described it as fun and entertaining. Nine of the families placed a social value on the visit and in seven families value was given to the opportunity of being in touch with nature.

Parents played multiple roles during the visit of their families to the aquarium. However, what parents considered as their roles, in many cases did not coincide with the observations made in this respect. The observations indicate that in general terms, parents engaged in educational conversations with their children, educated themselves, and lead their groups throughout the galleries of the aquarium with more frequency than what they actually realised and acknowledged during the interviews.

Some of the factors that make an exhibit memorable for adults are a) personal and emerging interests, b) pre-defined agendas, c) novelty or surprise factors, and d) enjoyment.

There is strong evidence in the data set to suggest that adult learning took place as result of the aquarium visit. The types of identified learning are categorised in terms of the cognitive, social, and affective domains. After their aquarium experience, the adults within all the families showed evidence of new factual or declarative knowledge, since they were able to recall specific facts and concepts regarding habits and habitats of marine animals, conservations of the oceans, and Latin names of fish. Nonetheless, the data set provides little evidence of development of high order intellectual skills such as analysis, synthesis, or evaluation of concepts associated with the aquarium visit.
The adults of all the families also learned about their family members and their social dynamics in settings such as the Vancouver Aquarium. Parents learned about the behaviour and personalities of their children and became more aware of their group interactions. They also identified new cognitive outcomes and learning strategies in their children as a result of the aquarium visit.

For the adult members of a family group, the appreciation of the diversity of marine life and the opportunity of being close to it were important affective outcomes. The wish to engage in future activities related to the ocean and the emotional connections to positive past experiences were common affective products of the visit as well.
RESEARCH QUESTION 2: Do family groups visit aquariums with predefined agendas? In what ways do these agendas affect group learning?

4.6 Day planning and on-site strategies

It can be argued that the aquarium experience starts when the visitors first conceive their visit. What they do after the development of that conception, and the prior activities surrounding the aquarium visit, can also powerfully affect the ways in which the visitors experience a day at the aquarium.

When the visiting families were stratified by place of residence—nine families from the Lower Mainland (LML), and four from outside this region, two types of behaviour became evident. A family group visiting from Vernon did not fit within these clusters, so despite the fact Vernon is not part of the LML, for analysis purposes the family was considered as part of the LML cluster. Visitors coming from outside the LML planned their visits with longer lead times than visitors from within this region. Three out of the four families visiting from outside the LML had been planning their visit for 1 to 2 months, whereas families visiting from the LML planned their visit from between 2 weeks to the morning of the day of the visit.

According to Moussouri (1997), the different strategies visitors use during their visit to a museum can be unfocused, moderately focused, and focused, and Falk et al. (1998) affirm that these strategies affect the length of the visitation. Overall, families with unfocused agendas were more likely to stay at the aquarium longer than families with focused agendas.

The analysis of the PREV data set indicates that visitors from within the LML were more likely to have moderately focused and focused strategies for conducting their visit. As well, seven of the nine LML families declared to have plans to stay at the aquarium for about 2 hours, whereas the other two planned on staying at the venue as long as necessary.
On the other hand, visitors from outside the LML tended not to have a pre-defined plan for the visit (unfocused strategies) and were similarly likely to have plans to visit the aquarium for as long as necessary or to have plans of being there for about 2 hours. Also, the information collected during the POSTV and the FLWUP indicates that visitors that visited the aquarium for the first time or had not been there for a long time, had intentions of planning better or focusing their future visiting strategies (i.e. informing themselves about show times, visiting the galleries in a different or particular order, etc).

Moreover, visitors from outside the LML were more likely to have plans to visit other museums or tourist attractions on the same day as the visit to the aquarium; all the families visiting from these locations had other plans for the day, whereas almost all the LML visitors declared to have intentions to go home after completing their visit.

The prior visitation of a family group to the aquarium had a strong impact on the way in which the members planned and actually conducted their visit. Families visiting from the LML were more likely to be frequent visitors and to know the setting before hand. They were familiar with the exhibits, show times, and other activities offered by the aquarium and were more likely to have a more or less structured or focused idea of how to move along the galleries, than families that had not been there for a long time or had not been there at all. Those who regularly visit the Vancouver Aquarium did not express anxiety about seeing as many things as possible, as opposed to first time visitors and/or visiting families from outside the LML. This makes sense if we consider that future visitations are already on the agenda of regular visitors.

M10: Yeah. And besides it's not the only visit, we don't have to see everything or go to every tank, we'll just go where there is something interesting for them
The strategies families used to move along the galleries of the aquarium varied from one family to another and shaped their Vancouver Aquarium experience. Only one family affirmed they had used the map as a means of orientation and direction, and another family admitted that their strategy was based on their previous visits and a predetermined way of moving around the aquarium. Seven of the families claimed during the PREV that for at least some time during the visit, they would just wander around the venue in order see every exhibit, and during the POSTV, 10 out of the 13 families acknowledged that their strategy within the aquarium was to ‘follow the flow’ and stop at as many exhibits as possible.

However, what most families claimed as their strategy to visit the aquarium at the moment of the PREV did not necessarily conform to what they perceived as their ways of proceeding through the galleries of the aquarium once the visit was completed. What is more, the declared strategies did not always correspond with the observations made during their visits (see leading roles in Sections 4.2.1 & 4.2.2).

The fact that in almost all the families children and parents were observed leading their family groups at some points of the visit indicates a constant interplay of guiding interests and agendas. It is likely that when children took the lead of the group, they were pursuing their personal agendas, but when adults were on lead they were either attending to the group’s agenda, or their own interests. The adults of only two families affirmed that in their groups there was no lead, but instead they opted for a joint negotiation and decision making amongst all the members of the group. In any case, there is evidence to support Moussouri’s (2003) assertion that personal and group agendas constantly interact and influence each other since they operate at the same time.

14 ‘Follow the flow’ was referred by participants as carrying out their visit by guiding themselves by the order and physical distribution in which galleries and displays are laid out.
4.7 Agendas

The agendas that parents brought to the aquarium can first be described according to the different motivations or reasons they had for visiting this setting with their families; as Rennie and Johnston (2004) claim, the choice of visiting such a setting seemed to be a focused and motivated act. These agendas can also be explained in terms of the intentions, goals or expectations, and pre-fixed plans that families have for the visit. As opposed to Moussouri’s (1997) two-dimensional model for the construction of agendas, a tri-dimensional model that considers motivations (why), intentions (what), and strategies (how) is discerned from the data set.

Besides these three core components, the discerned model accommodates other factors that contributed to the construction of agendas before the visits were actually conducted. As Adelman et al. (2000), Anderson et al. (2002), and Falk et al. (1986) assert, visitors’ prior experiences are critical determinants of the museum experience. As well, there are on-site factors that continuously shape the agenda while the visit is in progress. Thus, agendas are dynamic entities that are constantly being renegotiated and adjusted, as was the case in this study.

This continuous conciliation of interests and visiting strategies could account for the observed inconsistencies between parents’ claimed, perceived, and observed roles (Section 4.2), because what was claimed as the entry plan and the entry roles was constantly renegotiated and reshaped as the visit progressed. As a result, the roles parents assumed continuously adjusted according to the demands of the emerging agendas.

Figure 4.6 is a theoretical model of the factors that operate for agendas to adjust and reshape and is largely informed by the data collected in this study. This model was also constructed from the data discussed in Sections 4.7.1, 4.7.3 and 4.7.5. Prior experiences had a direct influence on the three agenda components (reasons, goals, and strategies). Such former
episodes dictated not only why parents wanted to take their families to the aquarium, but also determined what their intentions were and what strategies they planned to implement while in the venue. Once in the aquarium, there were multiple on-site factors that persistently affected both what families wanted to see and their visiting strategies. These on-site factors can be classified as intrinsic or extrinsic according to their nature (Section 4.7.5). The adjustment of goals and strategies as a result of these on-site factors, impacted directly on the agenda as a whole, causing it to change when any of its components was modified. The arrows indicate influence or effect on the element to which they point.

Figure 4.6. Factors that constantly construct and reconstruct agendas
4.7.1 Motivations and intentions

Parents had diverse entry motivations, incentives, or reasons for deciding to visit the Vancouver Aquarium the day when this study was implemented. Nonetheless, they can be classified in the following categories (Table 4.3)

<table>
<thead>
<tr>
<th>Entry motivation/reason</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation (escape from everyday life, day trip, relax, entertainment, amusement)</td>
<td>13</td>
</tr>
<tr>
<td>Learning (gaining information or knowledge, expanding understandings, appreciation, seeing the real thing, offering others a learning experience)</td>
<td></td>
</tr>
<tr>
<td>• Children</td>
<td>13</td>
</tr>
<tr>
<td>• Personal</td>
<td>12</td>
</tr>
<tr>
<td>Social event (family day out, create memories)</td>
<td>11</td>
</tr>
<tr>
<td>Life cycle (reproducing past experiences)</td>
<td>6</td>
</tr>
<tr>
<td>Practical issues (weather, proximity, safe place for kids, having coupons)</td>
<td>5</td>
</tr>
<tr>
<td>Introspection (recalling past experiences, feeling connections, imagining places)</td>
<td>3</td>
</tr>
<tr>
<td>Place (destination is emblematic of a locale)</td>
<td>1</td>
</tr>
</tbody>
</table>

These categories were established from the information obtained during the PREV phase, in light of Combs’ (1999), Moussouri’s (1997), and Pekarik et al.’s (1999) previous categorisation of visitors’ agendas, motivations, and satisfying experiences described in Section 2.5.1. It is important to point out that the seven different kinds of motivations described by these categories can come into play simultaneously.

Borun (2002), Falk et al. (1998), McManus (1994), and Prentice et al. (1997) affirm that when visiting a museum, family groups look for both collective enjoyment and an educational or informative experience. Hilke (1987) on the other hand, states that families visit museums for primarily social and recreational reasons. These claims that families bring a multiple agenda to
the informal setting were further confirmed by this study. In general terms, families entered the aquarium with a three-fold main agenda (recreation, learning, and social).

One of the most popular reasons for a family outing to the aquarium was recreation. The adults of all the participant families declared to be at the aquarium that day because they wanted to either have fun, break the routine, do something different, escape from work, enjoy themselves, take a day trip out of town, and so forth. In contrast, Adelman et al.’s (2000) found that adult aquarium visitors are not likely to consider having fun as a main reason for visitation; according to them, place, practical issues and social agendas are the most popular amongst single adults, adults with children, and adults accompanied by other adults.

AB: What do you expect your family to obtain from this visit?
F4: Just a fun day
M4: A fun day, a day out, something for them to look at
F4: That they don’t see normally
M4: Get out of you know, watching TV, and yeah, have fun

The other most popular motivations or reasons for visiting the aquarium that day, was to offer the children a learning experience, such as showing the children the different animals or providing them with the experience of being in touch with marine life. This supports Adelman et al.’s (2000) findings regarding aquarium visitors’ motivations. The adults of 10 families stated that they were there that day because their children had a special or particular interest in animals. In two families, exposing the children to an environment like the aquarium for the first time ever, came out as a motivating factor for the adults.

GM12: It’s just that it’s been so long, and we just wanted to bring her here now that she knows what these things are all about and this is her very first experience, so this will be interesting. . . . It is very exciting.
It's that now she’s old enough for the long run, old enough to understand what creatures are and have the patience to observe things.

Besides attending to their children’s own interests which itself constitutes a rationale for adults, this study revealed that grown ups also were prompted to visit the aquarium by personal or individual motives or purposes such as satisfying their own interests; Csikszentmihalyi and Hermanson (1995) consider this to be ‘intrinsic motivations’. The adults of 12 of the family groups declared to be motivated by the opportunity to appreciate the diversity and uniqueness of fish and other marine creatures.

F5: I’m interested in all fish

M5: I don’t know if I have a particular interest at all... I mean, I like to see the sea animals, and the shows, like the obvious kind of stuff, and I’m hoping that they have a lot of habitats. I would like to go and visit the different habitats and have different interactions.

All but two families expressed that having a family day out was amongst their reasons for visiting the aquarium that day; this supports McManus’ (1994) statement that visitors place high value on the social dimension of a visit to a museum-like setting, and that families in particular seek satisfaction from the experience of operating as an intimate social unit in a public space. The results are also consistent with Prentice et al.’s (1997) finding that museum visitors with children are very likely to consider social motivations as highly valuable for the visitation.

The fact that recreation, learning, and social agendas were so common amongst the participant families is in line with what one would expect given the relaxed nature of the aquarium setting (as opposed to a natural history museum), and given that all the participants were visiting in family groups. Interestingly, families not only were motivated to visit the aquarium by a learning and social agenda, but they also learned about their social dynamics as a
result of the visit (Section 4.4.2), thus suggesting a tight relationship between motivations and outcomes.

The life cycle motivations that include offering the children the opportunity to experience what parents lived as children themselves and reproducing past experiences was also a motivation for six of the families. These adults stated that they wanted to fulfill the desire of visiting the aquarium after a long time since their previous visitation, as well as have their children experience the same.

F2: I've always liked the aquarium, animals and stuff like that. I haven't been here for a while, so I always have wanted to come back, so I think this is a great opportunity for the kids. We also want to show her. We figured this could be interesting to her

[Later in the same interview]

M2: Because that's pretty much what you do as a parent, is show her all the things that you liked as a child, right? So. I want to touch little things, I hope the tidal pool is still there. See the shows and it'll be fun

Practical issues such as the adverse weather conditions on the day of their visit, having coupons and considering the aquarium a safe place for children also influenced the parents' motivations for visiting the Vancouver Aquarium in five different families.

Introspection agendas were also present. Recalling past experiences associated to marine environments or having an affective connection to the ocean were some of the adults' personal reasons for visiting the aquarium. It is likely that these personal experiences and the intrinsic interests previously described are somehow related, as Csikszentmihalyi and Hermanson (1995) claim.

M10: Like a lot of the BC stuff, we kind of grew up with that, surfers and divers and things like that
Only one parent mentioned that he was motivated by the fact that the aquarium is included in the list of places to visit when in Vancouver, in contrast with Adelman et al.'s (2000) claims that an aquarium's reputation is a popular motivating element.

During the PREV, entry intentions or objectives of the visit were also identified amongst the adult participants (Table 4.4). It is hard to elucidate which agenda some of these interests inform (i.e. interest in particular animals as learning or as introspective agendas), but others are clearly part of the learning, social, and entertainment agendas that families brought with them.

<table>
<thead>
<tr>
<th>Entry intention/goal</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>See particular exhibits</td>
<td>13</td>
</tr>
<tr>
<td>Show and teach the children</td>
<td>13</td>
</tr>
<tr>
<td>Spend a fun family day</td>
<td>11</td>
</tr>
<tr>
<td>See as much as possible</td>
<td>4</td>
</tr>
<tr>
<td>Gain information/knowledge</td>
<td>3</td>
</tr>
</tbody>
</table>

Before the visit, all the adults declared to have personal interests in seeing particular exhibits (Figure 4.7), but only four adults in different families affirmed their objective was to enjoy the whole aquarium. Interestingly, exhibits such as the Beluga Whales, the Sea Otters, and the local fish were some of the most popular exhibits amongst adults after the visit was completed (Figure 4.8). This connection indicates that the interests with which adults entered the aquarium influenced what they perceived as memorable when they left the venue.
Personal learning intentions included learning the Latin names of fish or learning about the local marine fauna. Nonetheless, after the visit the adults of all the families showed evidence of gains in factual learning regardless of their original declared entry learning agendas.
4.7.2 Intentions and child education

All the adults in the participating families had offering their children an enjoyable experience as a visiting motivation. According to Borun (2002), families go to museums and similar settings with the goal of providing a social event for the group and offering a valuable learning experience for the children. The enormous value these parents placed on their children’s experience could account for the finding that the claimed and perceived roles of the parents (Section 4.2) were child-related to a large extent.

The adults of all the families affirmed they wanted to show their children the different animals and offer them an opportunity to interact with marine life as well as see what they wanted to see. Also, the parents of three families claimed they wanted to show their children the real fish as opposed to fish cartoons as was the case for two families for whom that visit to the aquarium was the first they ever made with their 2 year-old girls.

M2: She’s been interested in fish lately a lot. We wanted to show her the real thing, now that she’s been watching ‘Finding Nemo’, right. So then she sees fish, but we thought we’ll bring her to see the real ones. And we haven’t thought of Science World because we so wanted to show her the fish because she is really into fish right now. . . . For me anyway it is important that she sees the real things. That she understands that they are alive and they are natural. To see them at least as natural as possible, because not all is just commercialised cartoons and toys. I really wanted her to see whales and dolphins for real.

In contrast and despite the fact that all the above can be considered as learning appreciation or affection for marine life, the adults of only three families affirmed that they had a learning objective for their children which in one case was to teach them the names of new things and in two other cases was to teach them respect and awareness of the bigger world.
M4: Yeah, even if they are running from spot to spot, it is still a learning experience, regardless. They are not just sitting watching 'Square Bob Square Pants' all day. They are learning, at the same time than having fun. And as I said, it is also a matter of having respect for the environment. And that is really it; that is the most important for us.

4.7.3 Factors that influence the prior-agendas

Prior experiences are key factors in determining what visitors expect to get from their visits to settings like the aquarium (Falk et al., 1986). Their personal interests and what they look forward to obtaining from the aquarium experience are shaped by particular and personally relevant prior events and prior knowledge. Also, according to Moussouri (2003), family profile, socio-cultural patterns, personal contexts, social contexts, and the setting itself are key in defining a family’s agenda.

It was not possible to ascertain the role that each of these factors had in the construction of the agendas found in this study, but in some cases it was possible to elucidate the relevance of some personal and social backgrounds that framed the agenda with which families experienced the aquarium. These include activities that, having been carried out prior to the visit to the aquarium, had influenced or shaped the declared interests and goals of some of the participant parents. The most common shaping factor was a previous visit to the aquarium long before this one. In half of the families, at least one adult affirmed having the intention of finding out changes in the displays, new exhibits, or just following up their observations from a prior visit.

M10: I want to see if they have the seahorses, because another time we were here a seahorse had had babies and that was pretty incredible, so. And I also like looking at the sea otters, they are my favourites.
Also, in five families parents acknowledged particular interests and intentions for the current visit based on past activities and personal memories concerning the ocean or animals. These activities included snorkelling, diving, selling animals, and traveling. Another three adults mentioned that previously seen TV programs and documentaries have promoted particular interests and intentions, thus shaping their declared agenda. The following case is particularly illustrative in this matter.

F1: Is there a beluga exhibit here? I would like to see the belugas, I have never seen them
M1: Yeah, we’ve never seen them
F1: I’ve only seen them on TV, yeah. I saw a special on I think the Discovery Channel. About whales and dolphins, sharks too. But mostly about dolphins and something on belugas, so I would like to see them

Having information on what is on display at the aquarium before the visit influenced what a couple of families considered as worth seeing for their visit. This prior information raised expectations and intentions, and was provided both by phone and through the web page of the aquarium.

M2: And when I phoned today to find out admissions costs and times, they said they had like a tropical and regional fish, and some underwater views, so I want to find out what those are. I just don’t know when and where, so we’ll probably wander, you know?

In addition, two parents of two different families asserted that what defined their motivations and intentions for the visit was the recent and new interest their respective children had shown regarding fish. This discovery led the parents to define their own intentions of showing the children the diversity of marine life.
M2: Yeah, sure. She is very quick with concepts once she has one. I don’t know if all the kids do that, but 2 weeks ago it was the ‘Cat in the Hat’ and now it’s fish. You know? It is fish right now, so I can see her really being locked into this. We visited in a way to reinforce her interest because right now she’s all about fish so we thought it was a nice thing to do with her

Nevertheless, when asked whether they had talked to their children about the aquarium prior to the visit, none of the parents declared to have prepared their children for the visit. In most of the cases, a few comments were made the same day just to inform the children about the plans for the day, regardless of the length of time the adults had been planning the visit.

M1: We avoided telling him that [that they were going to the aquarium that day]. We told them the last minute, because that’s all we would have heard from Portland to here

AB: And have you been talking about this visit with him?

M8: Just today

AB: This morning? What kinds of things were you telling him?

M8: Not much, just that we were coming here, we didn’t really prompt him at all. Oh, belugas, I think I just mentioned something about belugas

4.7.4 **Declared agendas vs. observed agendas**

In general, what families stated as their agendas for the visit during the PREV (declared agendas), was confirmed with the observations made during their visit (observed agenda). Across all the 13 cases family groups were observed attending to what they had previously declared as their intentions for the visit, or ignoring what they had explicitly outlined as not appealing for them. Thus, based on the observations it is possible to suggest that overall, the families fulfilled their prior agendas for the visit to the aquarium. The information provided by participants during
the POSTV phase further supported this assertion. Moreover, during this second interview it became evident that families also adjusted their motivations, intentions, and strategies due to the influence of on-site factors (see next Section).

The enjoyment agenda which was common among all the participant families, was fulfilled in all the cases. Other particular agendas such as seeing specific exhibits were also pursued, but in the cases where part of the agenda was to see exhibits that do not exist anymore (i.e. killer whales), some adults expressed frustration at the end of their visits. A different source of frustration amongst adults was not having time or opportunity to see what they wanted to see (i.e. they couldn’t find the exhibit they were looking for; the animals were not out; children would not let them appreciate the exhibits/shows).

M11: We tried to see the monkeys but we are convinced that they aren’t here today because we couldn’t see them
F11: Yeah
AB: They like to hide
M11: We went back, but they weren’t there still

Additionally, in two families, adults showed interest in having access to the Latin names of the animals on display, interest that at the same time led to disappointment or frustration when the information they were expecting to get was not found in the labels displayed at the aquarium.

4.7.5 On-site factors that affect/shape families’ agendas

Regardless of how well the visit was planned and how clearly expectations were laid out, there were multiple factors within the aquarium that influenced and shaped the way in which families conducted their visit. The agendas families brought to the aquarium were not static, but
dynamic and were constantly negotiated amongst family group members. This observation is congruent with Moussouri’s (2003) report on the active negotiation and refinement of families’ agendas while in the museum setting.

Agendas changed and adjusted continuously as the visitors proceeded episodically through their Vancouver Aquarium experience. However, this fact did not prevent families from fulfilling their general prior expectations, possibly because there were certain elements in their original agendas that were actually held unchanging or fixed and thus framed or delimited the set of experiences that families ultimately had during their visits. For example, the particular case of a mother who was not interested at all in seeing any of the shows due to her distress about seeing large animals in captivity, illustrates how a pre-fixed agenda shaped and framed the experience of her family group. The OBSV confirmed that this family did not attend any of the shows offered by the Vancouver Aquarium.

[From PREV]
M4: I actually don’t want to see the whales here. That’s not why we are here
AB: Why are you here?
M4: To see the fish, yeah. I don’t want to see whales. Well, the belugas maybe, but I don’t know. I feel better about them than I do about the killer whales. They used to be here and I didn’t like it at all, it was sad

[From POSTV]
F4: We didn’t do any shows, and I don’t think
M4: I don’t like shows anyway
F4: No, but the kids don’t see through the show
M4: No. Like what are the shows? With the seals and?
AB: Well there is this dolphin show and then the beluga show and they try to show the natural behaviours of these animals
F4: They are probably too young for that, so. They would sit down for a couple of minutes and then get restless and walk around

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M4: No, but I don't really want to show them shows, that's not why I'm here, to see performances. I don't want to see performances by animals; I don't want to see that

During the POSTV it became evident that even when parents apparently entered the aquarium with agendas that may seem somehow uniform (i.e. having a nice day with their families), these agendas diversified during the visit due to a number of ‘intrinsic’ and ‘extrinsic’ factors, yet this not meaning that the families did not have a nice day out. On the contrary, while meeting their original expectations, the families developed new motivations, interests, and strategies shaped by diverse on-site factors. To illustrate the dynamic nature of family’s agendas, agenda fulfillment and shaping factors, the case of one family group is provided in Appendix G.

The intrinsic factors included the development of a particular fascination or concern during the visit. These emerging motivations and interests caused the agendas of the entire family group to adjust and develop in a rather unique manner by influencing primarily the ‘Why’s’ and ‘What’s’ of Figure 4.6. For some families the emerging interest on learning more about one particular issue was what caused the original agenda to take its own course, and yet in other cases, the reason was the emerging interest on seeing a specific exhibit. This agenda diversification was evident across all the 13 examined cases.

F8: We actually were going to the underwater dolphin exhibit and next door there was the diving show and that made us curious, so we stopped there

The extrinsic factors, on the other hand, influenced not only the ‘Why’s’ and ‘What’s’ but also the ‘How’s’ of the visitation. Amongst these extrinsic factors, the age of the children was the most common key issue in determining the dynamics and pace of the visit. Parents of
four families acknowledged that short attention span, restlessness, tiredness, and short endurance were determinant factors that made them adjust their agendas for the visit.

GM3: It was good; she just doesn’t have the endurance that would be nice for her to have. We did a lot of things yesterday, she went swimming and ice skating, she’s just tired today; it was hard to drag her out this morning

Another cause of extrinsic agenda adjustment during the visit were the show times and touch pool times. Whether considered when planning the shape of the day, or found out as the visit went on, in half of the families show times influenced both the sequence in which exhibits were viewed, and the amount of time families spent watching them.

M6: We just tried to go in this sort of natural flow, like you go for one thing and then you are kind of open for the next one and you kind of go for that. We kept an eye on the time for when the shows were. So it was like ‘we have 10 minutes before the next show’ and go for the closest thing for those 10 minutes. We were trying to see everything, but not necessarily. We wanted to hit the shows and the key exhibits

Other extrinsic issues identified as factors shaping the agendas of families visiting the aquarium were the levels of crowdedness and the weather conditions. Adults declared to have decided how to move along the galleries according to how many people were around. Some of them stated that there were points when the crowds prevented them from moving towards the targeted exhibit, while other groups declared that they had decided to stop at certain points because they were intrigued by what the crowds were looking at.
4.7.6 Agendas for the future

During the POSTV, the adults of six families declared their intentions to engage in future activities somehow connected to their visit to the aquarium. At least one adult per family in five different families mentioned that the visit to the aquarium had prompted them to get closer to the ocean. Intentions to dive, surf, see marine animals in the wild and engage in outdoor adventure activities were among the things parents stated to have in their minds for a future family outing. Also, two mothers mentioned their willingness to assemble a fish tank at home so they could offer their children the experience of being close to real fish on a daily basis.

M2: I just want to have a tank at home, that is one of my wishes now
F2: I'd like to be closer to the ocean. I'd like to try and do some diving and stuff like that
M2: We saw the diving panels. If it wasn't for a 2 year old leading the day, we'd probably had stopped and talk to the people. We picked up a card from a guy that was talking about big white sharks and BC's undiscovered ship wrecks, so those are the things we were interested in and that we'd like to go to

The adults of two families also pointed out they would research a bit about the animals they just saw at the aquarium and share the activity with their children. Furthermore, the parents of two families disclosed their intentions of going back to the aquarium to reinforce the experience and follow up on what they just had seen.

Whether these future agendas were an exclusive result of the aquarium experience is hard to determine. However, it is possible to suggest that visiting the aquarium as part of a family group, had a strong impact on parents’ desires and intentions to involve their families and themselves in activities that concern the ocean, marine animals, or the aquarium experience itself. Whether by bringing up personal memories or by enhancing the discovery of new interests
in the adult members of a family group, the aquarium experience stimulated the eagerness to engage in future activities that are directly related.

Establishing the point at which the future agendas became established following the aquarium experience is not easy. It is likely that for some visitors, the visit was actually the starting point for a variety of future plans and family activities, whereas for others, the visit just reinforced a prior interest or aim. Prior experiences included remote events and incidents that make it hard to elucidate the point at which the aquarium visit was affected by them; in the same vein, it is awkward to demarcate what future activities were the result of the aquarium visit and to what extent they might be influenced by this single event.

It also proves to be challenging to outline the chronological and dimensional framework for the construction of agendas. A model (Figure 4.9) that considers prior experiences as shaping the pre-determined agenda with which visitors enter the aquarium, would suggest that the visit would become then a prior experience for the agenda of a future episode (X, Y & Z), and each of these episodes (i.e. Y) would be a prior experience for potential upcoming events (L & M). In this scheme, the impact of a visit to the aquarium in the execution of future related activities would depend on the nature and character of the prior experiences. In some cases, the aquarium experience could be actually the starting point for a number of post-activities, whereas in other cases, that experience could be just enhancing a previously established set of interests and intentions. The continuous arrows indicate direct influence and the broken arrows represent transformation over time; this means that through time, some episodes become prior experiences for future events.
Also, this scheme could consider the visit itself as part of a broader agenda in which the activities planned to be carried out in the days after the visit, are not a consequence of the visit to the aquarium, but are pieces of a wider agenda (A, B & C).

4.8 Agendas and learning

Researchers have pointed out that agendas play an important role in determining both the depth, quality, and type of learning outcomes resulting from a museum experience (Anderson, Piscitelli, et al., 2003; Falk & Dierking, 2000; Falk et al., 1998; Moussouri, 1997, 2003). Although only in a couple of cases an explicit learning agenda was declared before the visit, the adults of all the families revealed gains in factual knowledge as a result of their visit to the aquarium (Section 4.4.1). The common entertainment agenda did not prevent adults from
learning facts and specifics about animals as well as appreciation for marine life; this confirms the claim made by Falk et al. (1998) that most visitors do not see a real conflict between having fun and learning something at the same time. However, there was not enough evidence from the sample of families who participated in the study to support the claim made by those same authors that entertainment agendas may lead families to greater learning experiences.

What can be said, though, is that there appear to be some agendas that are not conscious to visitors and thus are not declared. That could be the case with the learning agenda of parents visiting the aquarium as part of a family group.

Yet, in most cases the entry and emergent agendas had an effect on both the ways of conducting the visit and the learning outcomes of the experience at the individual and group levels. If we consider that prior experiences and knowledge are crucial factors in shaping the agendas visitors bring to the informal setting, then prior experiences and knowledge as Anderson et al. (2002) and Falk and Adelman (2003) state, also mediate the learning experience of visitors (see also Mintzes & Wandersee, 1998).

A good example of a personal well pre-defined agenda affecting individual learning is the case of a father who clearly intended to see beluga whales for real for the first time, motivated by a documentary he had seen in previous days. The adult was then inspired to read and learn about those animals during the visit, more than the rest of the participant parents. This is consistent with Falk and Dierking’s (2000) assertion that visitors to museums learn as they assimilate the experience in a personally significant way that is defined by episodes that take place before and after the visit.

F1: Yeah. The dorsal, not the dorsal but the back flipper, the tail of the whales, how they use it to propel themselves up and then how they stay still in that position, like upside down, floating. And how they use this, the fins to move back and forth
M1: Yeah, I didn’t know that. I didn’t see that documentary that he saw, but I read it in one of the displays, but I had no idea.

In a different case, encouraged by positive personal memories of past events, the parents’ pre-agendas included seeing the local fauna. In this group, the parents shared with their children specific information about the local marine creatures and the geography of the BC Coast. The group went together through the explanatory labels of the gallery displaying the local fauna, and at the end of the visit, all the members were able to reconstruct some of the recently acquired knowledge. This is only one example of evidence that suggests that the entry agendas of the parents influenced the learning experience at the group level.

G10: And about the sea cucumbers, that they
F10: Yeah, the sea cucumbers, has anyone seen a sea cucumber? They throw themselves out if they’re threatened. They can do that, it's a nice defence.

Also, considering that there were on-site factors, including emerging interests, that shaped the families’ prior agendas as the visit developed, there is a high possibility that such factors directly/indirectly influenced the group learning experience. Falk (1983) states that amongst the factors that can possibly influence learning in a museum are behaviours, time, health, motivation, literacy, age, and gender; at least some of these were identified as on-site factors affecting and refining family groups’ agendas, and could have thus affected the collective learning experience.
4.9 Summary of Sections 4.6-4.8

The place of residence and frequency of visitations are important factors in defining the planning strategies for the visit. In general terms, families visiting the aquarium from the LML and Vernon planned their visits for a shorter time and had a more defined strategy with which to conduct their visits than the families visiting from other cities in Canada or the US. The adults played a determinant role in deciding how to conduct the visit, even when most of the families declared that their children had taken the lead of the group.

Agendas shaped the experience both at the individual and at the group levels. Overall, the observations made and the information obtained during the POSTV interviews suggest that what families declared as their agendas for the visit actually framed their experience at the aquarium. This worked in two ways since families actually attended what they declared to be of interest for them and also avoided what they declared as not relevant for them. Also, personal pre-defined and emerging agendas affected not only the pace and dynamics of the visits, but also the personal cognitive learning outcomes of the experience.

There were multiple forces that ultimately delineated the agendas with which family groups experienced their visit to the aquarium. The initial or primary agendas that families brought with them to the venue were constructed by the interplay of motivations (reasons for planning a visit), intentions (goals or objectives of the visit) and plans (ways of carrying out a visit). Across the 13 cases, these pre-agendas were fulfilled (i.e. having a nice family outing) but at the same time constantly negotiated and refined by multiple intrinsic (i.e. emerging interests) and extrinsic (i.e. random encounters, age of children) on-site factors. Intrinsic factors mainly shaped the agendas by impacting on motivations and intentions, and extrinsic factors also impacted the plans or strategies. Additionally, some agendas for the future were developed as a result of the aquarium experience.
RESEARCH QUESTION 3: How and to what extent is the adults' knowledge and understanding related to the aquarium visit connected or evidenced beyond the visit?

The follow-up interviews (FLWUP) provided evidence of the rich nature of the memories adults have about a family visit to the aquarium. Also, different types of activities with which family groups connected the context of the aquarium to other personally relevant contexts in the weeks after their visit were identified.

4.10 Memories of the visit

Parents shared their memories of the visit during the FLWUP. Most of these memories were episodic or autobiographical in nature (Conway, 2002; Terry, 2000) and involved descriptions and recollections about who was present during the visit, what the group/members did (episodes), what they observed (a wide range of exhibits was recalled), and feelings and thoughts that were evoked, in agreement to Herrmann and Plude’s (1995) report on museum memories. McManus (1993) reports similar findings, however according to Stevenson’s study (1991), visitors to a museum are able to recall exhibits and describe them in a rather elaborated manner weeks after the visit, and feelings and thoughts are more frequently evoked months after the visit. In accordance with the study conducted by Stevenson (1991), little evidence of semantic memories\textsuperscript{15} was found, but this does not mean that this kind of memories could not develop in the future.

\textsuperscript{15} Semantic memory is our store of general knowledge; it is like dictionary or encyclopedic knowledge (Conway, 2002; McManus, 1993).
4.11 Long term connections of the aquarium visit

When interviewed 2 to 3 weeks after the aquarium experience, parents recalled a number of activities and incidents that they considered to be linked in some way to their visit to the aquarium. Above all, it was clear that families talked about their visits with other people. According to Borun (2002) families can exchange information about an episode at a museum setting in the days, weeks, or even months following the experience, and Stevenson's study (1991) suggests that visitors talk to others about their experiences in museums in 99% of the cases. Across all the 13 cases, there was evidence from the FLWUP data set that adults and minors talked to some one about their experience; the adults of seven families referred it to family, others talked to friends, and the parents of two families talked about their visit to the aquarium with colleagues at their workplaces.

F5: I talked to a number of people at work that I went there, and that it was a wonderful thing to see. And I think I told them that I left with the impression, that I was impressed of how high memorable it was.

And then Carla . . . she was talking about it with her big brothers and sisters. So we were talking about it there as well.

Parents reported that those conversations involved general comments about the experience, such as having had a good time with the family, having enjoyed the quality of the displays, and overall satisfaction derived from the experience even with young children in the group. In five of the cases, these conversations had a positive effect on the other people, encouraging them to plan a visit to the aquarium. Also, in at least five cases, when chatting with different persons, adults mentioned the exhibits that stood out for them the most. These include the beluga whales, the Amazon Gallery, some of the shows, the big sea lion, reptiles and frogs, and tidal pools. This suggests an association between memorability and longitudinal recollection,
since the Amazon Gallery and the belugas were pointed out as the most memorable exhibits during the POSTV.

4.11.1 Connections with different contexts

Rennie and Johnston (2004) affirm that for a visit to have any long term impact, time is needed for learners to find the relevance of it and link it or adapt it to other contexts. From what the interviewed parents had to say, in the weeks after the visit, both the adults and the children engaged in activities associated to the aquarium experience in other contexts. These findings are congruent with Adelman et al.’s (2000) observations at the National Aquarium in Baltimore.

As perceived by the parents, the children engaged in aquarium-related activities after the visit both in the home and at school. This is congruent to Ellenbogen’s (2002) report of an interconnectedness between the visit to a museum and other family activities, and with Anderson et al.’s (2002) claim that children’s museum experiences are likely to be recontextualized in their home environment. The children of the participant families engaged in activities such as playing, reading books, and coloring with aquarium-related topics. One example of the comments made by parents about their children’s post-aquarium deeds is presented below.

F1: There is some little song that they learnt in day care about a beluga whale and they kept singing it, I heard that song quite a lot. It may take another week or 2 and then I will be hearing it again

AB: Anything else? Have they asked you questions about any particular animal, at all?

F1: Let’s see. Any particular animal? Besides the whales? May be fish. Spiders!

AB: Spiders?

F1: Yeah, they have been talking about spiders. He asked me this morning, in fact. Because I think they have some tarantulas there
However, it is the parents’ opinion that the comments and activities that their children made in the days after the visit were more frequent in the first days following the experience. According to the parents’ recall, the children of all the families engaged in at least one of the following at home (Table 4.5).

**Table 4.5.** Home activities in which children engaged in the weeks after the aquarium experience, according to their parents

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talking about the experience in general</td>
<td>12</td>
</tr>
<tr>
<td>Talking about particular animals (the dolphins and the belugas were amongst the most popular, others were fish in general, sharks and turtles)</td>
<td>10</td>
</tr>
<tr>
<td>Seeing pictures of the visit</td>
<td>5</td>
</tr>
<tr>
<td>Reading books or magazines with marine/animal contents</td>
<td>5</td>
</tr>
<tr>
<td>Watching movies or cartoons with marine/animal subjects</td>
<td>4</td>
</tr>
<tr>
<td>Asking questions about particular animals (dolphins, sharks, snakes, killer whales)</td>
<td>4</td>
</tr>
<tr>
<td>Playing in aquarium-related ways (i.e. during the bath, singing)</td>
<td>4</td>
</tr>
<tr>
<td>Talking to others about the visit (i.e. friends, neighbours, cousins)</td>
<td>3</td>
</tr>
<tr>
<td>Drawing fish and marine animals</td>
<td>2</td>
</tr>
<tr>
<td>Showing increased interest in living fish</td>
<td>2</td>
</tr>
<tr>
<td>Watching informative documentaries</td>
<td>2</td>
</tr>
<tr>
<td>Asking their parents about their past experiences with the ocean and the aquarium</td>
<td>1</td>
</tr>
</tbody>
</table>

Ellenbogen (2002) also reports that the conversations families begin in the informal setting can continue in other contexts such as the home. In this study there is strong evidence to support that claim, since in all but one case the families engaged in conversations concerning the aquarium visit at their homes.

On the other hand, the parents of three families reported that at school their children performed actions such as presenting topics about the animals they saw at the aquarium in front of the class, and taking their drawings with them to share with their classes.
We were just remembering what their favourite fish and animals were and they were drawing pictures of some and taking them to school with them.

In a couple of families the adults pointed out that their children would not forget that they were not able to see some of the animals they were longing to see before the visit. This indicates that children's frustrated agendas continue to be present in their thoughts for many days after the aquarium visit. Furthermore, in one case this frustrated agenda promoted the construction of novel agendas for the future (more about frustrated agendas in Sections 4.7.5 and 4.13) (see Anderson & Shimizu, 2005).

In the case of the adults, there is also evidence of the aquarium experience arising in other contexts, but in general, parents were much more able to report their children's post-visit connections rather than their own. This child-centredness is also congruent with the finding that during the visit, the adults placed special interest on the value of the experience for their children, both in terms of their family agendas and in terms of the roles they played.

At home, the adults of at least nine families talked to their children about what they saw at the aquarium and their past experiences with the ocean and the aquarium. These kinds of conversations are reported to be frequent on-site occurrences for family groups (Hilke, 1987). It is possible that the conversations that reinforce past experiences in order to enhance the development of a shared identity amongst family members take place not only during the visit, but in the weeks or maybe months after the experience.

One of the things we were talking a bit about is when the kids were asking us about our own childhood and stuff and we were talking a bit of just growing up on the ocean and that, and we were talking about the things that we did there because they were asking us funny stories from when we were kids. . . . Well, it was over dinner and they just like to ask us stories from when we were kids and stuff, and so I
think it was more like what we used to do at the beach, like how we played at the beach, finding crabs on
the beach and things like that. You know, looking under rocks and things like that

Also, the adults of six families went through the pictures they took the day of the visit to
the aquarium with their children or by themselves. The adults also engaged in activities such as
the ones presented in Table 4.6. These results support Falk’s (1998) assertion that individuals
who value learning seek it in many forms (i.e. educational TV, books, museums).

Table 4.6. Home activities in which adults engaged in the weeks after the aquarium experience

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talking about the experience at the aquarium and related topics</td>
<td>9</td>
</tr>
<tr>
<td>Seeing pictures if the visit</td>
<td>6</td>
</tr>
<tr>
<td>Reading books/magazines with their families</td>
<td>2</td>
</tr>
<tr>
<td>Reading materials and booklets they collected during the visit to the aquarium</td>
<td>1</td>
</tr>
<tr>
<td>Watching TV documentaries (i.e. animals; learning opportunities in informal settings)</td>
<td>1</td>
</tr>
<tr>
<td>Assisting their children in drawing/coloring activities aquarium related</td>
<td>1</td>
</tr>
<tr>
<td>Reflecting on the memories of positive past experiences</td>
<td>1</td>
</tr>
</tbody>
</table>

M5: It was a TV show I saw about a school, where the kids went to a... In high school they had like a
semester in the aquarium, like they took courses right in the aquarium, and it was sort of related to science.
But I can’t remember where I saw that. And I’ve been thinking about that a lot. I don’t know if that was the
result of visiting the aquarium or not or probably the result of different programs I’ve seen, but I was very
interested about these different programs where they can take semesters of school in unique environments.
Just like this one where they can get on a ship and travel around the world and do different things. And then
there is the space place where they learn all about aeronauts and space and aeronomics. And there was one
for marine topics

M13: What did we talk about? We talked a little about the different types of sharks, and I think it was sort
of brought up by looking at a book. There is a story with a fish or shark in it and then that sort of brought
up the memories of the visit to the aquarium and we said things like 'oh that’s a hammer head shark, did we see any hammer head sharks at the aquarium?' and stuff like that. And then, they were asking things like ‘oh Mum, do you remember this?’ and then looking at pictures, because my mother-in-law took pictures

Besides talking to colleagues at work about the generalities of the visit, there is evidence to suggest that adults linked the aquarium experience to contexts such as the workplace in a rather idiosyncratic way. As Anderson et al. (2002) affirm, children’s recollections and interests after a museum experience are diverse, individualistic, and idiosyncratic in nature; this seems to apply to adult visitors as well. In one of the families, the adult that participated in the FLWUP declared to have thought of her personal experience there in terms of her occupation. Being a designer, the woman considered the aquarium an extraordinary place from which to obtain insights and ideas for the development of new projects:

AB: And what about you? Have you had any thoughts about your experience there?
GM12: I did actually. I belong to an on-line forum of wearable art forms, so we were discussing what a great place it would be for inspiration for textures and colors and design ideas and stuff like that
AB: That’s so neat
GM12: It actually encouraged the girl, she lives in Seattle, to go to the aquarium in Seattle not long after that

4.12 Long term learning from the aquarium visit

Framed by a constructivist paradigm, this study considers learning to be dynamic, continuous, contextual, and multi-dimensional (see Section 2.2). Furthermore, it is acknowledged that any impacts derived from a visit to an informal setting can take place weeks, months, or years after the experience. During this time, visitors can develop and demonstrate
changes in attitude, behaviour, and/or knowledge in other relevant contexts in their lives (Falk & Dierking, 2000; Rennie & Johnston, 2004).

Parents declared that their children showed evidence of long term cognitive learning in the 2 to 3 weeks following the visit to the aquarium. According to Falk and Dierking (1997), a long term recollection of a museum visit can be considered learning if it not only involves episodic memories associated with the experience. Four parents declared that their minors were able to recall facts about the habits and habitats of particular animals (i.e. the anaconda, sea lion, and whales). In another two families with young children, parents claimed that the minors showed gains in vocabulary as a result of the visit to the aquarium and were able to connect ideas. Also, in one case a girl expressed a growing interest in marine life, according to her father.

AB: And your little girl? Has she engaged in any activities, readings, playing, cartoons?
F1: Yeah, cartoons. She has a Tom and Jerry cartoon that her grandmother brought her from Italy and there is one that has a fish of some sort that looks like a shark. . . . She made a connection between that and the sharks she saw at the aquarium?
AB: In what ways? Did she say something?
F1: Well, she knew the word ‘shark’
AB: Do you think she learnt that at the aquarium?
F1: Yeah, probably

AB: Do you think that before the visit to the aquarium she had made the connection between fish and water?
M2: No, I don’t think as much. . . . So now she is learning the word [fish], and actually she’s starting to use the word ‘wet’. If her hands are wet she says ‘wet’ and if the touches water she says ‘wet’. I think that may be the aquarium combined with the bath, yeah. She is really connecting that, wet and water
The adults also showed evidence of long term factual or declarative cognitive gains that implied more than episodic memories associated with the aquarium experience. The adults of two families brought up facts about the habits and habitats of animals, thus confirming previous claims that learning as a result of a museum experience is highly personal and persistent over time (Adelman et al., 2000; Falk & Dierking, 2000; Rennie & Johnston, 2004).

M4: The presence of snakes and things like that, like reptilian types. Oh, yeah, I know what it was. It was the fact that snakes can live in the water, and that they are not just in the jungle and trees and that, but there are snakes in water

Also, the adults of two families reflected on their social learning, mentioning that they had appreciated the opportunity to interact with their family members in a new or different way. In the affective domain, the adults of half of the families expressed their contentment about having the opportunity of being close to the richness of marine life.

M8: I know for myself that I liked the different ways that we were encouraged to interact, so it wasn’t only just go and look at things; it was more around getting involved with my son. We actually did a little craft together

AB: He was all excited about it

M8: Yeah, very very. He still has them. . . . You know, there is not much interaction just sitting down and coloring, but he enjoyed that. And so did I. I think it was a nice break, a nice change of activities

There is little evidence to support the idea that in the 2 or 3 weeks after the visit the adults developed intellectual skills or higher order conceptions as a result of their visit to the aquarium, but this could take place in the following months or even years, since according to
Anderson (2003), Falk and Dierking (1997), and Stevenson (1991), learning can continue long after a museum-type experience.

4.13 Agendas for future activities

During the FLWUP the families expressed their intentions of engaging in future activities that could be connected to the aquarium experience. The Vancouver Aquarium experience shaped the agendas for future family plans not only in terms of motivations (reasons) and intentions (goals) levels, but in terms of the future strategies.

Across all 13 cases, the most common plan was going back to the aquarium with their respective families. The adults of eight families stated they would like to reinforce the experience for their children and see what they missed on their last visit. The adults of four families affirmed they have plans of going back not only with their family members, but with other close people as well (i.e. family and friends).

M2: Pretty much what we want to do is take our passes and go back there soon and bring our niece, she’s 8. And bring her because my daughter and her play together a lot. She learns a lot form her
AB: She’s older
M2: She’s a little bit older, but she talks like I’m trying to get her to talk because with the older kids they learn the language and the words that the kids say, so she would be really having a good time at the aquarium with her cousin, you know?

In four different families the adults expressed that for their next visit they would like to spend more time attending to their own personal interests (agendas), independent of their families’ interests and demands.
GM12: Well, I know I am going by myself one day, so I can actually look at stuff

AB: And what would you like to look at?

GM12: Oh for me it would be the colors and the textures and stuff like that, it’s work related

In two other cases the adults expressed their interest in doing things differently in their next visit (i.e. planning ahead, start the visit in a different order). Also, in one case a mother asserted she would like her family to take part in new activities at the aquarium.

AB: So, have you or any of your family members developed any particular interest for a future visit to the aquarium?

M6: Oh, definitely. We really want to do the ‘Day with the belugas’. You need to be 8, but I’m thinking I will send my husband by himself right now. That sounds really great for the next time we go

Other popular family plans for the future involve scuba diving and/or snorkelling; the adults of four different families affirmed they would like to take on activities like those in the near future. Also, in three families the adults are planning to take their families to see marine life in the wild. In one case, this plan is congruent with that family’s agenda of showing and engaging the children with the appreciation of nature:

F1: Well, we want to go to the coast of Oregon, so I guess that could be an upshot of the aquarium experience. There is a little tidal basin near what’s called Haystack Rock on the Oregon Coast about 90 or 80 miles from where we live in Cannon Beach, and there you can see starfish and other kinds of animals. So we’d like to take the kids to see that, once the weather gets better

In another case, however, this interest for wildlife developed both as a result of a larger agenda of inculcating respect for marine life in the children, and from the children’s frustrated
aquarium agenda of not seen killer whales at the aquarium. The idea of seeing whales in the wild was already in the minds of this particular family at the moment of the visit. This plan is also congruent with the mother’s clear rejection of seeing large animals in captivity and transforming this personal awareness into a learning experience for her daughters.

M4: That there where no killer whales, so that was a good learning experience with them, that they weren’t there and that they weren’t there for a reason, so we explained why they weren’t there

[Later in the same interview]

M4: Oh, we are going to go whale-watching for sure, at some point

AB: Great

M4: And my little one, I don’t know if you remember her, she is only three, she’ll be rather miserable on a boat for an extended period of time but at some point, we will definitely go whale watching. Absolutely. And we are definitely going to go to the [Vancouver] Island, and hopefully we will see some sort of marine life just from the beach. So yeah, we’ll definitely keep going

Only one adult declared to have a personal motivation about watching more TV documentaries to reinforce the experience at the aquarium, but in three families the future plans consisted of taking their children to other aquariums or zoos. In one particular case, a frustrated on-site agenda was pointed out as the starting point for developing a new plan of activities for the family group.

GM3: We would like to go somewhere where we could actually see an octopus, she never got to see it very well and she was all about it in our way there... and she never got to see it, there was not even a way to tell there was an octopus. It wasn’t exposed at all and we could never see it

The idea of setting up a fish tank at home was mentioned by two adults as an interest developed as result of the visit to the aquarium.
M2: Yeah, my husband and I were saying that we'd really like to get a fish tank because I had one in my house all my life growing up and my dad had this tank with fish and turtles, and stuff... And we don't have any pets right now, so we were thinking that that would be kind of nice to compromise with a pet.

AB: Ok, so are you really planning on working on that tank idea at home?

M2: Yeah. That would be great. I mean, seriously we have been thinking about it. It's just about starting it with the money, getting the tank started out, but we really enjoy water and fish, going in the ocean, but also having a tank at home would be great. And we'll give her [their daughter] the chance to see the fish all the time.

Some of these agendas for the forthcoming weeks or months were pointed out since the POSTV at the aquarium. In five families, what was mentioned as a plan for the following weeks or for the next visit to the Vancouver Aquarium was still in the minds of the adults at the moment of the FLWUP. Intentions of seeing animals in the wild, practicing scuba diving, or setting up a fish tank at home are some of the plans that were stated during the POSTV.

These findings indicate that as a result of a visit to the aquarium, new agendas were constructed on-site, and that in the long run these new agendas were still in the agenda of family groups.

4.14 Long-term evidence of on-site fulfilled agendas

Overall, the comments made by the adults that took part in the FLWUP suggest that, if not all, some of their agendas for the visit were fulfilled. The entertainment agenda was one of the most mentioned: all of the adults made positive comments about their experience and declared they had a fun family day at the aquarium and expressed appreciation for the opportunity of interacting with their family members in a different environment. Yet others recalled they actually had the chance to look at the exhibits they wanted to see.
Other parents admitted they had shown their children the different animals just as they intended, or that they had achieved the goal of showing their children the real fish as opposed to cartoon and commercialised images of fish.

M11: Actually last weekend we were watching the movie ‘Finding Nemo’ which is all about fish and stuff like that, so you think ‘oh yeah, see? Remember that? That’s what we saw at the aquarium’. So there is cartoon fish, but they were actually able to see the real ones at the aquarium which is nice

4.15 Summary of Sections 4.10-4.14

Family groups connected the aquarium visit to other contexts in several different ways. Both parents and children talked to other people about their visit in the days following the visit and in these conversations they reconstructed their experience at the aquarium. In the view of their parents, children performed activities associated with the aquarium visit both at the home and at school such as talking about the experience, reading books, and watching movies.

The adults connected their experience at the aquarium at the home and at the work place, but overall, they were better able to recall their children’s connections than their own personal ones. The activities parents engaged in over the weeks after their visit were reading books, watching TV documentaries, and assisting their children in crafting activities. Also, adults showed evidence of long term factual knowledge.

The interviewed adults expressed interest in engaging in future activities related to the aquarium experience (i.e. snorkelling/diving; seeing animals in the wild).

Additionally, the follow up interviews led to the observation that even when some agenda frustration took place during the visit to the aquarium, for the most part the agendas with which families entered the venue were fulfilled, and this satisfaction was evident 2 to 3 weeks after the visit.
Chapter 5: Conclusions, Limitations, Implications, Recommendations, and Questions for further research

5.1 Overview

The previous chapter dealt with the results and discussion emerging from the data gathered. The first section of this chapter summarises the salient findings for each of the three research questions that guided this study, and pinpoints the conclusions resulting from the data analysis. The second section deals with the limitations of the study. The implications of these salient findings for museum and aquarium research and programming are presented next. Recommendations for researchers, as well as for program and exhibit developers and aquarium educators are also included in this chapter. Finally, some questions for further research in the field are suggested.

5.2 Salient findings and concluding remarks

This section presents the salient findings and concluding remarks of the study stratified by research question.

RESEARCH QUESTION 1: What is the nature and character of parents'/guardians' learning within a family group context, while visiting an aquarium?

• Overall, in addition to playing diverse roles, as Diamond (1986) asserts, parents actually claimed and perceived fewer roles than was observed by the researcher.

• Amongst these unnoticed and/or unacknowledged roles were the adults' functions as learners and group leaders during the visit, roles that were evidenced by the observations.
• Evidence of group-mediated adult learning was found, indicating that social interactions are key mediators and experiential sources for learning in informal environments.

• The fact that parents showed learning-associated behaviours (Borun et al., 1996; Diamond, 1986) and also revealed evidence of learning during the interviews, supports the claim that the adult members of the participant family groups learned as a result of their visit to the Vancouver Aquarium.

• The evidenced adult learning was cognitive, social, and affective in nature.

• Cognitive learning was characterised by declarative knowledge or the recollection of specific facts and concepts (Tennyson, 1992) about the creatures displayed in the aquarium, such as behaviours, habits, habitats, distribution, anatomy, life cycles, and so forth.

• The three identified sources of cognitive learning were exhibit and labels (visual), live shows (audio), and interactions with staff members (oral interaction).

• Nonetheless, little evidence of higher order thinking was found in this study.

• From the collective experience at the aquarium, the adults learned about their group members. They learned about their children's learning related characteristics such as attention span and personality in public spaces where social interactions are present. Adults not only identified cognitive developments in their children during the aquarium experience, but they also learned about how their children learn (visually, orally, or tactiley). Adults became more aware of their changing dynamics as social groups, as well.

• The affective evidenced learning was characterised by a strong sense of appreciation of marine life diversity and exceptionality, by the acknowledgment of the unique experience that the aquarium setting offers to visitors, and by emotional connections to past positive affective experiences. These personal affective responses were associated with the willingness to engage in future activities related to the aquarium visit (i.e. scuba diving or snorkelling), and are likely
to be significant in the collective development of a shared identity within a family group (Hilke, 1987).

- Additionally, it was found that personal interests, predefined personal agendas, novelty or surprise, and enjoyment played an important role in defining the impressions that exhibits made on the participants.

**RESEARCH QUESTION 2: Do family groups visit aquariums with predefined agendas? In what ways do these agendas affect group learning?**

- The results of this study indicate that family groups visited the Vancouver Aquarium with predefined agendas composed by motivations, intentions, and strategies; elements that were shaped by prior experiences and on-site factors.

- The strategies families used to conduct their visit, whether focused or unfocused (Moussouri, 1997), affected the length of the visit. At the same time, the visitation strategy seemed to be somewhat related to place of residence and therefore to visitation frequency; families visiting from the Lower Main Land (LML) were more likely to be frequent visitors and to have focused or moderately focused strategies for their visit, compared with those visiting from outside the LML.

- Taking the lead of the group was identified as a relevant component of these strategies, since leaders were the ones who defined both the pace of the visit and the order in which galleries and shows were experienced by the family group.

- Despite the fact that adults do not necessarily realise that their families undergo a continuous interplay of leading roles between children and themselves, parents and children constantly negotiated their personal interests in the course of the aquarium visit, and that both agendas operated simultaneously, as Moussouri (2003) asserts.
• Considering that as a result of the visit parents gained awareness of their adjusting social
dynamics as a function of, for instance, the changing age of their children, it can be claimed that
parents also learned how to negotiate their own agendas and their children's evolving interests.
• Parents placed a great value on their children’s experience and most of their perceptions
of the aquarium experience were children-centred.
• Families arrived to the aquarium with a planned agenda that initially seemed somewhat
homogeneous across the cases (mainly recreation, learning, and social), but agendas diversified
and changed during the visit due to a number of on-site factors that can be categorised as
intrinsic (personal emerging interests) and extrinsic (external causes such as show times,
children’s ages, and levels of crowdedness).
• Across the examined cases, agendas were dynamic and renegotiated; nonetheless, there
were elements in the entry agendas that were held fixed during the visit and ultimately framed
the experience that families had at the aquarium.
• Prior experiences stood out as decisive factors in determining what visitors expected to
obtain from the aquarium visit, and this claim is in agreement with Falk et al. (1986). Amongst
these, prior visitation, personal experiences with the ocean, and previously seen TV programs
were the most relevant.
• Families were motivated by the intention of having a fun social day at the aquarium;
bearing in mind that a significant fraction of the adults’ learning was social in nature, a
relationship between parents’ entry agendas and the quality and type of learning outcomes on the
personal and collective level can be pointed out.
• Across the analysed cases, the previous claim is further supported by the connection
between learning agendas and cognitive and appreciation outcomes, as well as by the link of
introspection agendas with learning in the affective domain.
Entertainment or recreation agendas did not prevent adults from learning in the cognitive, social, and affective domains, and emergent agendas, like entry agendas, influenced the ways in which family groups conducted their visit and learned in and from the collective aquarium experience.

The agendas with which adults entered the aquarium influenced what captured their attention and what they were able to recall by the end of their visit.

Sources of agenda frustration amongst adults were identified, such as expecting to see exhibits that no longer exist or not having time or opportunity to attend to their own interests.

**RESEARCH QUESTION 3: How and to what extent is the adults’ knowledge and understanding related to the aquarium visit connected or evidenced beyond the visit?**

The aquarium experience influenced parents’ desires and intentions to engage with their families in future activities related to marine life and/or the ocean. The experience shaped parents’ agendas for future visits to the Vancouver Aquarium.

These intentions and agendas were sustained over time and reaffirmed weeks after the aquarium experience, stressing the longitudinal impact of the visit on adults’ interests and motivations.

Parents’ recollections about the aquarium visit 2 to 3 weeks after the experience were episodic or autobiographical in nature, and little evidence of semantic memories was found.

Connections of the aquarium experience to other contexts relevant for the participants were evident. According to their parents, children linked the visit to the home and the school, whereas they – the adults, primarily connected the aquarium experience to the home (i.e. reading books, watching TV) and the workplace.
• Adults’ recollections and connections were individualistic and idiosyncratic in nature (see also Anderson et al., 2002).

• The families engaged in conversations involving the aquarium subject in the weeks after the visit; such reinforcement of past experiences could have enhanced the construction and development of a joint identity amongst family members.

• In the view of the parents, their children’s learning at the aquarium was evident in the weeks after the visit.

• Adults themselves gained long-term factual or declarative cognitive knowledge at the Vancouver Aquarium; social and affective learning was persistent over time as well.

• There was little evidence to suggest that in the 2 to 3 weeks after the visit, parents developed higher order intellectual conceptions and skills.

5.3 Limitations of the study

It was acknowledged on Section 3.11 that interpretive case studies are reliant on what participants have and want to say in a particular moment and circumstances, and are also subject to the researcher’s personal and professional judgements, understandings, criteria, and sensitivity. This study was developed from the case participants’ perceptions, readings, and explanations of particular experiences and episodes, under the informed point of view of the researcher. Just as there was a possibility of bias in the selection of information and criteria of interpretation on the part of the researcher, there was also a possibility of conscious or unconscious decision on the part of the participants to choose what and how to share the information on which this study was based.

The potential for reactivity in the process of data collection, or the possibility that participants’ comments, observations, and behaviours could have been prompted or influenced
by the research process is also recognised as one factor that could have shaped the nature of the findings and conclusions of this study. This is particularly true for the OBSV, POST and FLWUP. Knowing that they were taking part in a research study, participants could have experienced their aquarium visit differently than they normally would have, thus affecting the nature of their experience and comments about it. Also, participants could have felt intimidated by the fact that they were being observed during their visit. However, in the opinion of the researcher, evidence of such intimidation was indiscernible.

It is also recognised that by interviewing participants three times, they could have been cued or predisposed for responding in a particular way during the second and third interviews. Moreover, the interview process itself could have worked as a mediating device that could have facilitated the recollection of particular episodes and/or exhibits, thus altering the authenticity of the raw data on which this study is based.

Finally, this study does not aim to account for all kinds of family groups’ learning experiences at informal environments; not even at aquarium settings. This study describes and analyses the experiences of a set of families at the Vancouver Aquarium, and the results are then a consequence of the particularities of the participant family groups and the specifics of this setting at the moment of data collection.

5.4 Implications of the study

Some implications for the field of informal setting learning and visitor studies emerge from the main findings of this study. This section describes the repercussions of this study for museum and aquarium research and practice.

Adults visiting informal environments as part of a family group are to be considered as active lifelong learners and not only as providers and facilitators of the experience for younger
visitors. Even when they may not explicitly acknowledge their role as learners, adults visiting informal settings are interested in having a learning experience as individuals: they read labels, pay attention to audio information, and some of them are likely to engage in conversations with staff members.

Parents'/guardians' learning experience is to be understood under a broad definition of learning that takes into account gains of information, knowledge, and expansion of understandings, and also involves appreciation, being in touch with real objects/animals, and sharing the experience with others. The adult members of family groups need to be regarded as individuals with their own interests and expectations for a museum visit, with learning capacities and intentions, and with great decision-making control and influence within the informal setting.

Considering that the contact with living creatures elicits emotional responses and connections with past affective experiences, and promotes cognitive and affective gains in adults, it is likely that the outcomes from a visit to settings where parents are not exposed to interactions with living organisms would be different in nature and character from those promoted at places where living animals are in display, such as aquariums and zoos. Informal setting researchers and educators need to be aware of the learning potential of a first hand encounter with living things at the informal environment, since this may not only be true for parents but for all members of the family group, as well as for the different audiences that visit museums and similar settings (i.e. school groups and solitary visitors).

It had been previously established that family groups place a very high value on the social nature of a visit to informal environments (Borun, 2002; Hilke, 1987; McManus, 1987). The fact that parents not only have fun and enjoy a day out with their children, but also learn about their family members and get to know each other under a unique and enjoyable atmosphere, could explain why the social aspect of a visit is so appreciated among family groups. Merely learning about and knowing their children better could constitute in itself a
motivation for parents to plan a family day out at an informal setting. Considering that parents are highly child-centred, the impact of the level of fulfillment of this type of learning agenda on the collective and individual experiences at the informal setting could be determinant.

Researchers and educators, then, need not only to acknowledge that families value the social aspect of an experience at the museum setting, but that they value what they learn about and from their social dynamics and interactions.

Adults’ personal agendas are built, amongst other things, on personal interests and prior experiences and they frame the experience at the individual and family group levels. However, multiple on-site factors can cause adults’ agendas to diversify and change once the visit is in progress. This means that in order to fully understanding the way in which parents learn in and from an informal experience, and providing learning opportunities within the informal setting, it is crucial to consider both the entry and emergent agendas, and the factors that elicit such diversification. Solely considering that entry agendas shape the learning experience and attending to these entry agendas is not enough, since emergent agendas seem to be as significant in the progress and outcomes of a visitation.

Furthermore, there seem to be ‘unconscious agendas’ that even when not explicitly declared, are playing a role in the collective and personal experience of the family members. By better understanding the dynamic and adjusting nature of agendas, it is possible for informal setting educators and programmers to somewhat influence parents’ emerging agendas. Taking into account that parents play a fundamental role as leaders of their family groups, this is a very powerful tool for the creation of engaging learning opportunities for all the family members. This becomes even more relevant if we consider that recreation and social agendas do not prevent adults from learning.

The learning impact of an informal experience not only resides in the experience itself, and agenda diversification not only takes place within the boundaries of the informal setting. A
day at the aquarium can inspire parents to pursue future family activities related to the ocean and marine life, and can trigger individual learning opportunities in other personally relevant contexts in the weeks after the experience. This seems to be the case for children, as well.

Visitors in general can experience impacts derived from a visit to an informal setting even years after such experience (Borun, 2002; Falk & Dierking, 1992; Rennie & Johnston, 2004). Thus, for a) understanding how the adult members of a family group learn in and from informal experiences; and b) articulating engaging and meaningful learning opportunities at the informal setting, it is essential to reflect on the longitudinal sequels in the different contexts of visitors’ lives such as the home and the workplace.

5.5 Recommendations

The recommendations emanating from this study can be categorised as recommendations for researchers, and recommendations for program and exhibit developers and aquarium educators.

5.5.1 Recommendations for research

- Future research in the fields of family learning and family learning in informal environments should consider the adult members of family groups not only as facilitators and instructors, but also as active lifelong learners.
- Researchers should take into account that parents are not likely to primarily perceive their role as learners and that most of their perceptions and recollections of a family day out at an informal setting are highly children-centred; therefore, having them talk about their own learning experiences can be challenging.
• When investigating how and what people learn at and from informal settings, a distinction should be made to differentiate settings where visitors experience living creatures from settings where only or mainly artefacts are displayed.

• Attention should be paid so as not to dismiss or ignore the personal agendas the adults of family groups bring to the informal setting when investigating family learning, given the important role that parents have as leaders of their families and the function of agendas shaping the group and individual experience.

• Family group’s ultimate learning experience at the informal setting ought to be analysed not only in the light of the declared entry agendas, but also taking into account observed and perceived entry and emergent agendas.

• It is further recommended that when investigating the impact of agendas on the learning outcomes from a visit to an informal setting, an agenda classification that considers introspection or emotional connections be used. It is important to take into account that even when the categories used are mutually exclusive, many agendas are likely to be at play simultaneously, not only at the personal, but at the social levels.

• Not only family research, but visitor studies in general should consider agenda consolidation as a continuing, dynamic, and non-linear process where multiple episodes, not only informal setting experiences, are interlinked and influence one another.

• To better comprehend how families learn in and from a visit to a museum or a similar setting, researchers need to consider that the effects and outcomes from such an event can idiosyncratically manifest in the long term, since families assimilate the experience in a personally relevant way.
5.5.1 Recommendations for program and exhibit developers and aquarium educators

- It is recommended that the development and implementation of family programs, family activities, and family-friendly exhibits offer diverse output modalities (visual, audio, and human interaction).

- Family programs and activities that foster the simultaneous intellectual engagement of all the family members are likely to be successful in stimulating family learning because through the interaction with the minors, parents can fulfill their own social agendas.

- Aquarium educators and programmers should capitalise on, and bear in mind the enormous potential for the development of learning opportunities that living creatures offer, particularly in the affective domain of learning.

- For aquariums and informal settings to develop successful family programs, it is important for them to understand the nature of the most predominant agendas that families and family members bring with them when visiting (recreation, learning and social agendas).

- By identifying the on-site factors that cause family agendas to diversify during the visit, educators could make the most of the adults’ emerging agendas in order to offer the whole family identifiable choices from which all members could benefit.

- Temporal programs could offer families a more diverse range of learning opportunities than permanent programs, since families are likely to constantly look for novel experiences to suit their recreation agendas.

- Providing families with materials to take home could also expand the learning outcomes from an aquarium experience, considering that after their visit family groups readily link their aquarium visit to other contexts.
5.6 Questions for further research

This study provides new insights to the ways in which family groups learn in the aquarium setting. However, some emerging issues ought to be considered as areas for further research. For instance, the role of non-living artefacts in eliciting affective responses in the adult members of a family group as opposed to the clear emotional effect of living creatures and their positive impact on parents'/guardians’ learning experiences, is still to be investigated.

Due to their changing and alterable nature, it is hard to determine the chronological flow of the consolidation of agendas (a model is proposed in Section 4.7.6). Investigating and better understanding how agendas are constructed and put into play is an area in which still more work is needed. Also, more research is needed to clarify the nature and impact of non-declared and non-perceived agendas.

Longitudinal studies that account for the development of family groups’ aquarium experiences in the months or years after the visit are also needed to better comprehend how family members collectively and individually make sense and find meaning from informal experiences and their connection not only to other contexts, but also to multiple family activities that may take place after the aquarium experience.
References


Appendix A. Advertisement poster used to recruit participants at the Vancouver Aquarium

The University of British Columbia
Department of Curriculum Studies

Vancouver Aquarium Marine Science Centre

Voluntary participants needed for a study on:
“Family Group Experiences in Informal Environments. The role of Agendas and Social Interactions”

YOUR PARTICIPATION WILL MAKE THE AQUARIUM A BETTER PLACE FOR YOUR FAMILY!!

Upon consent of participation, you will be compensated with HALF PRICE ENTRIES on your current visit AND FREE ADMISSIONS for a future visit to the Aquarium.

We are looking for English and Spanish speaking families with at least two adult members and one child under 11 years of age. Groups will chat about their experiences at the Vancouver Aquarium in three short interviewing sessions.

Interested? Ask for Adriana Briseño
Appendix B. Participant consent form

Objectives of the Study:
The overall purpose of this project is to gain some understanding of how visits to the Aquarium impact on family experiences and interactions and whether the museum visit is connected to other contexts and situations. Additionally, this study aims to investigate the way in which families negotiate their visit agendas and the extent to which such agendas impact on the group’s experience. This project is part of the graduate work of the co-investigator, and the data will be used for her thesis.

Data Collection Procedures
You and your family have been invited to participate in this study because you meet the criteria of inclusion previously defined (only English-speaking families with children up to 11 years of age will take part of the study). Data collection in relation to your family will consist of a 5-10 min face-to-face interview concerning your expectations of your visit to the Aquarium. You will be unobtrusively observed at some points of your visit in order to investigate group interactions and behaviours. At the end of your visit your family will be asked to participate in a 30-40 minute face-to-face interview concerning your recent experience. Two to 3 weeks later you will be contacted by phone to participate in a 15-20 min interview where you will get to talk about your family’s experience at the Aquarium.

Confidentiality
Data collected in this study remain confidential between the principal investigator and the co-investigator and you. You will have the opportunity to review the transcripts of your interviews. When results of the study are published and disseminated we will ensure that data collected from you and your family remains anonymous. However, we may use some of your verbatim comments to elucidate the findings of the study in forums such as scholarly conferences, journal articles and a graduate thesis. In all cases your identity will be concealed by use of a pseudonym.

Remuneration/Compensation:
In order to thank you and your family for your time and effort, in case you decide to participate in this study, half price entries to your current visit to the Vancouver Aquarium Marine Science Centre will be granted upon consent of participation.
Inquires
Questions related to this study are welcome at any time. Please direct them to Dr. David Anderson (Principal Investigator), Department of Curriculum Studies, University of British Columbia, 2125 Main Mall, Vancouver BC V6T 1Z4, Canada. PH (604) 822 2086, F (604) 822 4714, Or, M. en C. Adriana Briseño (Co-Investigator), Department of Curriculum Studies, University of British Columbia, 2125 Main Mall, Vancouver BC V6T 1Z4, Canada. PH (604) 822 9526,

Contact for concerns about the rights of research subjects:
If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598.

Consent:
Your and your family's participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to you or your family.

Your signature below indicates that you have received a copy of this consent form for your own records.

Your signature indicates that you and your family consent to participate in this study. Please specify whether you consent that your children take part in the study as well:

I consent/I do not consent (circle one) to my child's participation in this study.

Signature Date
(Parent or Guardian No. 1)

Printed Name of the Parent or Guardian signing above

Signature Date
(Parent or Guardian No. 2)

Printed Name of the Parent or Guardian signing above
Appendix C. Description of the participant families and observed behaviours at the Vancouver Aquarium Marine Science Centre

<table>
<thead>
<tr>
<th>Family Group</th>
<th>Composition</th>
<th>Relationship</th>
<th>Age and gender of children</th>
<th>Residence</th>
<th>Approximate time spent at the aquarium</th>
<th>Dominant observed behaviours</th>
<th>Observed ranked tendency to lead (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adults</td>
<td>Children</td>
<td></td>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>2</td>
<td>Parents, grandmother &amp; children</td>
<td>5.5 (boy) 3.5 (girl)</td>
<td>Portland (U.S.)</td>
<td>3 hrs</td>
<td>Talking, pointing and interacting with exhibits</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
<td>Parents &amp; child</td>
<td>2 (girl)</td>
<td>Surrey (LML)</td>
<td>2 hrs</td>
<td>Playing, pointing and talking</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>Grandparents &amp; child</td>
<td>4.5 (girl)</td>
<td>Abbotsford (LML)</td>
<td>2 hrs</td>
<td>Pointing, talking</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>3</td>
<td>Parents &amp; children</td>
<td>6 (girl) 4 (girl) 3 (girl)</td>
<td>Abbotsford (LML)</td>
<td>2.5 hrs</td>
<td>Playing, pointing, talking and interacting with exhibits</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>Parents &amp; children</td>
<td>6 (girl) 1.5 (boy)</td>
<td>Yellowknife (Canada)</td>
<td>6 hrs</td>
<td>Pointing, reading and interacting with exhibits</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>1</td>
<td>Parents &amp; child</td>
<td>1.5 (boy)</td>
<td>Toronto (Canada)</td>
<td>3 hrs</td>
<td>Pointing, talking, playing</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>1</td>
<td>Parents &amp; child</td>
<td>3 (girl)</td>
<td>Maple Ridge (LML)</td>
<td>1.5 hrs</td>
<td>Pointing</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>1</td>
<td>Parents &amp; child</td>
<td>4 (boy)</td>
<td>Edmonton (Canada)</td>
<td>3 hrs</td>
<td>Pointing, talking to interpreters</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>1</td>
<td>Parents &amp; child</td>
<td>7 (boy)</td>
<td>Abbotsford (LML)</td>
<td>2 hrs</td>
<td>Pointing, reading, talking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parents, children &amp; exchange student</td>
<td>7 (boy) 5 (boy)</td>
<td>Vernon (Canada) (b)</td>
<td>Talking, pointing, reading</td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td>--------------------------------------</td>
<td>----------------</td>
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<td>----------------------------</td>
<td>---</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>3</td>
<td>Parents &amp; children</td>
<td>8 (boy) 6 (boy) 4 (girl)</td>
<td>Abbotsford (LML)</td>
<td>Talking, pointing</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>3</td>
<td>Parents &amp; children</td>
<td>2.5 (girl)</td>
<td>Aldergrove (LML)</td>
<td>Talking, pointing</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td>1</td>
<td>Parents, grandmother &amp; child</td>
<td>6 (boy) 3(boy)</td>
<td>Vancouver (LML)</td>
<td>Talking, pointing</td>
<td></td>
</tr>
</tbody>
</table>

(a) 1 = none; 2 = little; 3 = medium; 4 = large
(b) This family was considered part of the LML cluster, although Vernon is not located in the Lower Mainland
Appendix D. Map of the Vancouver Aquarium Marine Science Centre

Welcome to another world
There's more to see and do on the lower levels.

- Clownfish Cove
  Fun and games for kids eight and under.

- The SubShop
  Gourmet coffee, snacks, books, toys and gifts.

- Wild Coast Underwater Viewing
  Get face-to-face with BC's marine mammals.

- AquaNews
  Find out what's happening in the waters of the world.

- Beluga Underwater Viewing
  Explore the fascinating world of Arctic animals.

- See the electronic "Show Times" board for today's schedule.

- For the safety of the animals, balloons, pets and smoking are not permitted anywhere in the Aquarium.

- A limited number of strollers and wheelchairs are available for loan. Please ask at Admissions.

- Additional washrooms are also located in Wild Coast and Beluga Underwater Viewing Areas. Hours and activities are subject to change.

NO SMOKING in Aquarium grounds.
Appendix E. Interview protocol

ENTRANCE INTERVIEW:
Overview/background questions:
- Where were you born?
- Where do you live?
- Your children: How old is/are she/he/them?
- What comes to your mind when you hear the term museum? Science centre? Art gallery? Aquarium?
- Did you as a child visit Aquariums? With whom? What is your most vivid memory of visiting an Aquarium?

Research Question #2: Do family groups visit aquariums with predefined agendas? In what ways do these agendas affect group learning?
- Have you been to the Vancouver Aquarium before? Probe: Why?
- Why have you chosen to visit the Vancouver Aquarium with your family today?
- For how long have you been planning this visit?
- Do you or any member of your family have in mind a particular intention/reason/interest for visiting the Aquarium today?
- What do you expect your family to obtain from this visit to the Aquarium? Both specifically and in general.
- How long do you plan to be here?
- What do you plan to do afterwards? Probe: Right after the visit today? For your next weekend?
- What is your role within your family when you visit places such as this Aquarium? What kind of talking do you have with your children in settings like this? Probe: Do you explain, answer questions, read labels, ask questions, lead to discovery (authoritative answers; scaffolding; discovery).
- How do you decide where to go on your visits to places like this?
EXIT INTERVIEW:
Research Question #1: What is the nature and character of parents'/guardians' learning within a family group context, while visiting an aquarium?

- In general terms, how would you describe your visit to the Aquarium?
- Were there any special moments for you or your children during this visit? Probe: Why was it special?
- What particular exhibit or location stands out for you? And for your family? Why do you think this particular place/exhibit came to your mind? What happened there?
- What do you think you have gained from this visit to the Aquarium? What do you think your children have gained from this visit to the Aquarium? Probe: In terms of knowledge, attitude, emotion, aesthetics. Have you learned anything from this visit?
- What did the experience offer you as a family group? And as an individual?

Research Question #2: Do family groups visit aquariums with predefined agendas? In what ways do these agendas affect group learning?

- Who decided where to go during this visit? How did you behave? What kind of talking did you and your family engage in?
- During the visit, did you or your children develop a particular interest for any exhibits or gallery in the Aquarium? If yes, In what ways do you think that interest shaped the visit for the rest of the family?
- Were there any other factors that may have altered your initial expectations for the visit? Probe: Weather, mood?

Wrap-up Question

- Do you think that the conversation we had today made you think about the Aquarium and your personal experiences in some way that is new or useful for you and your family?
FOLLOW UP INTERVIEW:

Research Question #3: How and to what extent is group knowledge and understanding connected with the aquarium visit, evidenced in other contexts?

- In the past two/three weeks, what thoughts in relation to the visit to the Aquarium have you had?
- After your visit to the Vancouver Aquarium, have you and your family engaged in conversations or activities related to it? What were they?
- Can you recall any particular situation when the Aquarium experience was linked in some ways to any other context or activity by you or your kids? Probe: Like at home, or at school?
- What have you seen/read/thought/experienced that could be directly or remotely connected to the visit to the Aquarium? Probe: Link to specific examples of activities: family reading, TV programs.
- Have you or any of your family members developed any particular interest for a future visit to the Aquarium as a result of your experience there 2 weeks ago?
- Do you have in mind any particular activity you would like to do with your family that could be connected to the Aquarium experience?
Appendix F. Parents'/guardians’ declared and observed roles during the visit to the aquarium

Table A. Frequency of the claimed and observed roles

<table>
<thead>
<tr>
<th>Declared roles (before the visit)</th>
<th>Frequency</th>
<th>Declared roles (after the visit)</th>
<th>Frequency</th>
<th>Observed roles (during the visit)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain, educational talk</td>
<td>10</td>
<td>Explain</td>
<td>7</td>
<td>Point/show</td>
<td>13</td>
</tr>
<tr>
<td>Answer questions</td>
<td>6</td>
<td>Point out interesting things</td>
<td>6</td>
<td>Talk</td>
<td>13</td>
</tr>
<tr>
<td>Let the children lead</td>
<td>5</td>
<td>Read for the children</td>
<td>6</td>
<td>Help the children reach/use the exhibits</td>
<td>11</td>
</tr>
<tr>
<td>Educate themselves</td>
<td>3</td>
<td>Let the children lead/develop their own interests</td>
<td>3</td>
<td>Read labels for themselves</td>
<td>10</td>
</tr>
<tr>
<td>Expose the children to the information and reinforce that</td>
<td>3</td>
<td>Help the children interact/explore</td>
<td>3</td>
<td>Adults lead</td>
<td>9</td>
</tr>
<tr>
<td>Make sure children see what they want to see</td>
<td>3</td>
<td>Answer questions/concerns</td>
<td>2</td>
<td>Children lead</td>
<td>10</td>
</tr>
<tr>
<td>Point out interesting things</td>
<td>3</td>
<td>Facilitate the connection to prior experiences</td>
<td>2</td>
<td>Observe/interact with exhibits by themselves</td>
<td>9</td>
</tr>
<tr>
<td>Behaviour watch out</td>
<td>2</td>
<td>Keep it simple</td>
<td>2</td>
<td>Negotiate where to go with the children</td>
<td>7</td>
</tr>
<tr>
<td>Let the children explore</td>
<td>2</td>
<td>Make sure the children stop and look carefully</td>
<td>2</td>
<td>Adults negotiate where to go</td>
<td>5</td>
</tr>
<tr>
<td>Read out for the children</td>
<td>2</td>
<td>Teach respect for the environment</td>
<td>2</td>
<td>Play with the children</td>
<td>5</td>
</tr>
<tr>
<td>Ask the children questions</td>
<td>1</td>
<td>Talk about what parents already knew</td>
<td>1</td>
<td>Read labels out loud</td>
<td>5</td>
</tr>
<tr>
<td>Facilitate connections to prior experiences</td>
<td>1</td>
<td></td>
<td></td>
<td>Logistics</td>
<td>4</td>
</tr>
<tr>
<td>Guide the children through the aquarium</td>
<td>1</td>
<td></td>
<td></td>
<td>Ask questions to interpreters</td>
<td>2</td>
</tr>
<tr>
<td>Logistics</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play talk</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

159
### Table B. Claimed roles (PREV) by family

<table>
<thead>
<tr>
<th>Declared roles (before the visit)</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>G4</th>
<th>G5</th>
<th>G6</th>
<th>G7</th>
<th>G8</th>
<th>G9</th>
<th>G10</th>
<th>G11</th>
<th>G12</th>
<th>G13</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain, educational talk</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>10</td>
</tr>
<tr>
<td>Answer questions</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>6</td>
</tr>
<tr>
<td>Expose the children to the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>information and reinforce that</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Point out interesting things</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Play talk</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Read out for the children</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Ask the children questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
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<td>Facilitate connections to prior</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>experiences</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Let the children lead</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>Make sure children see what</td>
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<tr>
<td>they want to see</td>
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<td>Guide the children through the</td>
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Table C. Perceived roles (POSTV) by family

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<th>G5</th>
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<th>G7</th>
<th>G8</th>
<th>G9</th>
<th>G10</th>
<th>G11</th>
<th>G12</th>
<th>G13</th>
<th>Total</th>
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<td>Point out interesting things</td>
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<tr>
<td>Answer questions/concerns</td>
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<td>prior experiences</td>
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<td>Teach respect for the environment</td>
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<td>Talk about what parents</td>
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<td>already knew</td>
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</tr>
<tr>
<td>Let the children lead/develop</td>
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<td>their own interests</td>
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<td>Help the children</td>
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<tr>
<td>interact/explore</td>
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</tr>
<tr>
<td>Make sure the children stop</td>
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<td></td>
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<td>x</td>
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<td>and look carefully</td>
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Table D. Observed roles (OBSV) by family

<table>
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<tr>
<th>Observed roles (during the visit)</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>G4</th>
<th>G5</th>
<th>G6</th>
<th>G7</th>
<th>G8</th>
<th>G9</th>
<th>G10</th>
<th>G11</th>
<th>G12</th>
<th>G13</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point/show</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<td>Talk</td>
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<td>x</td>
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<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Read labels out loud</td>
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<tr>
<td>Children lead</td>
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<td>x</td>
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<td>x</td>
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<tr>
<td>Read labels for themselves</td>
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<td>x</td>
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<td>x</td>
<td>x</td>
<td>x</td>
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<td>10</td>
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<tr>
<td>Observe/interact with exhibits by themselves</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td></td>
<td>9</td>
</tr>
<tr>
<td>Ask questions to interpreters</td>
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<td>2</td>
</tr>
<tr>
<td>Help the children reach/use the exhibits</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Play with the children</td>
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<td>x</td>
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<td>5</td>
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<tr>
<td>Logistics</td>
<td>x</td>
<td>x</td>
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<td></td>
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<td>4</td>
</tr>
<tr>
<td>Adults lead</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>9</td>
</tr>
<tr>
<td>Adults negotiate where to go</td>
<td></td>
<td></td>
<td>x</td>
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</tr>
<tr>
<td>Negotiate where to go with the children</td>
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<td>x</td>
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<td>7</td>
</tr>
<tr>
<td>Take pictures</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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Appendix G. Case of one family’s (G6) entry agenda, exit comments on the factors that shaped their visit, and on-site observations.

<table>
<thead>
<tr>
<th>Entry agenda (PREV)</th>
<th>Factors shaping the entry agenda (POSTV)</th>
<th>Observations (OBSV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6: You have a web page that I checked out on the internet before we came here, and I know he’s going to like seeing all the fish, and then the third thing is that I think there is some kind of play area for little kids where they can touch stuff, so I want him to do that</td>
<td>M6: Oh, we had a good time, we enjoyed it a lot</td>
<td>Parents chose galleries and tried to engage the boy in certain exhibits, but he ran or pointed to other exhibits and the adults followed him. This was observed many times during their visit</td>
</tr>
<tr>
<td>M6: I know they have some larger animals here and that’s what I really want him to see. I’d really like to see the tropical fish. And I’m really looking forward to the touch-pools, I saw there were some of those here and I figure we can touch stuff there</td>
<td>M6: I know that my husband always has a sort of a checklist of things to see and that he wanted Sean to hit the tidal-pools. And I knew they will only be open at certain time, so we really wanted to be available and see them</td>
<td>Boy wanted to play at the touch pool but mum and dad took him upstairs</td>
</tr>
<tr>
<td>M6: We just tried to go in this sort of natural flow, like you go for one thing and then you are kind of open for the next one and you kind of go for that. We keep an eye in the time for when the shows were. So it was like ‘we have 10 minutes before the next show’ and go for the closest thing for those 10 minutes. We were trying to see everything, but not necessarily. We wanted to hit the shows and the key exhibits</td>
<td>M6: And then my husband and I were talking and said ‘hey, if you really want to see the shows, I can watch out for Sean for some bit’ and then Sean really likes to run right now, so it was kind of difficult. We could see a lot of stuff, but not all of it</td>
<td>Mum and dad pointed/showed and talked to the boy during the visit</td>
</tr>
<tr>
<td>M6: I really would like to do all of the touch pools, so that was a shame that we couldn’t do that</td>
<td>M6: I really would like to do all of the touch pools, so that was a shame that we couldn’t do that</td>
<td>Family saw the dolphin show. Afterwards, the adults negotiate where to go and proceed with their visit</td>
</tr>
</tbody>
</table>

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These excerpts of the complete transcript of the PREV, POSTV and OBSV corresponding to only one family group (G 6), exemplify the way in which an entry agenda is shaped by a number of on-site factors, giving rise to an observed agenda that is both consistent with the entry agenda and includes emerging elements. The first column shows that for M6, the main agenda was to offer her boy an enjoyable experience that principally included interaction with touch pools, play area for children, and the general experience of seeing the fish and the large animals. At the end of the visit (second column), when asked what factors had influenced the way in which they had conducted their visit, she pointed out show times, tidal pool opening times, and the short endurance and restlessness of her boy as the main shaping factors.

In this case, the extrinsic factors influenced the prior agenda at two levels: strategy and fulfillment. On the one hand, the on-site factors cited above made the family move within galleries at a certain pace and direction. On the other hand, the age of their child prevented the adults from fully appreciating the shows and actually visiting the tidal pools that were mentioned more than once during the PREV as a target exhibit.

It was interesting that this family did not mention the shows as being in the agenda for the day, and despite of this, they not only did at least two of them as evidenced by the observations, but the show times seemed to really shape the pace of their visit. This indicates that shows could have emerged as on-site agendas that clearly delineated their aquarium experience.

The observations confirmed that the family did not engage in interacting with tidal pools even when at one point the boy seemed interested on them, and they did not spend time at the playground either. Nevertheless, they fulfilled the objective of seeing the large animals and fish. Also, according to they own statements at the end of the visit and the observations made, this family group fulfilled their recreation agenda.