VISITORS' CONCEPTIONS AND SELF-REPORT OF LEARNING IN MUSEUMS

by

Gabrielle Andrée Trépanier

B.A., The University of Ottawa, 1998
M.M.ST., The University of Toronto, 2001

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

in

The Faculty of Graduate and Postdoctoral Studies

(Curriculum Studies)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

February, 2015

Abstract

This dissertation questions and examines conceptions of learning underlying museum visitors' responses to a self-report of learning questionnaire. The central problem addressed by this study is a lack of significant engagement in the museum visitor studies literature with the methodological implications of self-report methods; in particular their sensitivity to contextual factors and the ways in which instruments can themselves shape respondents' accounting practices. The methods of investigation were grounded in phenomenographic research, an interpretivist approach oriented towards the description of how phenomena are conceptualized (Marton & Booth, 1997) and expressed (Anderberg, 2000; Säljö, 1997). Participants were invited to visit one of two museums, followed immediately by a self-report questionnaire. Once completed, a semi-directed interview was initiated to explore with respondents, as best possible, situated conceptions of learning used in the process of responding to the questionnaire. Through a hermeneutic process of transcription, analysis, and iterative categorizations 24 conceptions of learning were identified and organized into six main categories: learning as consuming facts and information, learning as cognitive acts, learning as embodied experiences, learning as behaviours and actions, learning as serendipitous, and learning as knowing about self and others. Discursive analyses of the transcripts also identified accounting practices and visitor self-concepts turning on low visitor responsibility for learning and the granting of considerable agency to the built environment. As a whole, the results affirm the need to include interpretivist and critical perspectives on the use of self-report methods within visitor studies and point to specific areas where more investigation is needed.

Preface

Ethics approval for this research (project title: The Self-Report and Self-Assessment of Learning in Museums) was provided by the UBC Behavioural Research Ethics Board, certificate number: *H11-01391*. Under the supervision of my supervisor and doctoral committee, I designed this study, and conducted all data collection and analysis of the research data.

Table of Contents

List of Tables

List of Figures

Glossary

Accounts: written or spoken stories that explain conduct or generally pertain to reasons, causes, or motives.

Accounting practices: ways of talking about different things to different people. These function as conceptual resources for organising one's contributions to situated discourse.

Behaviourism: a theory of learning defined in terms of conditioning and the incremental acquisition of skills through organized accumulations of stimulus-response associations.

Bias: conditions that systematically make answers different from their true, or at least more accurate, values.

Cognitive validity: the degree of correspondence between the intended meanings of questionnaire items and respondents' interpretations.

Conceptions: qualitative relationships between an individual and a phenomenon, commonly defined as ways of seeing something.

Constructivism: a theory of learning which posits that individuals actively construct their own understandings, adjusting their mental models to accommodate new encounters.

Discourse: bodies of ideas, ideologies, as well as working attitudes, modes of address, and courses of action within specific social practices.

Experienced contexts: what study participants experience as relevant for making sense of the research activity to which they are contributing. These include memories of past experiences and subtle or ephemeral aspects of the research settings.

Instruments (data collection): written tools employed in procuring data for analysis within a research methodology.

Informal learning: a label used to differentiate between museums and schools, referencing non-classroom settings, the absence of an explicit curriculum, and the inability to issue diplomas.

Items (in questionnaires): concise statements, questions, and listed potential answers used to elicit information from respondents.

Learning outcomes (museums): stated or anticipated results of visitors' engagements with museum contents; often separated into cognitive, affective, and behavioural categories.

Mediated: objects and/or subjects in relations that pass through, or are dependent upon, an intervening agency.

Outcome space: an explanation of structural relationships between different ways of making sense of a phenomenon in a given context.

Personal meaning maps: concept diagrams drawn by visitors before entering an exhibition, and amended afterwards in collaboration with a researcher.

Prepared contexts: pre-planned situations, instruments, and/or stimuli presented to study participants for the purposes of data collection.

Recursive: a characteristic of self-similar and self-repeating processes; a looping structure that embeds new or added meanings with each loop.

Self-report methods: the conveying of information by individuals about their thoughts, actions, beliefs, feelings, or mental states verbally, in writing, or in symbols and pictures

Self-assessment: the independent judgement of the learner on their own competencies or achievements on the basis of self-determined criteria.

Sociocultural learning: a learning theory embedded in social practices, positing that one is always learning through and amid cultural forces; developing skills, knowledge, and identity concurrently.

Situated learning: learning theorized as a social process in which knowledge is co-constructed, situated in a specific context, and embedded within particular social and physical environments.

Visitor-learners: coined for the present research study, visitor-learners references conceptions of museum-goers as individuals engaged in museum learning.

Visitor-participants: coined for the present research study, visitor-participants references museum-goers as they are in the process of contributing to research or evaluation activities.

Visitor studies: a field of research and evaluation focused on museum visitors and their experiences; often but not exclusively related to questions about museum-based learning.

Acknowledgements

My doctoral supervisor Dr. David Anderson and committee members Dr. Samson Nashon and Dr. Donal O'Donoghue have been exceptionally supportive over the past years. Their insights, perspectives, comments, and always thoughtful guidance were instrumental and I am deeply grateful.

I also owe much to Tom Szyc and to my colleagues and friends at the Canada Science and Technology Museums Corporation; their assistance, time, patience, humour, and timely much needed prodding have been invaluable. I am especially indebted to Marie-Sophie Desaulniers, Leila Corrigan, Monique Horth, Stephen Quick, Fraser McDonald, Chris Terry, Dr. David Pantalony, Brian Dewalt, Anna Adamek and the front-line teams at both the Canada Science and Technology Museum and the Canada Aviation and Space Museum. To Patrick Milot I also offer a (very) long-ago promised “gros merci.”

I was also blessed through the research process by participants whose intelligence, candor in expressing what was great and not-so-great about their visit, and willingness to contribute time and energy to this study were to my mind quite remarkable.

Lastly, I also wish to acknowledge the University of British Columbia and The History Education Network for their financial support.

To Barbara Louise, my mother, and Joseph Louis Pierre, my father. For your love and generosity.

Chapter 1 Introduction

No longer perceiving themselves as solely dedicated to collecting and researching material culture, contemporary Western museums[1] operate at the intersection of education, leisure, culture, and tourism (Grek, 2009). As such, arguments are often made that museums must strive to be visitor-focused and to understand their visitors as clients, as learners, as individuals, and as members of different ethnic, social, and class-based groups (Dawson & Jensen, 2011; Hein, 1998; Rennie & Johnston, 2004; Weil, 1999; Wells & Butler, 2002). In particular, Hein (1998, p. 3) stated that the "need to consider what meaning visitors make of their museum experience comes from two different sources: one is the increasing importance of the educational role of museums; the other is the increasing pressure on museums to justify their existence."

At present, these needs are addressed by a community of researchers interested in museums as rich environments for the study of learning, as well as a community of museum evaluators who assess the outcomes of museums' efforts in order to inform the development of new exhibitions and programs. These researchers use a variety of methods, the popularity of which wax and wane over time as new ideas emerge, and as the social and cognitive sciences continue to evolve. Once firmly at the periphery of visitor research, self-report methods are now commonplace; used extensively in scholarly research on learning in museums (Allen, 2002; Anderson, Storksdieck, & Spock, 2007; Bell, Lewenstein, Shouse, & Feder, 2009; Ellenbogen,

[1] In the broadest sense "museums" includes zoos, science centres, art galleries, aquariums, living history sites, and nature-related sites like botanical gardens or nature interpretive centres. While not all of these institutions actively collect art, natural specimens, or artefacts, acquisition and preservation are still important activities for many museums.

2002), in exhibition evaluations, in market research, and in various efforts to be ‘visitor centric’ (Falk, Bronnenkant, & Heimlich, 2008; Weil, 1999; Wells & Butler, 2002).

However, despite their wide use the nature of these methods and the assumptions underlying them are rarely discussed in the visitor studies literature, leaving a gap between practical usage and the theoretical grounding of self-report methods. It is this gap that situates this study. Going forward, the aim is to explore this area by the light of visitors’ perceptions of both learning in museums and their own responses to a self-report instrument.

1.1 Background

My interest in this topic stems from personal experiences gained by working in various museums as an audience researcher/evaluator. In that capacity I frequently employ self-report data to assess or better understand visitors’ museum experiences, including what if anything was learned. Early in this career, I approached self-report methods quite uncritically, making the common assumption that individuals know their thoughts and feelings and can report on them with accuracy and candour (Schwarz, 2012). Specific to self-reports and learning, this translated to a concomitant assumption, described succinctly by Karabenick et al. (2007), that learners are sufficiently aware of their own processes and outcomes to be able to discuss and describe them.

A desire to question self-reports as they relate to assessments of learning in museums grew out of assuming the responsibility of managing visitor research for three museums located in Ottawa, Ontario. Inheriting a long-running program of yearly audience surveys that used the same self-report questionnaire at each site, I became increasingly curious about whether or not items such as “I learned something new today” meant the same thing to respondents at different museums, and whether similar criteria and thought processes were at play in dissimilar

environments. Moreover, I also became aware that the widespread use of self-report methods in museums has only rarely inspired explicit attempts to understand their nature.

1.2 Significance

Looking outside museum-based studies, this questioning is supported by the literature on self-reporting in both social and psychological research. Indeed, from a variety of perspectives, studies have demonstrated that self-reports carry with them important inexactitudes, idiosyncrasies, and complexities. For instance, researchers have noted many ways in which survey respondents can misinterpret questions, response items, or their very own memories. In interview settings, participants may take unintended cues from the data collection environment, making it more difficult to understand respondents' point of view (Denzin & Lincoln, 2011; Fleming, 1986; Fontana & Frey, 2005; Paulhus & Vazire, 2007; Procter, 2001b; Säljö, 1997; Schwandt, 2000; Schwarz, Oyserman, & Peytcheva, 2010; Simmons, 2001; Tourangeau & Yan, 2007).

However, while museum scholars have devoted considerable thought to the contextual, linguistic, and individuated nature of museum learning (Allen, 2002; Anderson, Lucas, & Ginns, 2003; Brizeño-Garzon, Anderson, & Anderson, 2007a; Hein, 1998; Leinhardt & Knutson, 2004; Phipps, 2007; Rennie & Johnston, 2004), inquiries of a similar nature have not been made into visitors' responding processes, their self-reports of learning, and how they perceive the instruments and questions used to gather self-reports. This is worth investigating, as the pervasive use of self-report methods is likely to continue in both visitor studies and in informal learning research (Bell et al., 2009) as long as evidence of museum learning is sought by those who fund and work in these institutions (Hooper-Greenhill, 2007; Pekarik, 2010; Rennie & Johnston, 2004).

1.3 Theoretical Underpinnings

This study is grounded in an interpretivist epistemology, meaning that knowledge is seen as constructed rather than discovered (Fay, 1996). The study's theoretical frame draws on the concept of intentionality, a theory of mind that argues the relational nature of mental processes; a perspective usually summarized by the idea that all thinking is always (and already) *thinking about* something. Specifically, the study employs an intentional-expressive theory of the relationship between thoughts, conceptions, and their expression in language. This posits that 'raw' thought is never fully transferable into language, and assumes that once expressed conceptions reflect the physical and social settings of their emergence (Anderberg, 2000; Säljö, 1997).

In a similar vein, this study employs a theory of learning as a situated social practice, meaning that learning is firstly seen as a way of being in, and engaging with, the social and physical world; one that is mediated, recursive, and inseparable from its contexts. This way of thinking views learners (be they students, apprentices, or museum-goers) as cultural and historical agents, and places the transformation of identity at the centre of learning (Dawson & Jensen, 2011; Ellsworth, 2005; Lave & Wenger, 1991; Niewolny & Wilson, 2009).

1.4 Methodological Approach

A phenomenographic research approach guides this inquiry, meaning that data collection and analysis were directed at understanding how phenomena, in this instance 'museum learning', are conceptualized (Marton & Booth, 1997) and expressed (Anderberg, 2000; Säljö, 1997) by others. A qualitative research practice, phenomenography works inductively, beginning with transcripts of respondents' accounts and passing through successive waves of hermeneutical analysis to detect patterns and dissonances within the pool of collected statements. These

eventually form an ‘outcome space’, meaning an elucidation of relationships between conceptions, i.e., ways of making sense of a phenomenon in a given context (Åkerlind, 2005, p. 322).

This methodology was selected because of its focus on the multiple ways in which something can be perceived by individuals. Moreover, by the light of ideas presented by Anderberg (2000), Adawi et al. (2001), and Säljö (1997) phenomenographic practices can help researchers to reflect on multiple levels of context at play in participants’ self-reports, and in subsequent accounts of the reasons behind their answers.

1.5 Organization of the Dissertation

This dissertation contains six chapters, including this introduction. Chapter 2 will address the literature surrounding self-reports in museums and in the wider interdisciplinary literature. These provide context for the study’s research questions. Chapter 3 explores both the theoretical frames and the phenomenographic methodology that guided data collection and analyses. Chapter 4 presents the results of data assembled through self-completed questionnaires and phenomenographic interviews. This includes a review of questionnaire findings, the phenomenographic outcome space, and a discursive analysis of participants’ accounting practices relative to their learning self-reports. Chapter 5 provides a discussion of the findings in relation to the study’s theoretical and methodological frames. Finally, Chapter 6 concludes the dissertation by summarizing key outcomes, and the study’s limitations, implications, and recommendations.

Chapter 2 Literature Review

The following literature review is divided into three sections. The first addresses the general countenance of museum learning research, describing the field of visitor studies, significant theories of learning, and depictions of museum goers as visitor-learners. The second section provides an overview of self-report methods and the assumptions underlying them in positivist, postpositivist, and interpretivist research paradigms, with a particular focus on issues of context. These paradigms are highlighted due to their prevalence in visitor studies. Finally, gaps in the literature addressing the self-reporting of learning in museums are noted and related to this study's research questions.

2.1 Researching Learning in Museums

This section contains an overview of the field of visitor studies, the theoretical frames guiding the investigation of learning in museums, and how both evidence and the visitor 'as learner' are constructed and positioned in the literature. As a whole, these provide context for the learning self-report practices explored in section 2.2.

2.1.1 Visitor studies

While empirical studies of museum visitors can be found as early as the 1930s, a distinct field of research and evaluation focused on visitors and their experiences only began to cohere in the 1960s (Adams, 2012). While the border between research and evaluation is quite porous, Phipps (2007, p. 6) defines evaluation as seeking "to inform the use of the particular program or exhibition in question" and research as examining "a particular learning situation with an eye toward advancing the field with knowledge that is applicable in a broader range of situations."

Staunchly positivistic and behaviourist in the past, the present-day field of visitor studies is fairly diverse. Contemporary practices draw from educational and cognitive psychology, formal and informal science learning, market research, ethnography, curriculum and assessment theories, cultural theory, sociology, and epidemiology (Bell et al., 2009; Dawson & Jensen, 2011; Ellenbogen, 2002; Falk & Needham, 2011; Hood, 1993; Lindauer, 2004). Research activities are typically carried out on the museum gallery floor. Commonly used methods include self-report questionnaires and interviews, unobtrusive tracking of visitors' movements through exhibitions, and recordings of visitors' conversations (Allen, 2002; Hein, 1998; Wells & Butler, 2002). Less frequently, researchers have also employed purpose-built labs for recording talk and behaviour (Gutwill & Allen, 2010), used survey methodology to look for museums' impacts at the community level (Falk & Needham, 2011; Scott, 2003), and produced ethnographic accounts of the place of museums in people's lives (Ellenbogen, 2002). Studies occur in all types of institutions however science-related organizations such as zoos, aquariums, nature centres, and science centres continue to be especially significant contributors (Adams, 2012; Anderson & Ellenbogen, 2012; Dawson & Jensen, 2011; Phipps, 2007).

Still relatively young, visitor studies are often criticised for lacking shared and robust models for the study of museum learning (Hooper-Greenhill, 2007; Pekarik, Schreiber, Hanemann, Richmond, & Mogel, 2014) and for a tendency to provide findings about visitor learning without properly articulating theoretical frames and methodological implications (Anderson & Ellenbogen, 2012; Dawson & Jensen, 2011). It is the later of these issues that this research hopes to address.

2.1.2 Museums and visitor learning theories

As it occurs in museums, learning is often described as 'informal' (Dawson & Jensen, 2011; Koran, Koran, & Foster, 1988; Schauble, Leinhardt, & Martin, 1997). Though commonly used, both the exact meaning and the usefulness of this term are debated (Garcia, 2012; Smith, 2008). For instance, in the science learning literature 'informal' can signify *all* learning that happens outside of the classroom, learning in structured non-school settings like science clubs or science centres, or learning in settings with no underlying educational intentions, such as one's backyard (Anderson & Ellenbogen, 2012). Specific to museums, Hein (1998) contended that this label is at best administrative; referencing non-classroom settings, the absence of an explicit curriculum, and the inability to issue diplomas. Beyond these, Hein stressed that 'informal' distinguishes neither museums' pedagogical characteristics nor the quality of learning that transpires in those environments. Closer to the present, Smith (2008) and Anderson and Ellenbogen (2012) argued that the application of formal/informal labels can be somewhat arbitrary and (especially pertinent to my own research interests) risk reducing a complex phenomenon down to an oversimplified binary.

Indeed, for scholars and educators the nature of learning and what counts as evidence of its occurrence depend heavily on paradigmatic[2] views and their associated theories (Anderson & Ellenbogen, 2012; Hein, 1998). Within visitor studies, three theoretical views of learning are especially influential. In chronological order these are behaviourism, constructivism, and

[2] Briefly defined, paradigms are evolving complexes of assumptions about the social and natural world that inform and legitimize research questions and practices. These include ontological assumptions about truth and reality as well as epistemological beliefs about the nature of knowledge (Bird, 2013; Creswell, 1994).

sociocultural learning. Each is briefly summarized here while their methodological implications are addressed in section 2.2.

Behaviourism: Early museum learning researchers (1930s-1970s) espoused behaviourist theories almost exclusively. Grounded in the work of psychologist B.F. Skinner (1904-1990), this view likens learning to conditioning and to the incremental acquisition of skills through organized accumulations of stimulus-response associations (Bell et al., 2009). In museums, this perspective translates to a focus on learning behaviours (e.g., reading or looking at displays) and the attainment by visitors of pre-determined outcomes or end goals. This privileges transmission models of learning and the argument that learning can be studied via measurements (e.g., time spent reading text panels) without needing to reference mental processes (Graham, 2010). In exhibition evaluations, Lindauer (2005) describes the behaviourist approach as a 'cause-and-effect' model, meaning that: "attending an exhibit will *cause* visitors to acquire *particular* knowledge or information" (p.145, italics are mine).

Constructivism: Constructivist views of learning came to prominence in visitor studies through the 1980s, arguing against transmission models and the absence of theories about visitors' cognitive processes (Hein, 1998; Jeffery, 2000). Constructivism posits that individuals actively construct understanding out of their own prior experiences, beliefs, and socially-constructed world views, generating mental models used to make sense of what surrounds them. As such, learning is seen as a process of adjusting one's mental models to accommodate new encounters (Driver, 1983; Hein, 1998). The emergence of this perspective in museums fostered the idea that learning involves visitors making their own meanings; resulting in outcomes that may or may not align with stated objectives (Anderson & Ellenbogen, 2012; Hein, 1998; Lindauer, 2004, 2005). This encouraged museums to look beyond behaviour and informational

gains and explore *with* visitors changes in attitudes, values, self-perceptions, and knowledge structures (Breakey, 2012; Harvey, Hudson, & Tureff, 2003; Hooper-Greenhill, 2007).

Sociocultural Learning: Sociocultural theories of learning began to emerge in museums in the 1990s. Constructivist in the sense that meaning is made and not just received, this view embeds learning in social practices, meaning that one is always learning through and amid cultural forces; developing skills, knowledge, and identity concurrently (Bell et al., 2009). Rooted in critical theory this perspective argues that learning is recursive[3], context-dependent, and mediated by tools, practices, symbols, and language. As such, contexts and contents of learning are essentially inseparable. For instance, even when the contents of a learning task (e.g., an artefact label) are identical, this perspective assumes that different cultural frames can make for different outcomes (Lave & Wenger, 1991; Niewolny & Wilson, 2009; Phipps, 2007; Rennie & Johnston, 2004).

As adapted for museum research, sociocultural theories build on the cognitive view while calling forth cultural and linguistic considerations. For example, Leinhardt and Knutson (2004) articulated a model of museum learning as "conversational elaboration[4]" which featured interconnected notions of identity, environment, and explanatory engagement. This supported theorizations of learning both *in* and *as* conversational practices, ones that make, modify, extend,

---

[3] Recursion, a characteristic of processes that are self-similar and self-repeating, can easily be mistaken for iteration as both ideas describe a looping structure, however whereas each iteration rejects all or part of what came before it, recursion embeds new or added meanings with each loop (Corballis, 2011).

[4] Meaning an elaboration of what is already known and understood, including extensions in detail and/or refinement of what visitors already appreciated along modifications of assumptions or presumptions (Leinhardt & Knutson, 2004, p.7).

and elaborate upon visitors' existing knowledge (Allen, 2002; Leinhardt & Knutson, 2004; Leinhardt, Tittle, & Knutson, 2000; Schauble et al., 1997).

At present, each of the learning theories described above productively frame investigations of visitor learning. Moreover, as will be discussed at greater length in section 2.2, the emergence of constructivist and sociocultural perspectives effectively placed visitors' own experiences, and therefore their spoken and written self-reports, at the core of much current research. Relative to that, it is worth noting the counter-points of scholars such as McManus (1993) and Ellsworth (2005) who contend that museums routinely provoke forms of learning quite difficult to access through language.

Illustrating the difficulties of elaborating research methods that capture the entirety of learning as it manifests among learners, McManus distinguished verbal thoughts from both *non-verbal thinking* and '*enactive representations*'. The former refers to the use of images, figures, or models to explain objects, while the latter describes thoughts about the manipulation of objects and "in general thinking about how things work" (McManus, 1993, p. 110)**.** More recently, Ellsworth (2005) argued that by virtue of their visual and physical natures, including displays of objects and carefully designed environments, museums' impacts are often non-linguistic. Indeed, for the author museums are at their most powerful and transformative potential when they successfully address visitors as 'embodied' beings; that is as sensing *bodies* not brains ambulating on a tripod. In that sense, learning as it unfolds in museums is imagined as equally 'in' the body and 'in' the mind. Lastly, for Ellsworth the awareness of deep learning, i.e., the realization that one is in the process of changing their view of the world, is a very much felt before it is known.

2.1.3 Evidence and the visitor-as-learner

Returning to more 'mainstream' views, the emergence in the 1980s-1990s of constructivist and sociocultural theories helped researchers and evaluators argue with increasing confidence that museum learning is a complex, situated, contextual, cultural, and personal phenomenon; one best conceptualized from the learner's point of view (Anderson et al., 2003, 2007; Anderson & Ellenbogen, 2012; Dawson & Jensen, 2011; Falk & Dierking, 2000; Hein, 1998; Munley, 1987; Pekarik, 2010; Rennie & Johnston, 2004). However, despite the particular emphasis placed on learning's many contextual[5] dimensions, interesting and long-standing tensions remain in the visitor studies literature where learners and 'proof' of learning are concerned.

In particular, tensions are discernable between discourses focused on learning as open, unpredictable, and difficult to measure, and the remaining desire to educate museum visitors about *specific* topics in science, art, or history (Allen, 2004; Weil, 1999) and provide evidence of such impacts[6] to stakeholders (Bell et al., 2009; Doering, 1999; Hein, 1998; Hooper-Greenhill, 2007). For Grek (2009) the presence of these forces means that that for contemporary exhibition developers, researchers, educators, advocates, and marketers[7]:

> (…) the ideal visitor is usually constructed as the individual who will pursue *independent and self-directed* learning in the museum. His/her experience has to be authentic, active and enjoyable; further, the more it fits in the learning *outcomes prescribed by the museum/gallery itself* the better. (…) all visitors, both traditional and

---

[5] For instance, Falk and Dierking (2000) proposed a model with personal, physical, and sociocultural contexts.

[6] Including but not limited to learning; for alternate examples see Packer (2008).

[7] For some authors, these tensions have been exacerbated by the presence of marketing in museums (Grek, 2009) and market research practices in visitor research (Dawson & Jensen, 2011).

non-traditional, interpret exhibitions according to their own personal frames of reference. (Grek, 2009, p. 204, italics are mine)

Not surprisingly then, the museum literature is replete with lists, models, typologies, and evaluation frameworks attempting to make sense of museum-goers and their experiences. Examples of typologies include the simplistic 'Streaker, Stroller, Scholar' trope (Underhill, 2000) and sociological profiles such as Hood's (1983) 'frequent, occasional, and non-visitors' and Falk, Bronnenkant, and Heimlich's (2008) Situated Visitor Identities[8]. Models include the Satisfying Experiences List[9] (Doering & Pekarik, 2002) and Pekarik's IPOP[10] theory of experience preference (Pekarik et al., 2014).

Frameworks describing outcomes and impacts tend to echo traditional curriculum planning and assessment practices, such as breaking learning into pre-defined subsets in the spirit of Bloom's cognitive, affective, and psychomotor domains[11] (Adams, 2012; Dawson & Jensen, 2011; Lindauer, 2004; Pekarik, 2010). Contemporary examples, used for planning, museum advocacy, and post-visit measurements include the UK's Generic Learning Outcomes (Hooper-Greenhill, 2007), the National Science Foundation's impact framework (Friedman, 2008), and

---

[8] Falk posited five situated identities: explorer, facilitator, experience seeker, professional/hobbyist, and recharger (previously called a *spiritual pilgrim*, see Falk et al., 2008). The model is designed to take into account how visitors construct meaningful experiences before, during, and after visits to cultural institutions.

[9] Built from conversations with museum goers, this lists experience types under four headings: objects, cognitive, introspective, and social experience.

[10] IPOP stands for Ideas, People, Objects, and Physical, which describe and cluster museum experience preferences, behaviour in galleries, and visitor satisfaction.

[11] For example, teams at the Canada Science and Technology Museums must provide cognitive, affective, and psychomotor objectives when planning exhibitions and educational programming.

the Learning Science in Informal Environments strands (Bell et al., 2009). Researchers critical of these efforts contend that they instrumentalise and oversimplify the richness of museum experiences in order to preserve the measurability of selected outcomes (Lindauer, 2005; Pekarik, 2010). Especially pertinent to this study, Dawson and Jensen argue that these frameworks perpetuate implicit, largely behaviourist, and a priori assumptions that:

> (…) the museum visit is a significant intervention in people's lives, and that this intervention will have an immediate, measurable effect that visitors can identify and self-report within the timescale of the visit itself. (2011, p. 130)

Such beliefs, according to the authors, limit the degree to which authentic and truly contextual understandings can emerge from visitor research[12]. When used in tandem with market research practices (audience segmentations in particular) Dawson and Jensen also contend that these models propagate reductive perceptions of visitors; slotting complex individuals into a limited number of pre-determined clusters of wants, attitudes, and expectations.

Thoughtful reflections on these issues are also found in Hooper-Greenhill's (2007) discussion of the Generic Learning Outcomes. This includes a clear-eyed listing of the highly variable experiences that fit under the term "learning"; a listing that also serves to illustrate some of the challenges inherent to conceptualizing museum learning from the visitor's points of view:

> Learning includes learning new things, using prior knowledge in new situations, and reinforcing what is already known. Learning may relate to formal education, or may be focused in the everyday. For many people, unless effort is involved, learning is not happening. But for educational theorists, learning does not necessarily have to be hard

[12] The authors argue in favour of participant observations and other qualitative ethnographic approaches.

> work. In addition, learning is not always positive —we can learn to be afraid, or to undervalue ourselves, or to misunderstand facts and their implications. Learning can be irregular and patchy, with ideas implanted when very young remaining to guide opinions much later in life. Finally, learning can sometimes happen without our being aware of it. (Hooper-Greenhill, 2007, p. 157)

Lastly, and worth keeping in mind through the remainder of this literature review, the prospects of finding ways to address learning with visitors that account for its multiple dimensions, its products and its processes, seem grim. Definitions of what 'counts' as learning can vary wildly and deeply among individuals and between museum researchers and potential study participants, as in the following:

> Implicitly, it [learning] is understood as something that is produced within formal educational contexts and something that is separate from everyday life. From this perspective, museums, archives and libraries are seen as offering something that is not 'learning'. 'Learning' (the acquisition of information, knowledge, understanding) may happen, but it is not really what is of prime importance. For example, listen to Will Alsop, an architect, as he describes his favourite museum as 'the stuff of dreams', but then goes on to describe learning as something with 'academic connotations', something other than what museums do best:
>
> Museums obviously have academic connotations, but on the other hand there is the joy in seeing something extraordinary that's not in day-to-day life. If you learn something *en route*, well that's great, but it is not a prerequisite.
>
> The value of museums in offering joy and inspiration is appreciated by the speaker, but this is seen as other than learning which is understood as synonymous with

‘academic’; by implication, factual, formal, requiring effort, and not what he wants in the museum. (Hooper-Greenhill, 2007, pp. 155–156, italics in original)

2.2 Self-Reports in Three Museum Learning Paradigms

Building on the ideas described above, this section examines self-report methods in the study and evaluation of learning in museums. This is broken down by three major paradigms which, taken together, frame most past and contemporary museum-based learning research. As suggested by Anderson and Ellenbogen (2012) most of the literature fits within positivist or interpretivist frames; however, Lindauer (2005), focusing primarily on exhibition evaluation, also teases out a third postpositivist paradigm.

Each of these is considered here in relation to methodological assumptions underlying the use of self-report methods in visitor studies. Relative to the learning theories explored above, constructivism and sociocultural learning are typically embedded within interpretivist or postpositivist paradigms (Lindauer, 2005; Rennie & Johnston, 2004). Behaviourist research may also subscribe to postpositivist perspectives (for example see Ross & Lukas, 2005) however the visitor studies canon also contains examples of behaviourist research embracing positivistic methodologies and ‘objective’ de-contextualized data (Anderson & Ellenbogen, 2012; Hein, 1998; Nichols, 1999).

2.2.1 Self-report methods

‘Methods’ signify specific strategies, instruments and procedures employed in the procurement, analysis, and reporting of data within a research methodology (Anderson et al., 2009, p.182). ‘Self-report methods’ refer to the conveying of information by individuals about their thoughts, actions, beliefs, feelings or mental states verbally, in writing, or in symbols and

pictures (Durbin, 2010). Used across the social sciences, self-report methods contribute to investigations of sociological, educational, and psychological phenomena. Across positivist and interpretivist paradigms, these methods rest on the assumption that individuals are the best source of information about their own lives and thoughts given that no one else has greater access (Denzin & Lincoln, 2011; Paulhus & Vazire, 2007).

In that they are built on quite ordinary acts, such as asking someone about their day, self-report methods can seem like highly accessible research practices. However, the following sections argue that they are in fact complex tools with their own histories and controversies. Indeed, in both qualitative and quantitative incarnations, self-reporting is the subject of considerable debate (Guba & Lincoln, 2005). An extensive literature now surrounds the practice, addressing its value and limitations –a comprehensive summary of which is well beyond the scope of this review (see: Denzin & Lincoln, 2005; Eva & Reghehr, 2008; Fleming, 1986; Fontana & Frey, 2005; Procter, 2001; Richardson, 1999; Schwandt, 2000; Schwarz, 2012; Tourangeau & Yan, 2007). Instead, themes from positivist, postpositivist, and interpretivist traditions are explored and their uses in education research and visitor studies are described. Selected areas illustrate the underlying logic of self-reports within each paradigm and draw out issues leading to the articulation of the study's research questions (section 2.3 page 31).

2.2.2 Learning self-reports and positivist research

Positivism is premised on the assumption that knowledge exists independently of knowers and that scientific methods of measurement, conceptually neutral and value-free, allow for the construction of objective explanations of phenomena (Bernstein, 1983; Crotty, 1998; Fontana & Frey, 2005). Common positivistic uses of self-report methods include surveys, which typically attempt to apply the attributes of a sample to a larger target population (Gilbert, 2001; Procter,

2001a) and psychological instruments that gather data about feelings, attitudes, and beliefs for the purpose of explaining human behaviour (Baumeister, Vohs, & Funder, 2007). In educational research, self-report and self-assessment[13] methods are used to gather information relating to students' cognitive, perceptual, and affective experiences. These serve investigations of phenomena such as "achievement and social goals, domain interest, self-concept of ability, epistemic beliefs, perception of classroom context, and incidences of metacognition while learning" (Karabenick et al., 2007, p. 144).

Key to the value of self-report data in positivistic inquiry is their validity, reliability, and the minimization of biases. Validity is the degree to which items (typically closed ended questions with pre-determined response options) measure what they are intended to measure, while reliability is the degree to which a given measure is reproducible and precise (Kugler et al., 2007). Biases are conditions that systematically make answers different from their theoretical 'true score', meaning the answer a 'perfect' reporter with 'perfect' knowledge would offer (Procter, 2001a). Some biases originate with respondents while others are attributed to instruments (Paulhus & Vazire, 2007; Procter, 2001b; Simmons, 2001; Tourangeau & Yan, 2007). Common respondent biases include *acquiescence*, or a tendency to always agree with statements (the opposite is to be "reactant"); *extreme responding*, which is a tendency to use the high or low ends of rating scales; and *social desirability bias* which includes conscious impression management and sub-conscious self-deception (Heerwig & McCabe, 2009; Paulhus & Vazire, 2007; Tourangeau & Yan, 2007). The list of possible instrument biases is very long (a

[13] Tassinari (2012, p. 27) defined self-assessment as the independent judgement of the learner on their own competencies or achievements on the basis of self-determined criteria.

good overview is provided in Podsakoff, MacKenzie, Podsakoff, & Lee, 2003). Examples include *item context effects*, meaning the misinterpretation of an item due to what preceded it; and *measurement context effects*, which are false relationships between variables produced by the time or place in which measures are obtained.

Although their use in educational research is wide spread, Karabenick et al .(2007) argue that studying learning via self-report and self-assessment methods present distinct challenges. For example, the authors question whether all students/respondents possess the necessary self-reflection skills as well as the ability to contend with abstract concepts. Similarly, in terms of self-assessments Dunning, Heath & Suls (2004) identified four major biases in the form of tendencies to rate oneself as above average, to over-estimate the likelihood of desirable events, to underestimate task-completion times, and to demonstrate undue confidence in the insightfulness of one's own judgments. Self-ratings of competency are also influenced by the perceived rarity of the skill in question. For instance, individuals tend to rate their juggling abilities as 'less than average', ignoring that most people are also poor jugglers, while rating their cycling skills as 'above average' despite the more common nature of that ability. Researchers interested in self-assessments of academic performance also argue that attempts to improve these methods by comparing students' predictions with performance on achievement tests have left gaps in understanding learners' perceptions of their own learning processes, and their capacity to identify their own strengths and weaknesses (Lew, Alwis, & Schmidt, 2010).

Early visitor studies (1930s-1970s) treated self-reports methods with significant reserve. For instance, in 1968 Anderson stated that interviews and questionnaires suffered from "particular deficiencies" that distorted experimental results (Anderson, 1968 cited in Nichols, 1999, p.129). Favoured methods, such as visitor tracking, allowed for the generation of objective and

decontextualized data sets, often reducing exhibitions into sets of variables to be isolated, quantified, and analysed statistically. While this suspicion has tempered considerably, concerns that self-reports are subjective and imprecise recur regularly (see also Bitgood, 1988; Lawrence, 1993; Ross & Lukas, 2005) as illustrated by the somewhat grudging acceptance in the quote below:

> Although self-report data are susceptible to various forms of bias on the part of the research participant, they are nonetheless frequently used in studying outcomes with affective and attitudinal components because of the subjective nature of these outcomes. (Bell et al., 2009, p. 59).

Positivistic evaluations are typically grounded in the goal-based designs of traditional curriculum planning and assessment practices (Lindauer, 2005; Pekarik, 2010). These rest on broadly behaviourist beliefs that learning's end products are sufficiently predictable to be assessed against pre-determined goals (Lindauer, 2004; McKernan, 2008; McManus, 1993; Pekarik, 2010). Informing research questions like "Did the exhibition effectively communicate the main idea?' typical protocols require a numerical definition of 'effective' (e.g. 80% of randomly surveyed visitors can articulate the main message) and a pre-defined coding scheme that allows researchers to count the number of 'correct' responses.

Typical criticisms of positivistic self-report methods are that instruments with rigid answer formats require respondents to work from the researchers' worldviews rather than their own. Moreover, when the objects of self-reports are themselves socially constructed and abstract, interpretivists such as Collins (2011, p. 166) argue that data are at best "inferences from the flow of internal dialogues and social conversations." A common critique in museums is that despite efforts to do otherwise, self-report methods orient researchers towards a narrow and short-term

definition of learning as the de-contextualized recall of facts. Especially pertinent to evaluations, several authors have also argued that instruments reliant on close-ended (i.e., list-like) items leave unexpected impacts unexplored (Adams, 2012; Dawson & Jensen, 2011; Lindauer, 2005; Pekarik, 2010; Phipps, 2007).

2.2.3 Learning self-reports and postpositivist research

Influenced by the philosophies of Kuhn (1922-1996), Popper (1902-1994), and Feyerbend (1924-1994), postpositivist perspectives set aside the idea that questionnaires or interviews can access full and objective truths (Crotty, 1998; Denzin & Lincoln, 2005) working instead from the assumption that "(…) every aspect of human cognition, emotion, motivation, and behavior is situated and highly context-sensitive, thwarting attempts to understand it in a decontextualized way" (Schwarz, 2012). Such views challenge the idea that attitudes[14] and self-perceptions are knowable, stable across settings, and measurable. Reflecting on this from the perspective of personality assessment, Paulhus & Vazire (2007) state:

> It is often assumed that an honest self-disclosure is sufficient to yield an accurate self-description that can outperform consensus and predict future behavior. According to this view, only response biases stand in the way of accuracy. The assumption is that there is only one "truth" about an individual, a truth that is fully available to that individual. In fact, there are good reasons to believe otherwise. (p.232)

[14] Procter (2001b) defines attitudes as predispositions to behave in certain ways, but acknowledges issues with the construct such as the lack of direct relationships between verbal and non-verbal indicators of an attitude.

Indeed, methodologists such as Schwarz (2007), Tourangeau (2003), and Karabenick et al. (2007) have articulated a number of ways in which context and the imprecisions of language[15] are constantly at play in participants' responses. For instance, Schwarz (2012, p. 2) describes the interpretation of questionnaire items as instances of "pragmatic inferences," meaning quick situational judgements about what questions are "really" asking. These draw from several contextual features, including the physical setting (e.g., an office vs. a lab), the researchers' affiliations, and the amount of time elapsed between emotional states and questions about them. Tourangeau (2003) also investigated cultural influences on item interpretation, arguing that conversational habits (which for the author reflect both social and linguistic norms) influence how questions are posed, which topics are deemed sensitive, and what answers are considered appropriate, a response process also known as self-editing.

Drawing on the cognitive sciences, surveys methodologists also explored the significant information processing required of study participants faced with self-report instruments. These studies rest on the idea that the act of responding sets off a sequence of cognitive tasks requiring respondents to take in new information, make sense of it, store those meanings in their working memory, access stored memories relevant to the items so interpreted, and then consider these memories against the list of response options provided by researchers. From that perspective, data accuracy is vulnerable to problems remembering relevant information, to flawed estimation strategies, and to difficulties mapping recalled feelings onto response options (Karabenick et al., 2007; Schwarz, Oyserman, & Peytcheva, 2010; Tourangeau, 2003). Relative to such concerns, Karabenick et al. (2007) proposed adding to questionnaire development practices the assessment

[15] For example, the word 'drug' will have one range of meanings in a survey on allergies and another altogether in a survey on crime.

of ‘cognitive validity’, i.e., the degree of correspondence between *intended* meanings of questions (what the researcher *meant* to ask) and respondents’ situated interpretations.

In visitor studies, postpositivism gained ground through the 1980s, coming to light alongside of constructivism (Lindauer, 2005). Broadened definitions of learning required tools aimed at changes in affect, attitude, self-perceptions, and knowledge structures (Breakey, 2012; Harvey et al., 2003; Hooper-Greenhill, 2007). These included interviews and written self-report tools more suited to the individuality and subjectivity emphasized in constructivist models (Wells & Butler, 2002). For example, Bruni, Fraser, and Schultz (2008) used a graphical scale containing seven pairs of increasingly overlapping circles labeled ‘self’ and ‘nature’ to measure pre-post changes in the inclusion of nature in representations of self. For Lindauer (2005) ‘personal meaning maps’[16] are particularly representative of postpositivist and constructivist inquiry in museums, in that they gather evidence of conceptual changes using respondents’ own conceptual schemes.

2.2.4 Learning self-reports and interpretivist research

Interpretivism is a theoretical perspective on social research focused on “seeing things from the perspective of those being studied” (Fielding, 2001, p. 147). Its roots trace back to nineteenth-century debates over the differences between natural and social reality, and whether both could be investigated using the same scientific principles (Bernstein, 1983; Crotty, 1998; Guba & Lincoln, 2005). For Schwandt (2000) interpretivism is primarily concerned with *reconstructing* (rather than discovering) the self-understandings of actors engaged in particular actions. This distinction is important. While interpretivism directs researchers towards

[16] Concept diagrams drawn by visitors before entering an exhibition, and amended afterwards in collaboration with a researcher

understanding individuals and their subjective experiences, the meaning of an action is never just what an actor intended (Fay, 1996; Schwandt, 2000). Meaning is a broad intersectional concept, with individual, situational, social, cultural, and historical dimensions (Crotty, 1998; Fay, 1996). In terms of methodologies, Schwandt (2000) describes interpretivism as essentially hermeneutic, requiring researchers to think at both local and global levels. This means that in grasping the sense of a word, sentence, or action one must relate fragments to whole i.e., "the complex of intentions, beliefs, and desires or the text, institutional context, practice, form of life, language game" (Schwandt, 2000, p. 193) and whole back to fragments.

In terms of methods, interpretivism is closely associated with qualitative inquiry (Creswell, 1994; Crotty, 1998; Lindauer, 2005), which emphasizes the qualities of entities using "processes and meanings that are not experimentally examined or measured (if measured at all) in terms of quantity, amount, intensity, or frequency" (Denzin & Lincoln, 2011, p. 10). Interpretivist research typically employs subjective and contextual data obtained using a mix of methods. These include written or verbal self-reports, observation, and "naturally occurring empirical materials" (Peräkylä, 2005, p. 869) such as letters or archival documents. The most common self-report method is the unstructured or 'ethnographic' interview (Denzin & Lincoln, 2005; Fontana & Frey, 2005; Peräkylä, 2005).

The interpretivist paradigm in visitor studies emerged in the 1980s and gained steam through the 1990s (Anderson & Ellenbogen, 2012; Hein, 1998). Linked to constructivist and sociocultural theories of learning (see section 2.1.2, pages 9-10) it articulates the belief that museum learning "is best conceptualized from the visitors' perspectives" (Anderson et al., 2007, p. 198). Looking to the disciplines of ethnography and phenomenology, participant observation (Ellenbogen, 2002), open-ended written self-reports (Ballantyne, 2003), semi- and unstructured

interviews (Brizeño-Garzon, Anderson, & Anderson, 2007b), narrative methodologies (Everett & Barrett, 2009) and recordings of visitors' conversations (Leinhardt & Knutson, 2004) were added to the pool of legitimate research methods. In evaluations, Lindauer (2005) also noted the emergence of humanist research designs, which involve reflexive autobiographical methods such as diary-keeping.

Given the idiosyncratic nature of such accounts, interpretivist studies are typically unconcerned with predicting outcomes. Rather, encounters with exhibitions are assumed to foster learning processes and outcomes unique to each visitor (Anderson & Ellenbogen, 2012). Similarly, Lindauer (2005) describes interpretivist evaluations as goal-free and inductive. This entails exploring the range of ways visitors engage with exhibitions and, without pre-set objectives, generating categories during analysis rather than in advance of it.

Overall, the emergence of the interpretive paradigm in visitor studies fostered both linguistic and naturalistic turns (Allen, 2002; Ellenbogen, 2002; Hein, 1998; Leinhardt & Knutson, 2004; Roberts, 1997) characterized by a preference for working with 'natural' language as "the means by which we come to understand the museum experience from the visitor's point of view" (Munley, 1987, p. 141). Relative to the traditional positivism of visitor studies early constructivist scholars such as George Hein both welcomed and defended self-report data:

> Our ability to talk and think about what we have done is one of the great advantages of any research or evaluation activity involving human beings. Using this information can provide insight into our understanding of the meaning behind people's behaviour. It is "subjective" in the sense that it comes from a single subject, but not in the pejorative sense of being particularly unreliable or invalid (Hein, 1998, p. 71)

However, despite this early enthusiasm, reflections on what it means to use qualitative self-report methods are rare in the visitor studies literature. One of the few sustained reviews, Rennie and Johnston's "The Nature of Learning and Its Implications for Research on Learning from Museums" (2004) embraces sociocultural perspectives on learning within a broadly postpositivistic outlook. Defining learning as a phenomenon that is personal, contextual, and develops over time, the authors locate the usefulness of self-reports primarily in investigations of the 'personal' dimension:

> Further, knowledge or understanding gained, or an attitude change, are observable only in what learners say or do. These features have several implications for research, which we explore under two headings—the need to "see" the visit and its impact "through the eyes" of the visitor, and the need to consider multiple outcomes. (….) Visitors must be involved in the research process, not simply observed from a distance, because there is a sizable inferential gap between observing and interpreting. **Seeing through the eyes of the visitor** means that, at some stage, data must be collected *from* the visitor and this requires self-report data, or recording what visitors both say and do. (Rennie & Johnston, 2004, pp. S8–S9, bolding in original)

Interestingly, the authors next express a preference for studying contextual aspects with a mix of observational techniques and multiple visitor interactions in order to minimize reactivity in the data:

> An important consideration in research with people is the potential for reactivity in the process of measurement. How does one collect data in ways that do not change the behavior of the visitor? This problem has long been recognized. (Rennie & Johnston, 2004, p. S12)

Overall then, when considered from the wider field of interpretive inquiry and its views on self-report methods, blind spots in the visitor studies canon become discernable; especially in terms of the contextual nature of self-reports themselves. Looking to writings by Denzin and Lincoln (2011), Fontana and Frey (2005), Fielding and Thomas (2001), and Holstein and Gubrium (2005) this final section highlights pertinent areas of reflection essentially absent from discourses surrounding learning self-reports in museums.

2.2.5 Self-reporting in contemporary qualitative inquiry

Three methodological issues related to qualitative uses of self-report are sketched here. In order of presentation they are co-creation, accounting practices, and qualitative interviews as mutually accomplished accounts. In each case, their underlying assumptions derive from interpretivist and postmodern scholarship. Moreover, in that interviews are the most common method used in these modes, they are the primary focus.

2.2.5.1 Co-creation and postmodern interviewing

Running counter to the strictly sequenced, carefully worded, and close-ended questions typical of positivistic inquiry, which interpretivists contend force respondents to work from researchers' worldviews (Collins, 2011; Fielding & Thomas, 2001), Fielding and Thomas (2001) locate qualitative 'trustworthiness' in relation to interviewer and respondent building *mutual* understandings of the topics at hand. This is grounded in ethnographic conceptions of interviews as acts of "mutual participant observation" (Fielding & Thomas, 2001, p. 142); i.e., forms of social interactions mediated by shared cultural symbols such as language, signs, and gestures (Crotty, 1998).

In terms of how co-construction is realized in practice, Fontana and Frey (2005) make an interesting distinction between modernist and postmodernist orientations. By 'modernist' the

authors mainly refer to the belief that judicious uses of interview techniques can produce more 'authentic' results. Techniques include careful self-presentation (e.g., wearing appropriate clothes and keeping a friendly but neutral demeanour) and the practiced use of verbal and non-verbal tactics[17]. Echoing positivist notions of validity threats, these techniques aim to minimize respondent biases like over-politeness and 'rationalization', meaning when logical rather than emotional explanations are privileged (Fielding & Thomas, 2001, p. 126). Postmodern researchers have questioned these ideas, arguing they problematically assume that skilled interviews somehow draw 'truer' core knowledge (Fontana & Frey, 2005, p. 717) out of respondents. This is of concern if it sustains the fiction that self-report methods are like "windows into the inner lives" of participants (Denzin & Lincoln, 2005, p. 21). This in turn can lead researchers to ignore the filtering effects of research settings, language, gender, social class, race, and ethnicity.

2.2.5.2 Accounting practices

Peräkylä (2005) describes qualitative self-reports as "accounts given to the researcher about the issues in which he or she is interested" (p.869). In turn, 'accounts' are written or spoken stories that explain one's conduct or generally pertain to reasons, causes, or motives (Denzin & Lincoln, 2005; Peräkylä, 2005). The use of varying types of accounts is a feature of everyday life, not just interviews. For instance, one may describe a co-worker's odd behaviour quite differently to one's boss than to one's spouse. As such, *accounting practices*, as ways of talking about different things to different people, are conceptual resources individuals use all the time to "organise their contributions to situated discourse" (Säljö, 1997, pp. 179–180).

---

[17] Such as phrases like "please tell me more about that" and silent expectant glances.

Framing self-reports in this way highlights their nature as public acts of communication meant for certain people, at certain times, and in certain physical and socio-cultural settings. Moreover, the specific ways in which participants and researchers talk to one another, i.e., their interview accounting practices, are assumed to reflect contextual elements surrounding the encounters and the subject positions taken up by respondents and interviewers. For example, in investigating students' accounts of learning activities, Fleming (1986) likened their stories to a guided tour, in which the interviewer was regaled with tales that reflected the 'moral pressures' that accompany the position of student/respondent:

> The ways in which their accounts are constructed reveal the norms of acceptable learning action which they invoke in order to have their descriptions heard as appropriate in the circumstances. The world of learning is a moral world in which learners, readers, authors, and teachers have duties, rights and obligations towards themselves and each other. To neglect this fundamental facet of students' descriptions is to miss what the account is for and does within the setting of its accomplishment (Fleming, 1986, p. 552).

Keeping such social pressures in mind, scholars such as Garfinkel (1917-2011), a central figure in ethnomethodology (see next page), were critical of giving too much weight to contextual or cultural imperatives, in that they risked portraying actors as cultural or institutional "dopes" (Holstein & Gubrium, 2005, p. 493) automatically acting out the conventions of external social forces. The solution proposed is that actors' ordinary linguistic and interactional skills, i.e., their practical reasoning, produce the accountable features of everyday life relationally via "circumstantially accurate ways of interpersonally orienting to and interpreting the world at hand" (Holstein & Gubrium, 2005, p. 486).

2.2.5.3 "Accomplishing" the interview

Carrying on with ethnomethodological considerations, interviews themselves have been the objects of much research. Ethnomethodology, a discipline based in phenomenological and structuralist perspectives, investigates how daily life is "done" or "accomplished." Put otherwise, ethnomethodologists study how words, gestures, and behaviours are actively used by individuals to accomplish common social situations like meetings, parties, or interviews (Fielding & Thomas, 2001; Holstein & Gubrium, 2005; Sedgwick & Edgar, 2002). Analytical efforts do not therefore focus on *what* aspects (i.e., the topic of conversation) but rather on the *how*, exploring the ways in which talk and actions build an internal reality between individuals contriving "to produce the appearance of a recognizable interview" (Fielding & Thomas, 2001, p. 142).

Interpretivist researchers influenced by this analytical perspective argue that self-reports are contextual, but not only in the sense of being influenced by their wider social and physical settings. Instead, data are seen to reflect what "the interview" as a social and cultural fact means to those involved (Fielding & Thomas, 2001; Fontana & Frey, 2005; Holstein & Gubrium, 2005). For example, Fontana & Frey (2005) argue that in Western popular culture interviews command "an inherent faith" (p. 698) due to their uses in particular journalism and entertainment media, where they have become a trusted and familiar medium of contemporary storytelling.

2.3 Summary and Research Questions

At the present time, self-report methods figure in most contemporary efforts to understand, explore, measure, or assess museum learning. Moreover, with the sustained calls for visitor information and ongoing scholarly interest in visitors' perspectives, the place of self-reports in visitor studies seems cemented, at least for now. Considering the ideas discussed in sections 2.1 and 2.2 it is also clear that contemporary museum researchers are in broad agreement that

learning in these settings is constructed, complex, and emerges in relation to a multiplicity of contextual factors. These include visitors' prior experiences and knowledge base, their sociocultural identities, their social group, and the physical and educational characteristics of the institution (Bell et al., 2009; Dawson & Jensen, 2011; Falk & Dierking, 2000; Rennie & Johnston, 2004; Wells & Butler, 2002).

However, while self-reports are valued by postpositivists as means to close inferential gaps by seeing museums "through the eyes of the visitor" (Rennie & Johnston, 2004, p. S8) and by interpretivists for providing rich contextual accounts (Anderson & Ellenbogen, 2012; Munley, 1987) the methodological work to extend such considerations to self-reports *as methods* was found to be lacking. Indeed, absent from the visitor studies literature are any significant engagements with postmodern, ethnomethodological, interpretive, and postpositivist conceptions of self-report methods.

To be clear; these observations (which hew much closer to my own paradigmatic outlook) are not meant to suggest that one form of inquiry is better or more appropriate than another. Rather, the concern is that this narrow range of explicit frames for using self-reports risks limiting productive debates and the richness of perspectives available to museum researchers. A lack of understanding about such things as the slippery nature of word meanings, the co-creation of self-report data, and the situated nature of accounts, including physical and institutional settings, seem especially problematic as the field of visitor studies is still exploring the theoretical implications of learning's situatedness (Dawson & Jensen, 2011; Falk & Needham, 2011; Phipps, 2007).

With all of that in mind, the research questions that frame this study are meant as starting points for explorations of contextual elements in visitors' learning self-reports.

1. Do conceptions of learning emergent from the same self-report instrument appear to vary when employed in different museums? If so, how are they similar and how are they different?
2. What kinds of discursive practices are present in respondents' accounts of their own learning self-reports? What do these suggest about the impacts of research interventions on visitors' thought processes and responses related to learning in museums?

Chapter 3 Theoretical Framework and Methodology

As it was argued in the previous chapter, self-report methods are neither neutral nor transparent research interventions. Spoken and written self-reports are not simply exteriorized personal information but *accounts*, sensitive to contextual factors and constructed in complex cognitive, linguistic, and socio-cultural ways (Denzin & Lincoln, 2005; Fontana & Frey, 2005; Karabenick et al., 2007; Paulhus & Vazire, 2007). Moreover, while commonly used in studies of visitors and learning, the literature surrounding self-report methods in museums has not seriously investigated these methodological questions.

To begin such a process, this study focuses on issues of context (physical, situational, and discursive contexts in particular) and bring to the fore complicated relationships between what we think, how we conceptualize the objects of our thoughts, and what we can ultimately express in language. Within an interpretivist worldview, the basis of this framework is an intentional-expressive theory of conceptualization described by Anderberg (2000) as bridging a contextual understanding of speech acts and an intentional theory of mind. Analyses of participants' ways of talking about learning, and their accounts of themselves as respondents and visitors, are also framed by a theory of learning as a *situated social practice* (Lave & Wenger, 1991).

This chapter explores both theoretical structures and provides a description of the phenomenographic methodology guiding the research–with particular reference to the ideas of Säljö (1997), Adawi, Berglund, Booth, and Ingerman (2001), and Anderberg (2000). Following that, this study's research design, data collection, and analysis procedures are presented, along with reflections on the study's ethics and trustworthiness.

3.1 Epistemology

This study works within an interpretivist epistemology. In broad strokes, this signals the view that we are all born into a world of meaning, and rejects any notion of a "mind-independent, and permanently fixed reality that could be grasped or even sensibly thought of without the mediation of human structuring" (Shusterman, 1991 cited in Schwandt, 2000, p.201). Instead, interpretivism argues that knowledge of the world is not found, but made and re-made by the light of our own mediated experiences (Denzin & Lincoln, 2011; Driver, 1983; Schwandt, 2000). In that sense, knowledge is deeply contextual; filtered by our relationships with the world, by the languages we speak, and by the social, cultural, and historically-situated environments we inhabit (Crotty, 1998; Fay, 1996; Mallon, 2008; Puddephatt, 2011).

For Crotty (1998), this perspective is deeply tied to the concept of intentionality, a complex idea often summarized as the 'aboutness' of thought, language, and meaning. Not to be confused with intention in the everyday sense of doing something 'on purpose', intentionality describes the relational nature of experience. Its core is the idea that we cannot think without thinking *about* something, nor feel without having feelings *for* something. Unique to mental phenomena and mental states (such as awareness, thought, learning, loving, and fearing) intentionality informs the interpretivist rejection of direct correspondence between objects and their mental representations (Crotty, 1998; Jacob, 2010; Marton & Booth, 1997; Vagle, 2010). Instead, everything we perceive is perceived *as* or *in relation to*, rather than in raw form (Adawi et al., 2001; Anderberg, 2000; Richardson, 1999). In that sense, Vagle (2010) describes intentionality as the invisible thread that meaningfully connects humans to their surroundings, both consciously and not.

3.2 Theoretical Framework

In concrete terms, this study asked participants to visit a museum, respond to a questionnaire, and take part in an interview probing what sense they made of these experiences and the thinking behind their answers. As such, theories relating what it means to bring one's thoughts and feelings into languaged thinking, and to then express these via writing and speech acts, are central to this study.

3.2.1 Bringing thought into language: The intentional-expressive view

Within interpretivist modes of thought, the concept of intentionality is woven into both theories of mind and theories of language (Crotty, 1998; Jacob, 2010). As it applies to expressing the contents of our thoughts, intentionality posits only relational correspondence between semantic word meaning and what is 'in' one's mind; a stance Anderberg (2000) describes as *intentional-expressive*:

> To express a thought is not to translate it. The relationship is not between inner and outer speech; nor is there simply something in our heads that has a character open to translation. Rather, there exists something that could be more or less expressed. This statement is grounded in the idea that thought is to some extent independent of the capacity to handle a language, while at the same time it is dependent on this capacity when we have to conceptualise and express our thought in language. (Anderberg, 2000, p. 110)

In that sense, an investigation of learners' self-reports is not truly directed at how they *think* but at how they *conceptualize* the world around them. As defined in the phenomenographic literature, conceptions are qualitative relationships between an individual and a phenomenon, commonly defined as 'ways of seeing' something (Marton & Booth, 1997; Svensson, 1997).

Conceptions relate intentionally to how someone experiences and thinks about the world, without being identical to either. As such, a single object can be the source of many different "contents of thought" depending upon one's relationship to it (Anderberg, 2000, p. 91). For example, Marton and Booth (1997) described students' conceptions of learning as reflecting both *what* is in focus (e.g., a math problem in class) and *how* the individual relates to learning qualitatively, i.e., "the experience of the way in which the act of learning is carried out"(1997, p.84).

At the same time, both Säljö (1997) and Anderberg (2000) note that conceptualizing always relies on language and discourse[18], even if conceptions only take shape in one's mind. In sum, what is posited here is that when we reflect, talk, write, or otherwise account for ourselves, we do so in ways that make sense relative to our surroundings, our goals, and the socio-cultural norms at play (Adawi et al., 2001; Fleming, 1986; Richardson, 1999; Säljö, 1997). As such, conceptions are perhaps best described as "ways of understanding, talking, arguing and in general, ways of *bringing the world into language* in order to be able to communicate" (Säljö, 1997, p. 178, italics are mine).

In the context of this study, this perspective frames both questionnaires and interviews as exercises in conceptualization; requiring complex transitions of thoughts, memories, and feelings into language before one can even tick a response box. This also advocates for paying attention to the forms and styles of talk used by study participants, as these reflect both their relationship to the object of study, and to data gathering as a situated practice of its own (Anderberg, 2000; Fontana & Frey, 2005; Holstein & Gubrium, 2005; Richardson, 1999; Säljö, 1997).

---

[18] Briefly, discourses are both bodies of symbolic formulations (e.g., ideas and ideologies) and *working* modes of address, suffused into day-to-day social practices (Holstein & Gubrium, 2005, p. 490).

3.2.2 Situated learning

While describing learning *itself* as it manifests in museums is not the object of this study, this framework is nonetheless infused (in that it reflects my own scholarly understandings) with theories of learning as socially-situated processes. Rather than beginning with individual cognition, these perspectives argue that learning is a way of being in the social world; developing knowledge, skills, and forms of identity concurrently through more-or-less engaged acts of participation in various communities.

Put another way, learning is a social practice in the lived-in-world; one that is mediated, recursive, and essentially inseparable from the contexts of its emergence (Dawson & Jensen, 2011; Ellsworth, 2005; Lave & Wenger, 1991; Niewolny & Wilson, 2009). Learners, and those they interact with, are explicitly viewed as cultural and historical agents that shape, and are shaped by, various learning practices (Lave & Wenger, 1991; Niewolny & Wilson, 2009). For example, Niewolny & Wilson (2009) consider it understood that in classroom settings:

> (…) individual teachers embody the historical, cultural, economic and political contexts for education. But they are not just ciphers for structure; they also embody their own histories, politics, values and so on and in turn produce those educational contexts through their day to day work (Niewolny & Wilson, 2009, p. 71).

Working outside of classrooms, Lave and Wenger (1991) proposed that learning as situated social practice is best understood as forms of ‘legitimate peripheral participation’; referencing the ways in which new community members are socialized and integrated by increasingly complex participation in the group’s activities. Growth and progress are regulated via newcomers’ access to physical and social resources, such as tools for practicing skills or chances

to observe experts at work. Over time, this collapses together learning-to-do and learning-to-be, as newcomers eventually become the old guard.

Thinking about these perspectives in relation to museums and the learning opportunities they offer occasions interesting dissonances. For instance, time spent in museums is typically brief, open-ended, and self-directed. In the absence of teachers and experts embodying and re-interpreting curricula (writ large) on a daily basis, museums quite literally affix their semantic and symbolic contents into their architecture[19]. This likens museums to other public spaces like temples or courthouses that serve and reflect back social narratives about learning, faith, politics, and/or citizenship (Atkinson & Delamont, 2005).

As such, it may be tempting to dismiss the idea of legitimate peripheral participation as a useful theory of 'museum learning' because of the shortness of a single visit and the less rigid social relations among learners, and between learners and experts. However, museum researchers generally agree that decisions to visit rest on a complex of factors, including appreciation for artefacts, artworks, and museum environments; social circumstances like family coming to town; and visitors' identities, cultural perspectives, knowledge bases, motivations, and interests (Anderson et al., 2007; Brizeño-Garzon et al., 2007a; Ellenbogen, 2002; Falk et al., 2008; Falk, Moussouri, & Coulson, 1998; Hood, 1983; Pekarik et al., 2014). If framed as a continuum of experiences, rather than a collection of disconnected events, being a visitor can be a particular (peculiar even) but still legitimate form of peripheral participation in the lived-in world and with the communities whose histories, material culture, art, or practices[20] are displayed. An arguably extreme but still illuminating example of this is Ellsworth's (2005) descriptions of a visit to the

[19] Take for instance exhibition text panels which, once in place, will likely not be updated for months or years.

[20] This includes spaces devoted to learning about science and its processes.

much-lauded U.S. Holocaust Memorial Museum during which she felt herself 'pivot' into new relationships with herself and with the historical events that constitute the Holocaust. Interestingly, neither of these resulted in end-points particularly amenable to words; Ellsworth's accounts instead privilege affect, sensations, sudden self-awareness, and self-transformation.

3.3 Methodology

This section describes the practices used to investigate the research questions. This includes an explanation of phenomenographic approaches, research design, data collection, data analysis, and the study's ethical requirements. In addition, given that the research questions are oriented towards contextual factors affecting learning self-reports, potential meanings of 'context' are clarified and working definitions are established. The approaches described here relate to the scholarship of Säljö (1997), Anderberg (2000), and Adawi, Berglund, Booth, & Ingerman (2001) as these frame the exploration of context not as factor in learning (though it undoubtedly is) but as an under-addressed issue in visitor research methodologies. This section also considers ideas expressed by Åkerlind (2005) that provided useful clarifications on the phenomenographic research process.

3.3.1 Phenomenography

Phenomenography is a systematic and interpretive approach to exploring the qualitatively differing ways phenomena are conceptualized. Its practices are grounded in the 'second order perspective', meaning that attention is focussed on the perceptions of others. For instance, in educational settings phenomenographies typically seek to describe the "world as the learner experienced it" (Richardson, 1999, p. 57). This rests on the assumption that while conceptions vary from one individual to the next, as a whole they relate logically due to their connections to a

common phenomenon. The task of the phenomenographer is therefore to ‘experience’ (Adawi et al., 2001; Sin, 2010) variations in perceptions present in their data and find meaning in their similarities, differences, and interrelations. This entails building both ‘categories of description’ and an ‘outcome space’(Åkerlind, 2005; Marton & Booth, 1997; Säljö, 1997). Åkerlind (2005) describes these as follows:

> Outcomes are represented analytically as a number of qualitatively different meanings or ways of experiencing the phenomenon (called ‘categories of description’ to distinguish the empirically interpreted category from the hypothetical experience that it represents), but also including the structural relationships linking these different ways of experiencing. These relationships represent the structure of the ‘outcome space’, in terms of providing an elucidation of relations between different ways of experiencing the one phenomenon. (Åkerlind, 2005, p. 322)

As such, it is the phenomenographer’s task is to build a sufficiently diverse pool of meanings to allow for differences and similarities to emerge within the whole data set. Outcome spaces most commonly take the form of hierarchically inclusive relationships; however branching structures and linear relationships are also possible (Åkerlind, 2005). Finally, Dahlin (2007) has also described the end products of phenomenographic research as maps and as idealisations, in the sense that these are ultimately simplified representations, designed to help make sense of complex ‘real world’ phenomena.

3.3.1.1 Context in phenomenography

Early phenomenographic efforts were criticised for paying insufficient attention to the contextual and situated nature of their data, creating the idea that conceptions re-constructed by

researchers were stable and generalizable[21] (Fleming, 1986; Richardson, 1999; Säljö, 1997). In a limited sense this is still true, in that one of the first steps in a phenomenographic analysis is 'stripping away' the context of participants' contributions; making situated discursive statements (i.e., said by someone, to someone, in some way, at some time, some place, and some point in the conversation) into a collective pool of abstracted ideas (Adawi et al., 2001). However, through the early 2000s more considered views were articulated that do not as easily conflate a focus on collective experience with the generalizability of one's categories of description:

> This provides a way of looking at collective human experience of phenomena holistically, despite the fact that the same phenomena may be perceived differently by different people and under different circumstances. Ideally, the outcomes represent the full range of possible ways of experiencing the phenomenon in question, *at this particular point in time, for the population represented by the sample group collectively*. (Åkerlind, 2005, p. 323, italics are mine)

Similarly, Anderberg (2000, p. 9, italics are mine) views phenomenography as "describing conceptions *in different contexts* like learning, studying, teaching and instructions." In that the focus is on describing the range of meanings within a sample group *as a whole*, the complete set of collected statements becomes a context unto itself. In other words, "no one interview transcript (…) can be understood in isolation from the others. Every transcript, or expression of meaning, is interpreted within the context of the group of transcripts or meanings as a whole" (Åkerlind, 2005, p. 323).

---

[21] In the interpretivist tradition researchers do not 'discover' the meaning of something but rather re-construct it by interpreting the data generated with participants (Crotty, 1998; Schwandt, 2000)

Suiting the needs of this study, Adawi et al. (2002) also articulated this idea but deliberately surfaced two other dimensions; that of the researcher and that of the participant. Echoing issues noted in the literature review regarding the co-created nature of interview accounts, three distinct levels were proposed: *Researcher Context*, present at every step in the process; *Collective Context* or the total pool of collected meanings from which the research works; and *Individual Context* including how participants experienced their part of the research process.

Intersecting these, Adawi et.al (2001) also make a useful distinction between the *prepared* and *experienced* contexts of phenomenographic practices. Concrete and deliberate on the part of the researcher, the prepared context is what interviewees are presented with as a springboard for the ensuing conversation. For example, in their study on perceptions of heat Adawi et al. gave participants a cooling cup of coffee. Much more ephemeral, the experienced context is holistic and includes in it anything participants experienced as relevant for making sense of the situation at hand. As this includes memories of past experiences and subtle aspects of the interview, experienced contexts are not fully knowable. However, as aspects of the phenomenon come into focus through the conversation, elements of the experienced context can be reflected in participants' accounts. In this present study, the notions of prepared and experienced contexts, as well as the three levels noted above, served both the design of the interview situation as well as the analysis of the resulting data. The details of this are presented across the remaining sections of this chapter.

3.3.2 Research design

This section addresses the study's research design, with all major steps outlined in Figure 1. Data collection processes (including a museum visit, a self-report questionnaire, and a semi-directed interview), the inclusion of two different museums as study sites, and the recruitment of

three cohorts (museum staff, museum members, and local museum-goers) were all designed to elicit variations in participants' conceptions relative to the idea of 'learning in museums'.

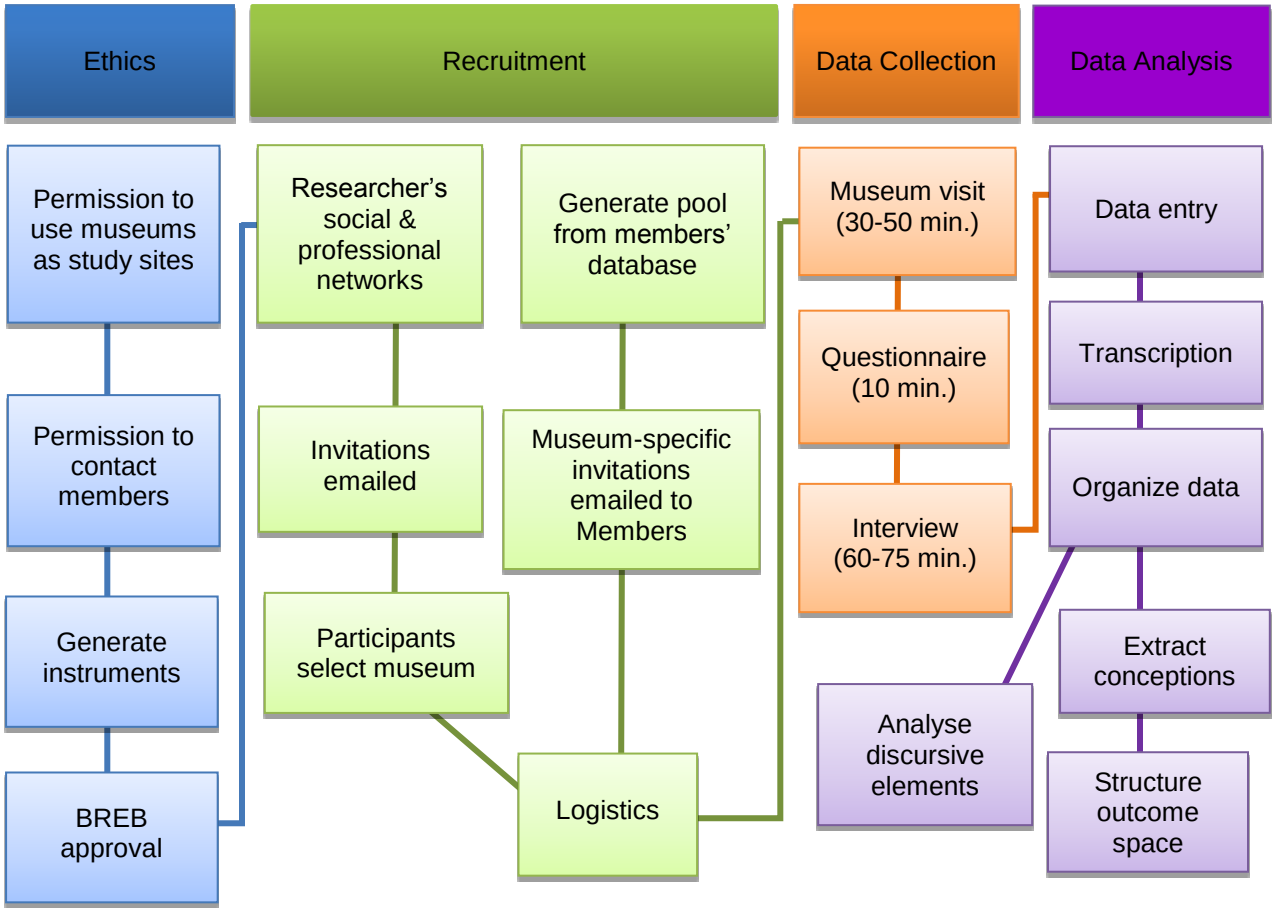

Figure 1. Overview of the major steps in the research design

3.3.2.1 Prepared context: The self-report questionnaire

As the focal point for the semi-directed interview that was to follow, the intention behind the questionnaire was to expose participants to a range of self-report questions and response items. Rather than design one from scratch, I opted to adapt an existing instrument that had been used at the museums. The choice was motivated by fairly pragmatic reasons. Very early in the process of developing this research design I intended to compare the findings to the data trends in the museums' database; however, on later reflection that facet was not as rich as the discursive

aspects of the resulting data. The instrument was kept however, mostly due to the fact that it contains a good range of question types (see Table 1) and the bulk of it was authored by someone other than me; a fact mentioned to participants when inviting them to comment on the questionnaire's structure and questions.

These considerations align with the idea argued by Adawi et al.(2001) that the task of the researcher in designing a phenomenographic study is to ensure that the overall situation will put the participants at their ease and enable a fruitful discussion. Beyond that, the goal is "to design contexts in which the phenomenon/a of interest can be approached in different ways to maximise the variation that can emerge during the data collection" (p.96).

Table 1

Overview of Self-Report Questions by Type

Question Types	Item Examples
Demographics (self-declared)	Gender, age, first language, level of education, residence
Behaviour Recall	Which parts of the museum you explored? + List
Preferences	What area(s) did you like most? (from items above)
Visitor Services (5 point agree-disagree)	The museum atmosphere was inviting
Museum Experiences (5 point agree-disagree)	The artefacts were interesting
Outcomes (5 point agree-disagree)	I learned something new on this visit
Self-Assessment (5 point expert-novice)	How much expertise you feel you have in aviation?
"Satisfying Experiences" List (5 pt. important-unimportant)	Gaining new information or knowledge Seeing 'the real thing' Seeing my children having fun
Learning and Synthesis (Yes/No and Open-Ended Prompts)	Did you encounter any new facts or new information while you were visiting the museum today? If yes, what? Do you think there is a message, or a main idea, that the museum is trying to convey?

3.3.2.2 The research settings

Two museums served as research settings, the Canada Science and Technology Museum (CSTM) and the Canada Aviation and Space Museum (CASM). They were selected for a number of reasons, the most practical of which is that they are my workplaces, allowing a high level of familiarity with the visitor experiences available, as well as institutional support for the study (e.g., floor staff helped with child-minding duties for interview participants). However, key to their selection were the different atmospheres and experiences available at each site.

The CSTM opened its doors in 1967. According to Babian (2008) it acutely reflected its era when "(…) the philosophical foundation of museums was also being transformed by profound social change" (p.24). Indeed, while the museum was developed with pressure from elitist perspectives to "elevate public tastes by educating the newly leisured masses" (p.25) its founding director looked to the recent successes of science centres and the rise of mass communications, and chose to emphasize display, demonstrations, and interactivity.

Source: Public Affairs, Canada Science and Technology Museums Corporation

Figure 2. Forestry exhibit, Canada Science and Technology Museum

The CASM began as a collection of bush planes and early Canadian aircraft held by the National Museum of Man, the present-day Canadian History Museum. In 1964 the collection was merged with the Canadian War Museum's military aircraft holdings. A purpose-built facility, shaped like a delta, was constructed in 1989, at which time the collection became a national museum. With the addition of the space theme in 2010 the Museum now houses the Canadarm and an exhibition on the International Space Station.

Source: Public Affairs, Canada Science and Technology Museums Corporation

Figure 3. Exterior and search and rescue exhibit, Canada Aviation and Space Museum

Managed by a common administrative body, sharing staff and a membership program, the two sites are quite different. The CASM consists of a very large and bright hangar-like environment that houses early flying machines, military and civilian aircrafts, bush-planes, search and rescue helicopters, as well as engines, airline archives, and uniforms. These are grouped thematically and by historical period, referred to by staff as the "interpretive islands." The museum is didactic, relying mostly on the large artefacts interpreted by text panels, and to a lesser degree on demonstrations, videos, and dioramas. Compared to the CSTM, it contains fewer hands-on and multi-media experiences.

The CSTM features a mix of artefacts, interactives, and kinetic experiences. Major themes include communications, transportation, natural resources, industrial design, physical sciences, and medicine. The museum is located in a re-purposed one storey industrial building. The interior is dark and frequently quite noisy, due to the many hands-on displays and demonstrations. A working steam train is also available for short train rides in the summer. CSTM exhibitions typically feature texts, artefacts, mechanical interactives (such as operating older technologies), and computer-based games or quizzes.

3.3.2.3 Recruitment procedures

Because of the time commitment and somewhat complicated protocol recruitment was not done among visitors already at the museums. Instead, individuals were recruiting using a purposeful sampling strategy that aimed to include a diversity of participant types. Three cohorts, museum staff, museum members, and local museum-going residents made up the final pool of 42 participants. These were split evenly between the two museums.

With the assistance of the Museums' membership office a sample of highly loyal visitors to each museum (more than ten visits annually) was extracted from a database of recorded visits by membership identification number. From within that sample a sub-set of members were randomly selected and invited to participate via an email message sent by the membership coordinator. The invitation included an outline of the procedures, the reason for the study, and the time commitment. My at-work email address and telephone number were provided, allowing interested individuals to contact me directly. Three months later information about the study was included in a regularly distributed eNewsletter to the overall membership. In total, four members were interviewed at the CASM and five at the CSTM.

Figure 4. Recruitment process for museum members

The local residents and museum staff were recruited in a similar fashion. For staff, an email from my work account was sent to a pool of individuals I felt would like to take part in the study. The sample includes professionals from the museums' curatorial, education, and design departments and included directors, managers, and interns. The email outlined procedures, reason for the study, and time commitments and included a copy of the consent form. Interested participants were invited to contact me by email. Only one round of recruitment was necessary. Five staff members were interviewed at the CASM and four at the CSTM. Local residents who had visited a museums, gallery, science centre etc. at least once in the past two years were recruited in waves through my memberships in a number of clubs in the Ottawa-Gatineau region, including a swimming club, a rowing club, and a martial arts school. Again, emails were sent (in this case from my personal email and Facebook accounts) to groups of individuals belonging to these clubs with study information and, in the email version, an attached copy of the consent form. As data collection moved forward recruitment efforts were directed at balancing as best as possible the variety of participant types with regard to gender, age range, and the type of social group that would accompany the respondent (solo, with friends, with children). A snowball sampling approach was also attempted; three participants were recruited via museum staff passing on an information flyer. In total, 12 local museum-goers were interviewed at the CASM and thirteen at the CSTM.

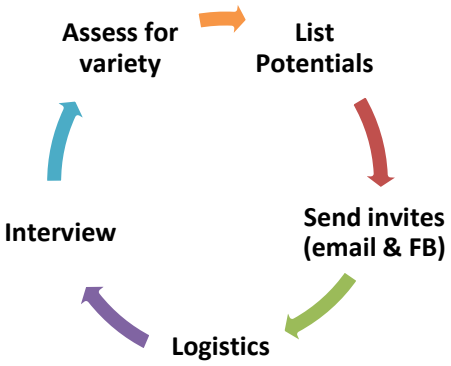

Figure 5. Recruitment process for local residents and museum staff

3.3.2.4 Composition of samples

Tables 2 and 3 provide an overview of the museums' visitor demographics and a summary of the participants at each of the study sites. The former uses data averaged from visitor surveys completed during summers of 2008 to 2010.

Table 2

Selected Museum Visitor Profiles

Characteristics	CSTM		CASM	
	Sample	Visitors	Sample	Visitors
Male	45%	44%	43%	60%
Female	55%	56%	52%	40%
English	86%	72%	76%	74%
French	14%	28%	24%	26%
Ottawa	86%	77%	71%	75%
Gatineau	5%	23%	19%	25%
High School	0%	22%	0%	17%
College	18%	27%	5%	29%
Undergraduate	27%	25%	48%	27%
Graduate	45%	26%	43%	26%
Age	42.0	36.5	37.1	43.2

Note: Canada Science and Technology Museum and Canada Aviation and Space Museum data: 2008-2010

Although the sampling strategy did not require the participants' profiles to match those of the museums' typical visitors, they are fairly similar.

Table 3

Composition of Study Samples by Museum Visited

Canada Science and Technology Museum					Canada Aviation and Space Museum				
	Cohort	Gender	Age	Social Group		Cohort	Gender	Age	Social Group
CSTM1	local	male	57	spouse	CASM3	local	male	27	spouse
CSTM5	local	female	34	friends	CASM4	local	female	28	spouse
CSTM6	local	male	42	friends	CASM5	local	male	41	spouse
CSTM10	local	female	37	spouse	CASM6	local	female	33	spouse
CSTM11	local	male	33	spouse	CASM7	local	male	45	solo
CSTM12	local	male	33	child	CASM9	local	male	35	spouse
CSTM13	local	male	41	solo	CASM10	local	female	33	spouse
CSTM14	local	male	41	solo	CASM11	local	male	33	child
CSTM15	local	male	36	solo	CASM16	local	female	30	solo
CSTM16	local	female	34	child	CASM17	local	female	33	solo
CSTM19	local	female	41	solo	CASM21	local	female	33	solo
CSTM21	local	female	32	solo	CASM19	local	female	32	child
CSTM2	member	female	63	solo	CASM1	member	female	37	child
CSTM3	member	male	74	solo	CASM2	member	male	44	friend
CSTM8	member	male	36	child	CASM8	member	female	38	child
CSTM9	member	female	39	child	CASM20	member	male	42	child
CSTM17	member	female	35	child	CASM12	staff	female	46	solo
CSTM4	staff	female	35	friends	CASM13	staff	female	48	solo
CSTM7	staff	male	58	solo	CASM14	staff	female	27	solo
CSTM18	staff	female	41	solo	CASM15	staff	male	44	solo
CSTM20	staff	female	25	solo	CASM18	staff	male	40	solo

3.3.3 Data collection

Data collection took place between December 2012 and April 2013 using self-completed questionnaires and semi-structured interviews captured using a digital voice recorder. Qualitative interviews are the most common method of phenomenographic data collection, typically enacted as a conversation in which the researcher and the interviewee jointly explore the phenomenon under investigation (Adawi et al., 2001; Åkerlind, 2005; Marton, 1994; Marton & Pong, 2005).

With the exception of the members who were pre-screened into the sample because of their high number of visits to a particular site, participants were invited to select their preferred time and museum. Once on-site, their first step was to tour the exhibitions for a minimum of one half-hour. To maximize comfort, participants were invited to return earlier if bored or stay longer if something was especially engaging.

Some participants came as a couple, and therefore one of the two spent roughly an hour in the museum before taking part. Beyond the approximate time limit, and suggesting that returning visitors explore "as you usually do" no visit instructions were given. Participants were asked to join me at the museums' cafeteria when ready. At that point the consent forms were signed and, if child-care had been requested, a staff member was introduced and the children kept exploring in their company. In total, four participants requested this. In the other family groups children were either old enough to explore on their own or another adult was present to look after them.

After completing these steps, participants were handed the questionnaire, which they filled out at the table by hand. I was present in case of questions, but occupied (typically sitting across from them with a laptop computer and headphones transcribing previous interviews) so as to avoid feelings of being rushed or scrutinized. Upon completion, participants were asked if they were ready to start the interview. With their permission the digital recording device was turned on, and they were reminded of the confidentiality of the interview.

The bulk of each interview was dedicated to discussing items in the questionnaire. Participants were repeatedly asked variations of "What did this question mean to you?" and "What made you write that/check that box/give that score?" An interview guide developed in advance was used to remember the sub-themes to be explored, though in no particular order. These included the visit on this day (e.g., did you have a nice visit?); motivations to visit

museums (e.g., what normally triggers a visit to a museum?); impressions of self-report questionnaires (e.g., do you mind doing surveys when you're visiting a public place?); perceptions of learning (e.g., what do you mean by learning?); learning and place (e.g., is learning in a museum different than other places, like work or school?); and learning and social setting (e.g., do you expect to learn when you're here with your kids?).

3.3.4 Data analysis

This study employed three types of data analysis: a phenomenographic analysis of interview data, a discursive analysis of the same, and a between-museum comparison of the response frequencies of closed-ended questionnaire items. Each interview was digitally recorded and transcribed for analysis using HyperTRANSCRIBE software. Multiple contextual factors could have been considered in the data analysis, including participants' first language, gender, and age, however these fell outside of the scope of the research questions. As such data from the two museums and the two linguistic groups were considered together. While transcripts remained in the language of the original, coding of the interview data was carried out in English.

Within the 42 collected, 16 interviews were transcribed in full. Using these, two preliminary rounds of analysis were completed; consisting of reading through the transcripts, noting themes and potential coding schemes. Following that, remaining transcriptions focused on excerpts of exchanges (Fielding & Thomas, 2001) that touched upon descriptions of learning, perceptions of the museums, visit experiences deemed important by participants, and reflections on the questionnaire items. Interesting segments and comments that did not necessarily link to literal readings of the research questions were noted by applying a time-stamp in the transcription file, accompanied with a brief description of the contents. Selected 'off-question' segments were subsequently transcribed for the discursive analysis.

3.3.4.1 Phenomenographic analysis: Conceptions of learning

This section explains the analyses as they were carried out. The linear presentation is mildly misleading given the hermeneutic and iterative nature of the task, which required considerable to-and-fro between the levels of analysis (Åkerlind, 2005; Marton, 1994; Marton & Pong, 2005).

After reading through the transcripts, the first step was to extract comments from the individual interviews related to how participants appeared to understand learning, both as a general concept and specific to museum settings. These segments were copied to a spreadsheet and tagged by random alpha-numeric codes that, further on in the process, linked statements back to individual participants. Following that, each excerpt was reduced to a decontextualized statement that represented (what I perceived to be) its underlying meaning(s). For example, the utterance "*they're playing with the buttons and don't realize they're learning but they are. At the same time they're learning I'm learning too"* (i17, CSTM) was reduced to two units of meaning (Adawi et al., 2001): 'museum learning as button-pushing' and 'museum learning as un-aware learning'.

These extractions and reductions were done in four successive waves. At the conclusion of the first three rounds tentative groupings were made and unmade. These were hermeneutic exercises in combining elements, considering them against each other, then against other emergent categories as well as against outlier statements that were difficult to classify. Adawi et al. (2002) summarized these operations as iterative phases of deliberate *de*-contextualization and creative *re*-contextualization; i.e., analytical reductions 'distilling' instances of meaning followed by the reconstruction of emergent meanings perceptible by the light of different contexts. These included my own 'researcher level' background knowledge and world views; the collective pool of meanings against which statements can be juxtaposed; the two museum settings; and what

remained of the individuals' context, i.e., their personal characteristics (age, gender, or cohort) and their descriptions of museum experiences previous to, or on the day of, their interview.

After the last round of extractions six main categories emerged and remained essentially un-changed. Elements within these categories continued to be re-sorted and re-classified. On occasion some sub-sets were entirely taken out of one category and moved to another, a result of exploring facets of the sub-groupings to ensure that they truly 'fit together'. This often entailed going back to transcribed excerpts to compare conceptions to the participants' own words. The most deliberate (and long planned) re-contextualization was grouping conceptions by museum setting. Another emergent context was the differentiation in participants' statements between 'learning in museums' and 'learning in general' (typically referencing participants' schooling, the workplace, and experiences such as travelling). For some respondents 'learning' appeared to reference all of these elements at once, while for others it was mostly tied to classroom settings. Interestingly, it was in exploring how frequently various conceptions were identified as general or museum-specific that structural relationships were finally established within and among the six categories (see Figure 6, page 95).

Finally, comparing the conceptions gathered at the two museums was the last step in the analysis, a deliberate act done to avoid what Adawi et al. (2002) view as the problematic conflation (on my part as the researcher) of ways of experiencing the *context(s) of a study* with the variation in the participants' ways of experiencing the phenomenon *of study*.

3.3.4.2 Discursive analysis

While the phenomenographic processes described above focused almost exclusively on how participants conceptualized learning, this analysis looked at the transcripts more broadly, paying attention to ways of talking about the questions, the thought processes they engendered, and how

participants accounted for themselves in relation to the museums, the artefacts, the interpretive materials, and the broad themes of the institutions (i.e., science, technology, and history). Processes included comparing conceptions of self-reporting (i.e., responses to questions like "What do you think this item is getting at?") with conceptions of museum learning, and analyzing the interplay between the two. Anderberg (2000) described this as analysing respondents' "thinking acts" (p. 95) as they manifested in spoken language.

In re-reading the transcripts, attention was paid to specific word uses, expressions, and interjections associated to participants' accounts of moments when their own learning became apparent, often marked by affective statements and struggles to articulate learning as experienced. Throughout, Fleming's (1986) comparison of students' accounts of learning to a tour guide 'regaling' the interviewer with well-selected stories also came to mind with fair frequency, in that:

> Despite our interest, encouragement, open ended questions, probing questions and our variation of structure and focus we cannot but be given a view of learning designed observably, intelligibly, adequately and appropriately for the tourist rather than the tutor, examiner, parent, peer or fellow learner. *As accountable members of a moral order our guides have an obligation to do so. They must do so if we are to recognise them as competent and acceptable.* (Fleming, 1986, p. 559, italics are my own)

This resulted in an analysis of differing ways respondents talked about and accomplished their roles as visitors, learners, and research participants. This created an interesting opportunity to explore questions of agency and the ways in which respondents positioned themselves relative to feelings of responsibility to learn (or not) and to otherwise 'take something away' from a museum visit.

3.3.4.3 Questionnaire

All questionnaire data were entered into an Excel spreadsheet. This includes demographics, the scores related to the various scales, and the responses to the open-ended synthesis questions. Frequencies from questionnaire items that proved especially fruitful in terms of the discussions they prompted were analysed, and differences between the scores reported at both museums were noted. Responses to the open-ended questions were categorized and compared to the self-reported scores. In that these responses were discussed during the interviews, the contents of the open-ended questions are also represented in the phenomenographic analysis.

3.3.5 Research ethics and trustworthiness

Ethical practices help to ensure that the well-being and integrity of research participants is recognized (Christians, 2005). This section illustrates how issues of informed consent, privacy and confidentiality, and the avoidance of harm were addressed in the course of this research. This is followed by an explanation of how this study meets criteria of trustworthiness relative to phenomenographic practices and interpretivist considerations (Åkerlind, 2005; Lindauer, 2005).

3.3.5.1 Ethical research

This study met the requirements of the Behavioural Research Ethics Board at the University of British Columbia. Steps taken to ensure that criteria were met are as follows.

Informed consent: I ensured that the participants were aware of their rights, understood the nature of the study, and actively gave their consent consistent with Bulmer's (2001) guidelines. Initial contact with all potential respondents was designed to make clear that they were free to decline at any point. Most individuals were invited to participate via email or Facebook messages. Colleagues were contacted through their work email addresses, and recruitment of local residents was initiated through friends and acquaintances. Those who chose to participate

were invited to pass along information about the study to anyone in their social networks they felt might be interested. These requests were made verbally, and it was emphasised that there was no obligation. After obtaining permission from the museums' directors, a selection of Canada Science and Technology Museums' members were invited, via email, to participate by the membership coordinator. This was done by using the membership database to generate a list of addresses belonging to individual who frequently visited one of the two museums. All of the individuals who expressed interest in the study received a follow-up message with detailed information about the goals and the process as well as a copy of the consent form. Most participants signed the form just prior to filling out the questionnaire.

Privacy and Confidentiality: I ensured that personal information about respondents remained confidential and that contents of the interviews were anonymous. The museums' membership office acted as the primary contact with members, and as such no personal data was shared. Interested members used the contact information provided to signal their interest directly via email (a telephone number was provided but not used). All visitors-participants' identities remained strictly confidential. Participants were assigned code numbers and all ensuing materials are identified by code. The digital research files, including transcripts, data from the questionnaires, and the interviews are stored securely. Hard copies of the questionnaires are kept in a locked filing cabinet.

Avoiding harm: Lastly, I ensured that my study did not inflict physical, mental, or emotional forms of injury on participants. Data solicited from participants in both the questionnaire and in the interview were not of an especially sensitive nature and participants were reminded that they were under no obligation to respond. For the comfort of participants, a trained member of the

museums' educational staff was made available to entertain and mind any children who took part in the visit portion of the study. This was organized in advance of the visit.

3.3.5.2 Trustworthiness of data

Consistent with Marton and Booth (1997) and Åkerlind (2005), the quality of the phenomenographic data were addressed by ensuring that the final categories were distinct, logically related and parsimonious, meaning that the important variations were represented by as few categories as possible. In terms of broader interpretivist criteria, this ensured that the research practices were such that the credibility, authenticity, and comprehensiveness (Lindauer, 2005, pp. 143–144) of results could be demonstrated.

Credibility rests on researchers demonstrating that their interpretations are grounded in data, as opposed to personal opinions. In this study, this was accomplished by citing the interview transcripts as illustrations of the various ways respondents conceptualized museum learning and self-reports. Details are also provided about the collection of questionnaire and interview data and their analysis so that readers may form an opinion as to the approaches and processes selected.

Authenticity refers to the minimization of occurrences that would make participants less willing to discuss their opinions, interpretations, and values. The aim was therefore to put respondents at ease. This was addressed by adjusting pace, rhythm, and the style of talk relative to those of the participants, and by focusing the conversation on their ideas and experiences. Flexibility in the interview guide allowed each conversation to be unique and able to flow in accordance with the participants' contributions to the dialogue.

Comprehensiveness is interpreted in this study as the ability to demonstrate that interpretations are not based on a single given utterance or answer, or on the basis of only one

participant's experience. After Lindauer's (2005) recommendation that studies aimed at understanding components of the museum experience should aim to speak with museum professionals as well as a wide range of visitors, the sampling strategy included museum staff (including curators, education personnel, exhibition developers and interns), museum members, as well as local museum goers attending alone, with family, or friends as well as people of diverse linguistic backgrounds. Without aiming for a representative sample (Procter, 2001a) efforts were made to reflect on sample composition as data collection was ongoing in order to direct recruitment efforts at sub-groups that had not yet been included.

3.3.5.3 Limitations

Two forms of limitations are acknowledged here. The first is that the task of the researcher in this study is to foster, distinguish, and then analyze instances of meaningful talk. As such, the process depends not only my own interpretations of other peoples' interpretations, but also on my deeming a given utterance to be worth including in the process (Säljö, 1997). As noted in the research position statement that follows this section, this is an inescapable fact that can be mitigated –in technical ways by using codes to avoid being aware of the origins of the conceptions in the outcomes space, and in the exercise of a reflexive attitude– but not suppressed.

The second is that even though very close in time, occurring in the same setting, and referring to the same visit, filling out a self-report questionnaire and being interviewed about one's thoughts and answers are not the same situation (Karabenick et al., 2007; Schwarz, 2012). As Anderberg (2000, p. 92) noted in her study of the relationship between phenomenographic conceptions and word meaning, studies that carry a self-reflecting or "meta" character always face these limitations because language cannot step outside of itself, nor can analyses of one's

thought processes ever be complete. Therefore, in this present study, the ideas expressed in the interview, and the working notions of learning that informed questionnaire responses, are held to be related, but never equivalent:

The implication of considering reality as socially constituted is that each account is situation-specific and has no absolute currency beyond that context. Therefore a description accurate in, designed for and appropriate to one setting cannot be unilaterally taken over and considered applicable to, and constitutive of another. In so far as interviews and study tasks are different settings we should not expect accounting practices in one to define action in the other. (Fleming, 1986, p. 550)

3.3.5.4 Researcher's position

It is unavoidable that my own frames of reference are interwoven into all aspects of this study, from the selection of the research questions, to the data collection and its "prepared context," and to the hermeneutic analyses of participants' accounts. Details that seem useful, both to the reader and to myself as a researcher attempting to sketch her own embededness (Cooper, 2001) are listed here. These include information about my professional experience in museums, my academic training, and my socio-cultural identity.

I have worked in museums, as a volunteer or employee since I was 17 years old. In chronological order this includes being a volunteer garden interpreter, a tour guide, and then 'head guide' at a historic site in Kingsmere, Québec. After completing a Masters in Museum Studies in 2003 I worked in exhibition evaluation, with brief stints in interpretive planning for exhibitions in Toronto and Ottawa, Ontario. As an evaluator I have worked almost exclusively for the national museums located in Ottawa; specifically the Canadian Museum of History, the Canadian War Museum, the Canada Science and Technology Museum, the Canada Aviation and

Space Museum, and the Canada Agriculture and Food Museum. In that capacity I frequently employ self-report data, both of my own creation and in interpreting the findings of other visitor studies. In that capacity I have grown increasingly curious, and sometimes suspicious, of studies grounded in these methods (my own included) for the reasons outlined in the literature review.

My identity, in the general sense of how I perceive and describe myself, is bi-cultural, meaning that I am half Québécoise and half English-Canadian. I am a native speaker of English and French, and grew up in a city (Gatineau, Québec) where virtually all of my family, friends, and colleagues were capable of expressing themselves in both languages. This is worth noting in that interviews occurred in whichever of the two languages the respondent was most comfortable, including in some cases a considerable amount of "Fringlish" typical of everyday conversations in the Ottawa-Gatineau region. This can occur when searching for a word that more easily comes to mind in the other language, or it can mark a deliberate code-switch on the part of the respondent and the interviewer. Without being a trained translator, I am capable of coding across the two languages, of establishing equivalencies in the pragmatic meaning of participants' utterances, and analysing cultural aspects of participants' discourses.

Chapter 4 Data Analysis

This chapter explores the data obtained from the study's 42 participants who completed the questionnaire instrument and the semi-directed interviews. Its three sections are organized in rough accordance with the study's research questions (see page 31). The first summarizes the questionnaire data and presents both differences and similarities in the information collected at the two study sites, i.e., the Canada Aviation and Space Museum (CASM) and the Canada Science and Technology Museum (CSTM). This also serves to highlight the questionnaire items that formed the spine of the phenomenographic analysis. The second section presents the results of the phenomenography, illustrating the qualitatively different ways respondents' perceptions of learning were expressed in the study settings. The third and final section analyses participants' discursive practices related to museums, focussing on how participants accounted for their self-reported responses and positioned themselves as museum visitors, learners, and research participants.

4.1 Self-Reported Learning: Questionnaire Results

An overview of the data generated by the questionnaire is provided below, focussing on the key items that asked respondents to rate, reflect on, and/or describe their learning in the course of their visit. Given the qualitative nature of the research, these data are not regarded as evidence of learning or as indications that either museum performs better at educating its visitors. However, when considered along with the other findings, the patterned ways in which participants answered these questions begin to suggest interesting variations in what assessments of one's own learning can signify. In that vein, this section focuses on differences and similarities in selected closed- and open-ended questions between the two museum samples.

4.1.1 Analysis of questionnaire data

The following results are presented in order of their appearance in the questionnaire (see Appendix A, page 146). Allowing for comparisons between the two museums, this section also contextualizes the question items that were of most interest in the phenomenographic analysis because they afforded the richest exchanges between respondents and researcher. In the tables that follow, these key items are marked with an asterisk (*).

Table 4

Frequencies by Museum: Visit Experiences Question Block

Question	Cohort	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
*There was something for everyone	CASM	5	11	4	1	0
	CSTM	6	12	0	2	0
The atmosphere was inviting	CASM	8	9	4	0	0
	CSTM	1	12	5	2	0
The staff was friendly	CASM	14	2	1	0	0
	CSTM	7	9	2	0	0
*The artefacts were interesting	CASM	12	7	2	0	0
	CSTM	4	13	2	1	0
*The information was easy to understand	CASM	5	14	1	1	0
	CSTM	3	15	0	2	0
The information was accurate	CASM	5	7	2	0	0
	CSTM	4	10	4	0	0
*I learned something new on this visit	CASM	16	4	1	0	0
	CSTM	3	16	1	1	0
I had fun during my visit to the museum	CASM	9	11	1	0	0
	CSTM	5	14	1	0	0

Question 8: Please rate the following according to how much you agree or disagree with the statement.

The first block of scale items in Table 4 was sourced directly from an existing instrument used at the CASM and the CSTM to assess the quality of visitors' experiences. As in those instruments, the items follow several demographic questions and a series of probes aimed at understanding what parts of the museum were visited and enjoyed most (see Appendix A, page 146). The items under consideration here address a mix of customer service issues (something

for everyone, inviting atmosphere, friendly staff, having fun) as well as measures related to the museums' missions of preservation and education (artefacts are interesting, information was understandable and accurate, and I learned something new). With the exception of three items, the scores were similarly distributed at both museums. A greater numbers of respondents at CASM were in 'strong' agreement that the atmosphere was inviting (eight vs. one), that artefacts were interesting (12 vs. four), and that something new had been learned (16 vs. three).

Table 5

Frequencies of Self-Assessed Expertise by Museums' Subject Areas

Subject Matter	Cohort	Expert (1)	(2)	Intermediate (3)	(4)	Novice (5)
*Aviation	CASM	1	1	3	5	9
History of Aviation	CASM	0	0	3	2	9
*Science	CSTM	3	6	9	2	0
Technology	CSTM	2	1	7	4	1
History of Science	CSTM	1	6	6	6	0

Question 10a. How much expertise you feel you have in aviation? Would you say…?
Question 10b. How much expertise you feel you have in aviation history?
Question 10a. How much expertise you feel you have in science? Would you say…?
Question 10b. How much expertise you feel you have in technology?
Question 10c. How much expertise you feel you have in the history of science?

Table 5 presents respondents' assessments of their expertise relative to the museums' main subject areas. Originally, 'science' and 'technology' formed a single item, however they were split after respondents commented that these were distinct areas of knowledge and should not be rated as a whole. Most of the CSTM respondents placed themselves at or above intermediate levels in science (18 participants). The self-reported levels in terms of technology and history of science were lower, clustering around the middle of the scale. At CASM, only 2 respondents placed themselves above intermediate, with the bulk of participants clustered in the novice range. Though important to note (expertise figures prominently in the discursive analysis, see section

4.3, pages 96-109) these findings are not surprising, given that aviation and aviation history represent much smaller fields of interest than science and technology. Indeed, virtually all 42 respondents reported some academic training in the sciences, if only at the high school level, while all but two reported no formal or practical knowledge of how aircrafts work or how they evolved over time. The lone self-declared aviation 'expert' had significant professional and personal interests, having worked as a helicopter mechanic and as a teacher of engine repair. The self-identified experts at CSTM all held graduate degrees in a scientific discipline.

Table 6

Frequencies of Learning Expectations by Museum

	Always	Sometimes	I don't give it much thought	No, never
CASM	14	4	2	0
CSTM	9	5	0	0

Question 11. Do you expect to learn when you visit a museum?

Table 6 presents participants' responses to a question probing expectations of learning when visiting museums. This item was added to the questionnaire after data collection had begun because the topic arose frequently during initial interviews. As such, the number of respondents in each category does not equal 21. Across both sites most respondents indicated that they expect some learning to occur each time they visit a museum. While not as useful to the phenomenographic analyses, this was an interesting and at times a contradictory factor in participants' accounts of museum learning. Table 7 presents the results of a question block adapted from the 'Satisfying Experiences List'(Doering & Pekarik, 2002), an instrument derived from a typology of museum experiences constructed from exit and entrance interviews with museum goers about what produces a 'satisfying' visit.

Table 7

Frequencies by Museum of the 'Satisfying Experiences' Question Block

Items	Museum Cohort	Very Important	Important	Neutral	Unimportant	Very Unimportant
*Gaining new information or knowledge	CASM	10	7	3	1	0
	CSTM	4	15	1	0	0
Reflecting on how technology shaped Canada	CASM	5	8	6	2	0
	CSTM	1	10	1	7	1
*Seeing 'the real thing'	CASM	11	10	0	0	0
	CSTM	6	8	5	1	0
Spending quality time with family or friends	CASM	9	5	7	0	0
	CSTM	8	6	3	1	0
Seeing my children having fun	CASM	9	2	1	0	0
	CSTM	8	1	1	0	0
Having everyone in my group enjoy themselves	CASM	6	10	1	1	0
	CSTM	3	9	6	0	0
*Imagining other times or places	CASM	6	8	3	3	0
	CSTM	3	8	7	2	0
Being pleasantly occupied	CASM	4	13	3	1	0
	CSTM	4	10	5	1	0
*Learning about myself	CASM	0	5	8	6	1
	CSTM	0	2	10	5	3
*Learning about the other people in my group	CASM	0	2	11	3	2
	CSTM	0	4	8	3	1

Question 12. The following is a list of experiences other visitors said were particularly satisfying about their visits to museums. How important are they to making <u>your</u> experience at <u>this</u> museum satisfying?

As a whole, the resulting data suggest that CASM and CSTM respondents placed little value on 'Learning about myself' and 'Learning about other people in my group' while important experiences included 'Gaining information or knowledge', 'Seeing the real thing', and 'Spending quality time with family and friends'. Across museums, the results are fairly similar, with mild differences registering in the importance of 'gaining information or knowledge' and 'seeing the real thing'; both favoured at the CASM.

After a number of scale and list-based response items, the last section of the questionnaire posed two open-ended questions: 'Did you encounter any new facts or new information while

you were visiting the museum today?' and 'Do you think there is a message, or a main idea, that the museum is trying to convey about science and technology / the technologies that allow humans to fly?' At both sites the cohorts provided a similar range and number of responses. These include 'factoids' such as "*The fact that Canadian Model Ts had two doors to be sold in the rest of the Commonwealth*"; outcome statements such as "*I learned about the differences between jets and the other types of planes*"; lists of objects and/or themes encountered such as "*Airships, WW2, Energy in aviation*"; and statements reflecting affective aspects of their museum experiences such as "*Surprised at the scale of early telecommunications equipment and just how small Sojourner is.*" The synthesis or 'main message' question also elicited comments about the museums' role in communicating to Canadians their scientific and technological histories, and promoting science and technology literary, with statements such as "*science is fun and interesting*" and "*Aviation is more accessible then you might expect.*"

Lastly, it is worth noting that individuals' ability to successfully answer the open ended question about encountering "new facts or new information while you were visiting the museum today" does not seem to relate to variations in self-ratings of the 'I learned something new on this visit' item. Tables 8 and 9 below juxtapose individuals' responses to both elements[22]. Particularly interesting given this study's research goals, these results do little to account for differences between the museums; while CASM respondents more frequently selected "strongly agree" (18 at CASM versus three at CSTM) nothing in the contents of the written responses offer any immediate explanations for the discrepancy.

[22] Among those respondents who provided a written response to the open-ended questions. In total 16 individuals in the CSTM sample and 18 in the CASM sample contributed an answer.

Table 8

Responses to 'I learned something new on this visit' and 'Did you encounter any new facts or new information while you were visiting the museum today?' at the CSTM

Score	Respondents' Self-Completed Responses
1	The fact that Canadian Model Ts had two doors to be sold in the rest of the Commonwealth
1	Pennfield was a pioneer in brain research/neurology
1	Canadian inventors
2	Did not recall
2	that early kitchen appliances were not to save labour but to increase electricity demand
2	A. Graham Bell AND an American both "invented" the telephone at the same time. / The front-end of cars is considered the most important "design" feature.
2	Info about trains, how they run. How a switchboard worked
2	Surprised at the scale of early telecommunications equipment and just how small sojourner is
2	older telephone technology prior 1980s
2	Canadian inventions -briefcase, jolly jumper. Electronic music invented in Canada? Sackbut Canadian first satellite -Alouette
2	I learned how a router works!
2	learned about the benefits of potash
2	Tar sands products in vials. Nice to see what this destructive process produces
2	Learning about how networks work (i.e., digital connections)
2	Seeing the changes that have occurred in communication technology, particularly in cordless phones
2	Timeline for Titanic, car history & involvement of Canadians

Table 9

Responses to 'I learned something new on this visit' and 'Did you encounter any new facts or new information while you were visiting the museum today?' at the CASM

Score	Respondents' Self-Completed Responses
1	Distance/durée de vol des premiers prototypes Canadiens. Écrasement sur fil haute tension et fracture de la hanche!
1	Boat planes are cool!
1	I learned that the Sabre wasn't the most reliable engine. I also learned it was a jet. I learned about the differences between jets and the other types of planes
1	Bush plane was the first one built in Canada in 1930's -can fly in any season except Spring thaw
1	I encountered many different types of planes and related instruments I hadn't seen before my visit. The space exhibit also had some info I didn't know about life for astronauts.
1	Astronauts go into the exit area of the station to acclimatize prior to doing a space-walk; Blood pressure drops and taste changes; Personal aircraft with a simple licence are on the horizon; New types pf engines will be req'd to save $, less environmental effects, not just changes to existing engines
1	Recovery of sunken plane in Foss lake and role of this museum in this and its restoration
1	General aviation history. The utility/history of certain aircrafts (The Beaver)
1	Fly-by-wire new made me curious
1	Des renseignments sur les conditions de vol de brousse et sur les défis rencontrés tant par les pilotes que les concepteurs d'avions
1	Franx Fighter suit. I had not thought before about the effect of g-force on the body, especially the blood flow
1	Airships, WW2, Energy in aviation
1	When the helicopters first entered service.
1	Environmental/scientific advancements in aviation tech
2	Snowbird plane
2	J'ai pu m'asseoir dans les cockpits pour la premiere fois et avoir le feeling d'un pilote
2	Names of airplanes, names of aviators, airplane design
3	New Heinkel aircraft on display

4.1.2 Key results: CSTM and CASM questionnaire data

As the next section will show, a wide variety of conceptions of learning emerged in the process of discussing participants' scores and the meaning(s) of the questions they answered. While opportunities to explore what respondents thought about museums and learning were provided by many elements in the questionnaire, especially fruitful items included 'I learned something new on this visit', the self-assessments of expertise, and the satisfying experiences

scale (Appendix A, page 146). Open-ended questions suggest that differences in participants' ratings cannot be explained solely on visitors' ability to recall and express new facts or new ideas.

Approaching the phenomenographic analysis, results to keep in mind are that the CSTM cohort self-reported lower levels of 'I learned something new', higher subject matter expertise, and were generally less inclined to select 'top box' rating (i.e., 'strongly agree' or 'very important'). The CASM cohort was primarily made up of self-declared novices. Ratings across most of the questions were on par or higher than the CSTM self-reported scores. Finally, respondents in both groups gave low importance ratings to items that addressed personal and interpersonal learning, i.e., about one's self or the others in the group instead of the museums' contents. This orientation is also reflected in participants' open-ended responses, which focused on factoids, types of information gained, objects and themes encountered, and reflections on affective experiences such as feeling curious or surprised.

4.2 Phenomenographic Analysis: Learning and Visitor Self-Reports

In total, 24 distinct but interrelated 'ways of talking' about museum learning were teased out of the recorded conversations. Analysis focused on participants' accounts of their reactions to questionnaire items and the ways in which they settled on their answers. This was an iterative process of listening to interviews, making notes, transcribing interviews (and later interview sections), extracting and 'decontextualizing' participants' statements about learning and museums.

Following that, the extracted meanings were 'recontextualized' by grouping, un-grouping, and re-grouping the statements in different configurations and considering these against various

levels of context[23] as proposed by Adawi et al. (2001). As clusters of similar ideas solidified, larger overarching themes were identified. These eventually formed six main categories.

Divorced for most of the analysis from the individuals who made each statement, and from the location of the interview, the results reflect my focus on conceptions and how I experienced their variations across the entire pool of collected meanings. This was done to avoid, as much as possible, confusing my sense of what distinguishes learning at the CASM from learning at the CSTM with participants' emergent conceptions, and their connections to the 'prepared context' (see section 3.3.1.1, page 42) of the questionnaire instrument.

4.2.1 Ways of talking about learning in museum visitor research

From iterative clustering of participants' statements, 24 qualitatively distinct views of learning were built and sorted into six categories of description, i.e., empirical interpretations of the varying ways a phenomenon is perceived by others (Åkerlind, 2005). Emphasising their languaged nature[24], Säljö (1997) also defined conceptions as 'ways of talking' about phenomena and categories of description as the "limited number of ways of talking about a phenomenon that is *perceived as relevant in a particular situation*" (1997, p. 179, italics are mine). Säljö's outlook is particularly suited to this inquiry, which expresses my curiosity about the construal of learning in the specific context of being both a museum visitor and a research participant.

In the following sections (4.2.1.1 to 4.2.1.6), the 24 ways of talking about learning are described and illustrated with quotes from interview transcripts. The order in which they are

---

[23] Which are: researcher context, collective (meaning the whole pool of collected meanings), and individual contexts; see section 3.3.1.1 page 42.

[24] Most phenomenographies employ un- or semi-directed interview methods (Sin, 2010)

presented follows the structure of the outcome space, which is discussed in detail in section 4.2.3 (pages 91-95). For the moment, it is sufficient to know that the six principal categories are listed in order of the number of statements they contain, beginning with the largest.

Categories of Description:

1. Learning as consuming information (256 statements)
2. Learning as cognitive acts (227 statements)
3. Learning as embodied experiences (218 statements)
4. Learning as behaviours and actions (122 statements)
5. Learning as serendipitous (88 statements)
6. Learning as knowing self and others (70 statements)

The conceptions within each category are listed in order of most 'general' to most 'museum specific' forms of learning; attributes that emerged early in the data analysis. For the most part, 'general' referenced learning in situations such as classrooms, the workplace, and travel.

4.2.1.1 Learning as consuming information

Five increasingly museum-specific sub-groupings make up this category: learning as gaining facts and information; learning as encountering curated information; learning as taking 'something' away; learning as encountering quirky/cool facts; and learning as the *what* and *how* of museum artefacts. Taken together, this cluster makes up the most common and widely used way of discussing learning. Indeed, every participant made at least one reference to learning as the acquisition of facts.

Gaining facts and information

Expressed at least once by each participant, absorbing information was typically the first idea to emerge when asking respondents to define what learning had meant to them as they

worked through the questionnaire. This was a largely cross-contextual conception, though aligned with representations of learning-as-product more so than learning-as-process:

> *So when I read that question, I, was there new information that went into my head today?* (i10, CSTM) [25]
>
> *Uhm, well I guess I see the museum as being in the education communication information transfer, transmission business that's what they're supposed to be doing* (i27, CSTM)

Encountering 'curated' information

Expressed by 21 participants, this conception reflects an awareness that information encountered in places like museums have been considered, filtered, vulgarized, shaped, and/or presented by someone. Respondents connected this to museums' larger educational goals and the messaging contained in exhibitions. For some this also conveyed a belief that museum information is generally trustworthy, although two respondents held a more critical stance, comparing some displays to forms of propaganda**.**

> *Uhm, generally I expect things to be presented in more like a factual knowledge, I could go read it in a book, but I also am interested to see the ways that somebody else portrays it. How it's interpreted, ya. 'Cause again like the Energy display, could have been presented in many different ways depending on who was you know funding it.* (i42, CSTM)

[25] These items reference visitor-participants' randomly assigned identification codes (e.g., i10) and the museum in which they were interviewed (e.g., CSTM).

Taking ‘something’ away

Identified by 22 participants, this conception describes learning as a kind of ‘take-away’. The word ‘something’ appeared to relate strongly to the museum setting, in that it tended to emerge while discussing visitor agendas and expectations. Interestingly, its use never denoted any avoidance of thinking up a specific example of learning, but rather an expression of visitor-participants’ open-ended expectations:

> *(…) more I guess for me as an individual that's probably the thing that I’m most interested in, is ah getting some information out of the visit. I don't go to learn something specific but I hope that when I come away at the end I’ve taken something out.* (i5, CASM)

Encountering quirky/cool facts

Still reflecting vague subject matter expectations, several of the more avid museum goers (eight participants in total) described museum learning as encountering fun, quirky, odd, or funky information, also phrased by one museum member as “*cool adult learning*” (i18, CASM). This quirky/cool trait cut across multiple subject areas and types of facts, including history, the natural and the social sciences, and technical information about artefacts.

> *I'm sure there's people come in here going no I want, like, some not only super technical information, but just some other strange things. How much metal or whatever goes into making a Lancaster Bomber? At some point ya, because if you come here enough and want something more...again it could be inconsequential weird facts. Something to make me go: really?!* (i22, CASM)

The *what* and *how* of artefacts

Lastly**,** 15 respondents described museum learning as gaining information specifically about artefacts. This included contextual information such as what it is and, given that most artefacts at both sites are mechanical in nature, explanations of how things work.

> *(…) for me who knows absolutely nothing about technology and you can kind of go "ah, that's how it works"* (i17, CSTM)

4.2.1.2 Learning as cognitive acts

Less cognitively passive than the idea of consuming information, this section explores respondents' descriptions of learning in relation to a variety of mental processes, both conscious and not. This includes learning as remembering and forgetting, learning as active thinking processes, learning as imaginative engagements, learning as the altering of one's knowledge or perceptions, and learning as deriving meaning from artefacts. Three-quarters of the total pool of respondents made at least one statement related to this category.

Remembering and forgetting

Expressed by 20 participants, this conception is linked to learning as factual gains in the sense that learning processes involve a great deal of forgetting along with a great deal of remembering. Indeed, forgetting was neither the absence of learning, nor a failure to learn. Rather, participants' accounts drew parallels between museum and school learning, in that both expose individuals to considerable amounts of information that will never be entirely retained. This is well illustrated by the following museum-specific statement:

> *(…) ça fait partie je trouve du processus d'apprentissage, dans le sens que, tu pourrais pas tout absorber premièrement, pis tu vas surement te souvenir de certaines choses qui t'intéressent vraiment* (i12, CASM)

[(…) it's part of the learning process for me, in that you can't first of all absorb everything, but you'll surely remember certain things that really interest you].

Another variant on 'remembering and forgetting' related to both the museum setting and the act of self-reporting. This took the form of participants noting that while they remembered learning facts, they didn't necessarily remember the facts learned by the time they were confronted with the questionnaire:

Like one of the hardest questions is "What did you learn?" I know I learned lots but I'd almost forgotten between leaving there and coming here. (i38, CSTM)

Active thinking

Identified in the accounts of 32 participants, this way of talking about learning reflected instances of metacognitive awareness among some respondents, relative to the mental processes they employed/experienced while in the museum (and in other stimulating environments such as forested areas).

(…) this time I may have finally understood what modem speeds are (laughing). Ya, you know something clicked and I went "Oh! OK that's what 16 bits means" OK, hunh. So a light bulb went on today (laughing) (i39, CSTM)

At the same time, participants' accounts also suggested a general belief that museum going is likely to entail active mental processes, whether fully conscious or not. This is noticeable in the use of expressions such as "*making connections*", "*soaking it up"* and "*working your brain differently*" as well as words like *grasping*, *déclancher* (setting off) and *clicking* to describe their museum going experiences.

Imagining

Linked for the most part to experiences with one, or several, of the large impressive artefacts on display at both museums (i.e., the Hall of Locomotives at the CSTM and the aircraft at the CASM) imagining-as-learning was noted in the accounts of 15 participants. Interestingly, the 'triggers' for imaginative acts, as well as the contents of the imaginings, were often related to personal factors, such as the case cited below:

> *I am ah, you know in my own life I'm slowly going through a process of, of ah, less and less technology in the house and that sort of thing. So, I got lost in imagining what it would have been like to be a pioneering ah, bush pilot with these guys* (i8, CASM)

Altering knowledge or perceptions

Expressed by 25 participants, this conception is similar to 'learning as active thinking', but also with emphasis on changes in one's understanding or feelings about a given topic. This is best exemplified by the statement below:

> *(...) or how the switchboard works thinking "oh of course I know how it works" then I was kinda like " 'K I get it for kind of a simple, you know this person, this person"[making switchboard-like gestures] but then you look at these huge rooms of switchboard operators and you kinda go "Ya, there must have been other steps!!" (laugh) It's that moment where you realize that what you think you know isn't really lined up with reality, and kind of going "oh! OK, so this person would switch to this, connect to that..."* (i37, CSTM)

Less specific examples of alterations were also present, and for the most part bore connections to the idea of always learning 'something' when one visits a museum:

(...) to me that's my expectation of a museum is that it's a place that's going to broaden my understanding of something. (i8, CASM)

Deriving meaning from artefacts

Last, and naturally specific to participants' conceptions of museum learning, was the idea of deriving various forms of meaning from encounters with artefacts. In total, nine of the 16 participants who expressed this conception worked at the museum. Not surprisingly, the more academic examples derived from the accounts of museum curators, individuals practiced at observing and drawing meaning from material culture.

(...) a few years ago I wouldn't of got all jazzed up about a Beckman 1986 centrifuge but there is some qualities that, of it...colour, shape, kinda 1980s design that got me going in different contexts and now I have a really I think an appreciation for that, whereas other people in the world don't, they'll think I 'm weird for liking that, but I think in 10 years a 1980s instrumentation show probably would be quite interesting. (i23, CASM)

Respondents also discussed forms of learning related to the construction and craftsmanship of objects on display.

(...) going to the Canadian Canoe Museum in Peterborough, I was able to look at stuff and look at construction and learn something you know from that and just the art and science behind that. (i38, CSTM)

4.2.1.3 Learning as embodied experiences

This category is made up of five sub-sets that focus on feelings, perceptions, sensations, and other lived experiences reflected in participants' accounts of learning. These include learning as

experiencing newness, being in a multi-sensory and multi-modal environment, experiencing flow-like states, and being in the presence of artefacts.

Experiencing 'newness'

Featured in descriptions of both general and museum learning, the experience of newness as a quality of fact, idea, setting, action, or activity was described by 24 participants. Applied to museums, encounters with something previously unknown or unexperienced (often a new fact or piece of interesting information) related to notions of novelty and trivia, as well as feelings of pleasure and amusement.

> *I mentioned getting out of my day to day stuff, I think it has to do with new experiences, can be fun. It's an inviting environment with lots of nifty things to look at. Ya, it's new, I think ah, novelty can be a very important part of this sort of thing.* (i8, CASM)

Multi-modal and multi-sensory experiences

This conception, found in the accounts of 20 participants, represents both general and museum specific learning as related to moving about in and experiencing environments through multiple senses. Typical settings for these kinds of learning experiences included travel and spending time in nature. Museum-specific examples generally focused on exhibits that provide unusual or novel stimulation:

> *(...) you know to actually go into like the Crazy Kitchen and go "wow, you know what you do feel the vertigo" and uhm it's that kind of thing that, when something does physically surprise me that's what makes it cool and interesting* (i38, CSTM)

I think ahm, putting people in the context of that time or place, that's in another era ahm it's fun and it helps you absorb the information if you're talking about the history of something, if you don't sort of immerse someone into that context, you know like the can with the string, sort of demonstrate the history of the telephone (laugh). It helps to learn, absorb info. (i14, CSTM)

Flow-like states

Statements related to this conception of learning were expressed by 30 participants. Flow[26] is a psychological concept which came into vogue in the visitor studies literature of the 1990s. Based on the scholarship of psychologist Mihály Csíkszentmihályi (1934-present) flow experiences are characterized by feelings of directedness, concentration, mental activity, the interplay of knowledge, memory, emotion, sensation, and perception, and the enjoyment of challenges that are neither too hard nor too easy (Lankford, 2002).

In museums flow-like states have been described as "pulling visitors' attention toward the environment and away from internal states" (Loomis, Harvey, & Marino, 1997, p. 240). This could mean losing oneself in an aesthetic experience or being free of embarrassment and uncertainty when faced with hands-on activities or a complex work of art (Hein, 1998; Lankford, 2002). In this study participants described feelings of absorption, amazement, engagement, and openness to the surroundings.

Even though aviation is not my, not something I would say is an interest of mine, I think you can't help but be fascinated by being immersed in the space. (...) But being in the space I actually find it pretty captivating. (i25, CASM)

---

[26] This conception is labeled according to my interpretations of respondents' accounts as 'flow-like'.

The feeling that museum contents reached out to participants, instead of visitors having to make an effort to connect, also characterizes this conception.

(…) j'dirais un musée ça doit venir me chercher plus de l'intérieur, c'est...je dois apprendre sans me rendre compte que j'apprends (i2, CASM)

[I'd say a museum has to come and grab me from the inside, it's… I must learn without realizing that I am learning]

Similar on a discursive level[27] to conceptions of museum learning as the acquisition of quirky/cool facts, flow-like states also relate to instances of learning in which participants experienced the museum environment as 'weird', 'fun', 'nifty', or 'cool'.

On trouvait ça pas mal funky la... les différentes sortes d'hélices, la forme d'avions aussi, aussi j'ai ben aimé la p'tite cabine les modèles avec les numéros, c'té bien faite aussi (i9, CASM)

[We found it all pretty funky…the different types of propellers, the shape of the airplanes, I also like the little cabin with the models and numbers, it was well done too.]

Being in the presence of artefacts

Emergent from the accounts of 18 participants, this last 'embodied' conception of learning relates to learning from artefacts as a cognitive act, but highlights respondents' emotional, visceral and/or aesthetic interpretations, rather than the academic meaning-making noted in section 4.2.1.2. As examples, the first excerpt recounts a participant's strong emotions as she skirted around a World War II era bomber at the CASM.

[27] By this I mean in terms of the participants' vocabulary and turns of phrase.

Ben, j'ai appris que j'aimais pas certains avions en fait. C'est marrant parce que la sensation que j'ai eu c'est une sensation que j'ai assez rarement, mais ça m'arrive souvent dans des musée ou des choses comme ça, c'est juste un sentiment...je peux même pas m'approcher du truc (i2, CASM)

[Well, I did actually learn that I don't like certain airplanes. It's funny, because the feeling I got is one that I only rarely get, but it does happen often in museums or places like that, it's just this feeling… I can't even get close to the thing]

The second account is from a CSTM staff member, reacting to an artefact's physical properties.

(…) so I was talking to them about the trench digger, and I realized for the first time just how wicked that machine looks and that if you slipped or if, you know, your tie got caught in one of the gears you're...you end up in the trench. And you know, no amount of reading about it and not even pictures, you look at it it's grimy and it's got gears shifting and the gears are, ah, just like bone crunching stuff. (i16, CSTM)

4.2.1.4 Learning as behaviours and actions

This category is reminiscent of behaviourist models of learning, in that participants described observable actions either *as* learning or as a short-hand for actions assumed to *produce* learning. The most commonly mentioned of these conceptions was learning as reading, followed by learning as physical or tactile exploration, learning as seeing and looking, and learning as examining artefacts. As above, these are listed in order of least-to-most museum specific.

Reading

In all, 25 participants equated reading with learning in museums, academic settings, and in everyday situations. In the museum context, reading related to taking in information, and was

used as short-hand for mindful engagement with interpretive materials. This is illustrated in the following statement (by a museum member who typically visits with her young children) made during a discussion of museum-going without children:

> *(...) it would be more probably for learning, you know I'd actually take the time to look at stuff and read stuff 'cause I don't really have the time* (i36, CASM)

Looking and seeing

Present in the accounts of 13 participants, looking was only occasionally a form of learning in its own right; a somewhat surprising result given museums' highly visual natures. In a more colloquial sense, looking was also used to signify or 'stand in' for active engagement with museum contents. The quotes below reflect both elements of this:

> *Looking at, actually LOOKING at the ejection seat and going "oohh that looks not comfortable at all."* (i22 CASM)

> *(...) and part of learning for me is seeing, so even the fact that I've seen something like this, that's interesting that I've never seen before, that's part of the learning, so it's not necessarily that...the written content, written material or whatever* (i3, CASM)

Tactile and kinetic

This category reflects a common association, noted here in the accounts of 19 participants, of museum learning with hands-on experiences such as pushing buttons, using levers, or playing with computer interfaces. Not surprisingly, this conception often surfaced in conversations about children's needs and learning styles, however several adults also appreciated the physical and kinetic aspects of exhibition environments for themselves.

(...) some people like to read through things and learn that way, whereas you know you have the stuff for the kids with the buttons to push and levers to pull, so that's really important. (i28, CSTM)

Examining artefacts

More intense than simply looking at objects on display, this last sub-set represents occasions where the act of examining an object is described as a form of learning in its self. Not surprisingly, the 11 participants who discussed this form of learning had expertise and/or background knowledge enabling them, such as the following example from a respondent who is both a frequent museum-goer and an experienced seamstress:

(...) I love details, like if I'm gonna look at a costume I'm gonna look at the seams and how they, like is it hand-stitched. So seeing the real thing is important. Ya, looking at rivets or how was the sail stitched together, I might go look at that... (i6, CASM)

4.2.1.5 Learning as serendipitous

This category of meaning refers to conceptions of museum learning as a series of unplanned and haphazard discoveries. This includes moments of pleasant information browsing, happy accidents, un-expected personal connections to exhibition contents, and learning that occurred inadvertently –which one respondent described as 'collateral learning'.

Unplanned or 'collateral' learning

This conception, expressed by 22 respondents, was most often described by adults visiting with, and also for, their children. Dedicating a significant amount of attention to their young ones, these participants described lower expectations of leaving the museum with the impression of having learned something.

(...) I feel like it's more for them, I want him to be exposed to these different things and if I get some like collateral learning OK (i28, CSTM)

(...) I was talking about the different networks that they have and just the mechanics of it and I had never stopped to think about it, and I...outside of this museum I would have no desire to go and look up that information but you know, like while you're waiting for the kids to run around do the tunnels, like "oh well I'm standing in front of here so I might as well just read up on some stuff that's nearby. (i28, CSTM)

Self-directed and personal

Expressed by 20 respondents, this conception addresses museum learning as personal, situated, subjective, and/or self-directed. However, the limits of this were clear to respondents, in the sense that 'personal' signified a relationship with museum content (often with emotional dimensions) but did not comprise the idea that museum learning can also be directed inward, as a self-reflexive experience. The idea of personal connections is reflected in the following excerpt, expressed while discussing the participant's definition of 'interesting':

(...)'interesting' probably, it depends on...what you're interested in learning about or what, like I found the things that I most read about or spent more time looking at would be things that are connected to my past or to my, like the model of the Victoria Bridge in Montreal, I grew up in Montreal so I was like "Oh no kidding!" I didn't know that at the time is was the 8th, 8th wonder of the world and the longest bridge of its time (i30, CSTM)

4.2.1.6 Learning as knowing self or others

As its position as the sixth and final category indicates, references to social forms of learning and learning as introspection were relatively infrequent. Indeed, without prompting by items in the questionnaire (see Appendix A, page 149) as well as the interview guide (see Appendix B, page 166) aimed at exploring the idea of 'knowing when you've learned' with participants, it is possible this conception would have been entirely absent from the outcome space.

Learning as relaying information

Expressed by seven participants as an aspect of both general and museum learning, the capacity to relay information to others was cited as a way of knowing that one has retained a given fact or idea.

> *(...) ah, learning so finding facts that you didn't know about, gathering information, ahm, ah, just taking a little tidbit of something that you can have a conversation with somebody else later on*. (i36, CASM)

One participant also indicated that being able to explain an idea to someone else (i.e., a classmate) was a way of knowing that one had grasped that given concept.

Learning with others

While learning *about* others was frequently rejected (sometimes quite vehemently) as a potential outcome of museum-going, roughly half of the participants (21 in total) noted that conversations with members of one's the social group, during or after a visit, can contribute significantly to what is gained:

> *(...) it's great when you're actually there at a museum with someone else who actually kinda does understand* (i42, CSTM)

Learning about myself/non-introspective

Addressed by 16 participants and related to a questionnaire item probing the importance of "learning about myself" (see Appendix A, page 149) during a museum visit, this is the only category to contain a negative sub-set, i.e., expressions of what museum learning *isn't*. This is not surprising, in that 33 out of the 42 participants rated the item between 'neutral' and 'very unimportant'. Within the pool of 20 statements, 13 were categorical rejections:

> *I don't see how a museum would do that. I'm here to learn about other things rather than just myself.* (i41, CSTM)

The remaining seven considered introspective learning possible but rare; often requiring special circumstances. As an example, the following excerpt begins as the respondent is describing an exhibition addressing the history of practices related to the attractiveness of women:

> *(...) the history of ahm, not really fashion but what we will do to make ourselves attractive and so learning about myself was pretty massive in that one, because as I walked through and I was like: Ok so whale bone, corsets, ok well I would never wear that...Oh! But you wear spanks and that's another version of... learning about how I feel about foot-binding…well I'm disgusted hmm, ya but that's the society… they give you the info as to why they do it. Then you're left going well can I really be that judgemental? (i40, CSTM)*

Learning about others

Four statements from four individuals make up this final category. Two noted that museums provided chances to learn about their children, while the remaining pair saw museums as interesting settings in which to observe others. An example of each is provided here:

That's maybe of a new behaviour for her, she's now 9 she can read it herself, could go off and run around and look at it. So I did learn something new about her, but I wouldn't include that from the question in my learning. (i25, CASM)

(…) just learning about how little I know about certain things, that was fun. And then also the same thing applied to other people in my group, seeing how they react to things (i31, CASM)

4.2.2 Conceptions of learning at the CASM and the CSTM

Tables 10 and 11 (pages 90 and 91) provide location-based comparisons of participants' conceptions. The first features a break-down in terms of the frequency of the various conceptions in the (now separated) pools of meaning, and the second a comparison of the number of individuals who expressed the various ideas in the course of their interview. Together, these suggest that the questionnaire instrument itself exerted a significant amount of influence on the conceptions of learning that emerged.

For the most part, only minor differences are perceptible in the distributions of conceptions extracted from each museum's data pools. Most dissimilar were the number of statements (or 'units of meaning') concerning *Active Thinking* (54 at CASM vs. 34 at CSTM); *Deriving Meaning from Artefacts* (23 at CASM vs. 34 at CSTM); *Flow-Like States* (53 at CASM vs. 34 at CSTM); *Reading* (34 at CASM vs. 22 at CSTM); and *Experiencing Newness* (32 at CSTM vs. 19 at CASM). These are italicised in Table 10. Relative to the number of participants who expressed each conception (at least once) the differences between museums are even smaller. The two largest gaps, five participants in each case, are in *Looking and seeing* (nine at CASM vs. four at CSTM), and *Relaying information* (six at CSTM vs. one at CASM). Other conceptions with slight variations (differing by four) in favour of CASM are *Deriving meaning from artefacts*;

Flow-like states; *In the presence of artefacts*; and learning as *Unplanned or 'collateral'*. Similar gaps favouring the CSTM are *Remembering and forgetting*; and *Knowing self and others* (these conceptions are italicised in Table 11).

While small, these variations do make sense relative to the contents and atmosphere of each museum. As noted in section 3.3.2.2 (pages 45-47), the CASM is a large and bright hangar-like environment, with aircraft and other large artefacts grouped together and interpreted by text panels. It features fewer interactive experiences and is generally less family-centric. The CSTM is media and information rich, featuring a mix of large and small artefacts (from locomotives to scalpels) in an environment more akin to a busy science centre. Along similar lines, these findings also relate to participants' ratings of their museum experiences (see Table 4, page 63). In particular, a greater number of respondents in the CASM sample 'strongly agreed' that the atmosphere was inviting (eight vs. one), that artefacts were interesting (12 vs. four), and that something new had been learned (16 vs. three).

Table 10

Learning Conception Frequencies (CASM and CSTM Sub-Samples)

Categories	Conceptions	Units of Meaning		
		CASM	CSTM	Totals
Consuming Information	Gaining facts and information	68	58	126
	Encountering ‘curated’ information	25	20	45
	Getting something	17	21	38
	Encountering quirky/cool facts	11	7	18
	The what and how of artefacts	17	12	29
Cognitive Acts	Remembering and forgetting	19	23	42
	Active thinking	54	34	88
	Imagining	13	7	20
	Altering knowledge or perspectives	25	20	45
	Deriving meaning from artefacts	23	9	32
Embodied Experiences	Experiencing newness	19	32	51
	Multi-sensory and multi-modal	21	27	48
	Flow-like states	53	34	87
	Being in the presence of artefacts	20	12	32
Behaviour and Actions	Reading	34	22	56
	Looking and seeing	13	4	17
	Tactile and kinetic	16	17	33
	Examining artefacts	8	8	16
Serendipity	Unplanned or ‘collateral’	17	17	34
	Self-directed and personal	30	24	54
Knowing Self and Others	Relaying information	1	8	9
	Learning with others	20	16	36
	Learning about myself/non-introspective	9	12	21
	Learning about others	3	1	4

Table 11

Number of Participants Reporting Conceptions of Learning (CASM and CSTM Samples)

Categories	Conceptions	Respondents		
		CASM	CSTM	Totals
Consuming Information	Gaining facts and information	21	20	41
	Encountering ‘curated’ information	10	11	21
	Getting something	10	12	22
	Encountering quirky/cool facts	3	3	6
	The what and how of artefacts	8	7	15
Cognitive Acts	Remembering and forgetting	8	12	20
	Active thinking	17	15	32
	Imagining	9	6	15
	Altering knowledge or perspectives	14	11	25
	Deriving meaning from artefacts	10	6	16
Embodied Experiences	Experiencing newness	11	13	24
	Multi-sensory and multi-modal	9	11	20
	Flow-like states	17	13	30
	Being in the presence of artefacts	11	7	18
Behaviour and Actions	Reading	13	12	25
	Looking and seeing	9	4	13
	Tactile and kinetic	10	9	19
	Examining artefacts	6	5	11
Serendipity	Unplanned or ‘collateral’	12	8	20
	Self-directed and personal	12	10	22
Knowing Self and Others	Relaying information	1	6	7
	Learning with others	10	11	21
	Learning about myself/non-introspective	6	10	16
	Learning about others	3	1	4

4.2.3 Outcome space

Categories of description presented within a logical structure, one articulated by the researcher to provide an “elucidation of relations between different ways of experiencing the one phenomenon” (Åkerlind, 2005, p. 322) form the phenomenographic outcome space. Dahlin

(2007, p. 337) also uses the term 'idealisation' to describe the concept, highlighting the difference between a model and the much messier phenomena it tries to represent.

Consistent with Pekarik's assessment of museums as "unruly"(2010) settings, attempts to map the phenomenon of museum learning did not yield a tidy structure (see Figure 6, page 95). Conceptions identified through the analysis process are not hierarchically inclusive. Rather, ways of talking about learning are organized within a structure derived from two attributes. The first is the volume of statements in each of the six main categories, and the second the degree to which conceptions were museum-specific or elements of learning 'in general'[28]. The data underlying these are presented in Table 12 (page 94).

Interconnections and resonances between conceptions are suggested in the graphical representation (see page 95) by overlaid lines and manipulations of the table's rows. This structure and the connections suggested emerged from analyses of participants' contributions. As such, relationships between conceptions are not *only* reflective of instances when respondents themselves made explicit links between concepts. However, the first and last rows (marked with lines capped by ovals) are derived from participant accounts and feature their logical continuity of ideas. In other words, when participants talked of learning as *factual gains* they largely did so in the context of recounting something they *read*, which was *new* to them, and which they joked would probably be *forgotten* a few days hence. This chain of ideas applies to the museum setting, but also served accounts of learning at home, in school, or in leisure time activities. Running along the bottom of the figure, conceptions of learning specific to museum artefacts were similarly connected. Not surprisingly, they tended to emerge from interviews with museum staff and avid visitors.

[28] Learning "in general" referenced school settings, reading, travel, and time in natural environments.

Unlike the top and bottom sets, the conceptual connections among the ‘middle’ items (second to fourth rows) are much less linear. Conceptions that align across the horizontal tend to intersect, but not always. Moreover, some conceptions can be associated to virtually all other ways of describing learning. This is the case of the ‘serendipity’ category and its two conceptions; learning as an unplanned ‘collateral’ event, and learning as stumbling upon something that is personally meaningful.

Finally, the structure of the outcome space reflects both the order and the weighting of ideas in the questionnaire instrument. For instance, the first items encountered focused on facts and information, then on learning “something new,” seeing artefacts, and imagining other times and places. Items near the end asked about introspective learning and learning about others in one’s visiting party. However, the outcome space does not simply mirror the questionnaire. Several items, such as “the information was accurate” and “reflecting on how technology shaped Canada” seemed to hold little meaning, as they generated almost no discussion and therefore no conceptions. Moreover, the sixth and final category of description (Knowing Self and Others) sits apart from the first five, as its constitutive elements were discussed mostly in the context of how poorly they fit with participants’ experiences of learning in the two museums.

Table 12

Frequencies and Percentage of Museum-Specific Units of Meaning by Conception

Categories of Description	Conceptions	Units of Meaning	% Museum Specific Units
Consuming Information	Gaining facts and information	126	65%
	Encountering ‘curated’ information	45	86%
	Getting something	38	94%
	Encountering quirky/cool facts	18	94%
	The what and how of artefacts	29	100%
Cognitive Acts	Remembering and forgetting	42	47%
	Active thinking	88	55%
	Imagining	20	67%
	Altering knowledge or perspectives	45	71%
	Deriving meaning from artefacts	32	100%
Embodied Experiences	Experiencing newness	51	59%
	Multi-sensory and multi-modal	48	69%
	Flow-like states	87	82%
	Being in the presence of artefacts	32	100%
Behaviour and Actions	Reading	56	76%
	Looking and seeing	17	83%
	Tactile and kinetic	33	85%
	Examining artefacts	16	100%
Serendipitous	Unplanned or ‘collateral’	34	69%
	Self-directed and personal	54	72%
Knowing Self and Others	Relaying information	9	22%
	Learning with others	36	75%
	Learning about myself/non-introspective	21	85%
	Learning about others	4	75%

Consuming Information	Cognitive Acts	Embodied Experiences	Actions and Behaviour		Serendipity		Knowing Self and Others
Factual Gains	Remembering, Forgetting	Newness	Reading		Collateral	Personal	Relaying Information
'Curated' Information	Active Thinking	Multi-Sensory, Multi-Modal	Looking, Seeing	Tactile, Kinetic			Learning with Others
Taking 'Something' Away	Imagining						(Non) Introspective
Quirky/Cool Facts	Altering Knowledge, Perspectives	Flow-Like States					Learning about Others
What and How of Artefacts	Deriving Meaning from Artefacts	In the Presence of artefacts	Examining Artefacts				

Museum Specific

Frequency of Conceptions

Figure 6. Outcome space representing the conceptions of learning in visitor-participants' accounts of self-report responses

4.3 Discursive Analysis: Accounts of Learning Self-Reports

As they emerged in a specific context, i.e., asking participants to talk about questionnaire items and their own responses, the resulting six categories and 24 conceptions of learning are neither exhaustive, nor held as representative of how visitors not taking part in the survey exercise think about learning. Rather, the accounts presented here are assumed to 'belong' to the contexts and the accounting practices of their emergence (Fontana & Frey, 2005; Säljö, 1997) in that:

> Accounting practices, ways of talking about and understanding reality, are of course highly social and cultural phenomena and they provide the conceptual resources by means of which individuals organise their contributions to situated discourse. The "same" phenomenon can be incorporated into very different accounting practices between cultures or contexts. (Säljö, 1997, pp. 179–180)

Within that perspective, this section explores the ways in which participants talked and positioned themselves as visitor-learners in relation to their own self-reports. Three threads are explored. The first looks at word usage and linguistic resources employed to account for participants' experiences. The second considers overlapping discourses of agency *in* and responsibility *for* learning in museums. The third thread explores how novices and experts (the latter in particular) accomplished these roles (Fleming, 1986; Holstein & Gubrium, 2005) and related these positions to their learning self-reports. Where appropriate, differences between the accounting practices employed at the two museums are brought forward.

4.3.1 "Hunh!" Accounting for something learned

While facts and information feature heavily in the conceptions of learning described above, participants often spoke of them generally or in the abstract. In the phenomenographic analysis, this gave rise to conceptions of learning as consuming *kinds* of information (i.e., curated, quirky, or about artefacts), and as taking *something* away (see section 4.2.1.1, page 74). Turning to the specific language forms that lead to these conceptions, this section focuses on self-talk and interjections; forms of speech found in over half of the 42 interviews.

'Self-talk' in this context refers to participants' internal monologues, which may or may not feature words spoken aloud. Interjections are a part of speech[29] used to convey surprise, strong feelings (e.g., joy or regret), to bring attention, to protest, and to command. Not grammatically related to the rest of a sentence, they can be a single word (hey!), an expression (good grief!), or a sound (phew…). During the interviews interjections served to communicate the newness, unexpectedness, or coolness of facts, objects, and experiences. Typical terms include '*cool'*, '*neat'*, '*dingue'* (crazy), '*wow'*, '*oh!'*, '*hunh'*, and '*ah-ha'*. In the example below, three interjections are used to convey a participant's disbelief and admiration for early aviators' dangerous test-flights:

> (…) les pionniers là... *what the anh!!* C'est minuscule, comme j'veux dire aventuriers pas à peu près, p'tits avions en bois ou en carton, sont courageux...quand même assez incroyable de pouvoir voir ça, tsé c'est super gros, pis toute les détails, j'sais pas c'est aussi épeurant que comme...*t'é comme wow!* Un être humain a fait ça, maintenant le

[29]The parts of speech: Verb, noun, pronoun, adjective, adverb, preposition, conjunction, and interjection. (http://www.uottawa.ca/academic/arts/writcent/hypergrammar/interjct.html)

confort tout ça, mais avant ça c'tais comme...y'en ont fait des tests, pis des écrasements, *tout les...hmm!!* J'serais pt'être pas la personne qui aurait testé ça. (c142, i12, CASM)

[(…) the pioneers over there…what the heck! It's tiny, they were crazy adventurous, little wood or cardboard planes, super brave…and really it's incredible to be able to see it, big and with all the details. I don't know, it's scary too…like wow! A human did that, now it's so comfy and all that, but before…and they did tests, and crashed, all the…hmm! Don't know if I'd have tested that.]

Specific to the interview portions that invited participants to describe the processes behind their learning self-reports, interjections featured alongside self-talk as story-telling features:

Participant*: uhm, I'll...on to that, the one thing that I wrote, I learned...I put detail about Pennfield, that was the one thing that I learned today, one of the innovators*

Interviewer: ok, ya ya

Participant*: uhm, that was one of the first moments when I said "oh, I actually got as much information as uhm, I got more information than I was expecting to get from it (i10, CSTM)*

These forms of speech also appeared as memory aids, and as ways of querying oneself about learning 'something':

Participant: *When I learned something new? I went...cool I didn't know that, and then moved on.*

Interviewer: *Ya, so you had a "hunh!" moment or something like that.*

Participant: *Yes*

Interviewer: *So when you were reflecting on the question did you ask yourself if you'd had a "hunh"?*

Participant: *Yes. Because or else I wouldn't know if I learned something. I probably did, but just wouldn't have known it.* (i18, CASM)

Particularly interesting, the use of interjections, self-talk, and the word 'something' in these examples do not stand for avoidance, disinterest, or forgetfulness. Rather, these forms of speech seem like respondents' best attempts at communicating their experiences of learning during museum visits *as* experiences and not as lists of factual gains. This idea is explored further in Chapter 5.

4.3.2 Responsibility and agency

This section considers the ways in which visitors positioned themselves relative to the task of learning. This includes various arguments that visitors are, at best, only partially responsible for their learning and descriptions of museum settings that grant a kind of agency to the physical environment. This also highlights an interesting intersection between responsibility discourses and conceptions of museum learning as flow-like states.

Indeed, while the transcripts contain multiple examples of museum learning described as an *active* process (physical and cognitive) this does not translate to an acceptance of *effort*. This is clearly reflected in the following excerpt in which a respondent sets limits to the amount of energy she will expend on any single element in an environment with so much to see. This emerged as the participant and I discussed her positive rating of the item "the information was easy to understand":

(...) c'est assez explicatif, pis t'est comme ah, ok, c'est clair. Créé cette année-là, utilisation, le but, oué l'information claire. Si c'est pas clair ben, passe à côté (rire). Je relis pas la phrase dix fois, y'a d'autre choses à voir. That's it!

[(…) it's explained pretty well, and you go "ah, ok, it's clear. Built in that year, use, goal, ya the information is clear. If it's not, well then movin' on (laughs). I'm not re-reading it ten times, there's other stuff to see. That's it!!] (i12, CASM)

In another instance, only limited efforts are needed due to the belief that learning (i.e., consuming information and experiencing newness) is almost inevitable in museum settings:

Participant: *C't'un musée, c'est-a ça que ça sert. Uhm veux/veux pas par défaut, si y'on du stock y'en on que j'ai jamais vu, je vais finir par apprendre de quoi juste par...law of large numbers...c'est...*

Interviewer: *Mais est-ce que...ce qui m'intéresse est-ce tu t'attends à faire un effort? Ou quasiment par osmose?*

Participant: *Non. Passif. Si je me tiens là assez longtemps. C'est comme euh, va te mettre dans douche, tourne l'eau tu vas finir par être trempe* (i25, CSTM)

[It's a museum, that's what it's for. Whether you want to or not, if they've got something you haven't seen before you'll wind up learning something by … law of large numbers ...

Interviewer: But is…what interests me is do you expect to make an effort? Or practically by osmosis?

Participant: No, passive. If I stand around long enough. It's like, uhm, get in the shower and turn the water on, eventually you'll be wet.]

As such, while the visitor must choose to engage with something, the responsibility for learning is mostly located outside of self. Somewhat like the shower image noted above, after the initial action (like turning on the water) a kind of agency is then granted to the surrounding environment. Artefacts and exhibits were described as ‘calling to’ participants and ‘catching their interest’. Even facts were described in active terms, in the sense that some perceived the museum as a lot of information ‘coming at them’. The connection between these two elements is present in the following excerpt:

> *(…) well I mean I think the responsibility does fall on the museum to make it easy for someone to learn, because some museums I’ve been to it's just like you know, it’s fairly simple, just photographs or artefacts and like these little paragraphs of text. After the first 5 or 6 you're like "ok well, I don't want to sit here all day just reading these." You know, you might just look at the photo or look at the artefact, you might you know get bored of that. So you know it’s your responsibility, ya but it also has to be interesting it has to be presented in a way that grabs your attention* (i14, CSTM)

In that sense, responsibility discourses intersect conceptions of museum learning as flow-like[30] states of fascination, absorption, amazement, engagement, and openness (see section 4.2.1.3 page 80). These also echo wider cultural tropes associated to museum environments such as hushed contemplation, reverence for the strange or beautiful things on display, and the museum as a place of deep transformations (Fisher, 2002).

---

[30]In museums ‘flow’ has been described as pulling visitor attention toward the setting or exhibit and away from any preoccupations with their “internal states” (Loomis, Harvey, & Marino, 1997).

However, specific to accounts of learning, these discourses of agency, flow, and responsibility can eventually be at odds with the very idea of using self-reports to assess learning, in that the ideal experience of effortless, fluid engagement is also one in which the person is unaware of learning–at least in the immediate to short time frame of most visitor studies. Reflecting an issue raised by Hooper-Greenhill (2007) in the literature review (section 2.1.3, pages 14-16), this final point is reflected in the following excerpt:

> *(…) pour moi c'est ça qui viens me chercher, je vais découvrir des choses sans avoir nécessairement l'impression de faire un processus de lecture, d'acquisition de connaissances, pour moi c'est ça, ça va être ça la différence, il faut vraiment que j'ai l'impression d'apprendre en m'amusant, mais apprendre doit pas se faire sentir* (i2, CASM)
>
> [(…) for me that's what gets me, I will discover things without necessarily having the impression of going through a reading process, the process of acquiring facts, for me that's the difference, I really need to have that impression of learning as having fun, but the learning must not be felt]

4.3.3 Novices and experts

While interjections and questions of responsibility were similarly distributed across both participant pools, the same cannot be said of self-assessed expertise and its relationship to ratings of learning. As such, this third and final thread is the only one to feature differences between the discourses encountered at the two museums.

Returning briefly to the questionnaire data, ratings of expertise[31] at the CSTM clustered around 'intermediate' while those at CASM clustered around 'novice' (see Table 5, page 64). In accounting for these, CSTM respondents typically noted basic training in science through their schooling and seemed uncomfortable with the idea of identifying themselves as novices. At CASM, participants appeared to feel little pressure to identify as knowledgeable about aviation and aviation history, while still reporting higher levels of learning as measured by the "I learned something new on this visit" item (16 participants 'strongly agreed' vs. only three at the CSTM).

With that noted, at both museums respondents who admitted unfamiliarity during their interview used humour and self-deprecation to account for their positions. This was especially noticeable when discussing "The information was accurate" in that a 'cheerful beginner' persona often emerged in statements such as:

> *I can't really judge how accurate, (laugh), like I'm not an expert in science and technology so I...you guys could be saying that the sky is purple and I would have to be like OK! (laugh)* (i28, CSTM)

However, at the other end of the expertise scale, constructions of learning played out differently. In total, only one CASM and three CSTM respondents indicated they were experts in any of the offered dimensions (aviation, aviation history, science, technology, history of science). The following compares two of these individuals, juxtaposing their accounts and their self-reported learning scores. As it will show, their accounting practices as experts are quite similar, until learning during the visit is clearly in focus.

---

[31] CASM sample: How much expertise you feel you have in aviation/in the history of aviation?

CSTM sample: How much expertise you feel you have in science/in technology/in the history of science?

Interviewed at CASM, Antoine (names have been changed), a male in his forties, is a certified engine specialist, a licensed pilot, and teaches engine repair at a local college. A living example of the aviation enthusiast stereotype, he has multiple professional and personal connections to the museum, including membership, frequent visits with his son, holding his wedding there, and using the museum's library resources for his students. Interviewed at the CSTM, Matt, also a male in his forties, completed graduate studies in chemistry and works in government in a scientific capacity. A voracious reader of non-fiction, scientific, and historical literature he regularly visits museums, though he had not been to the CSTM in several years.

Both men described their self-assessment thought process as comparing themselves and their knowledge bases to impressions of 'average' knowledge and hands-on experience in the general population. Repeatedly through both conversations the two experts welcomed opportunities to illustrate their status. Two examples are given here:

Interviewer: *If I asked you to "defend" this, [being an expert] how would you defend it?*

Matt: *How would I defend that… Uhm, being an expert in it I think means that you know a lot about a subject area but also realize that you don't know it all.*

Interviewer*: ok*

Matt: *Right? I'm a chemist, you want to argue oil and drilling technology with me, I'll crush you*

Interviewer: *(laughs)...ok*

[End of excerpt]

Antoine: *Tu regardes le landing gear là-bas, pis tu regardes comment les différentes approches, pis tsé moi mon background c'est plus à l'entretient, pis souvent j'ai des, des questions comme veux-tu bien me dire quoi qui pensaient faire ça de même...*

Interviewer: *OK, oué, (rire). What jackass thought of that? (Rire)*

Antoine: *(rire), Exactly, he certainly didn't have me in mind when he figured this out.*

[Antoine: You look at the landing gear over there, and you look at different approaches, and ya, you know my background is maintenance, and so I'm often questioning, like, what the heck were they thinking putting it together like that…

Interviewer: OK ya (laughing) What jackass thought of that? (laughing)

Antoine: (laughing) Exactly, he certainly didn't have me in mind when he figured this out]

Interestingly, both men further established their status as experts by describing their ability to easily identify and make meaning from the artefacts on display:

Matt: *Like to be able to walk by and look at you know, for example where this is done really well for me, you walk by and you see the first electron microscope ever inven...you know working electron microspcope, uhm you know, and know why it's here.*

However, while Antoine spoke in expansive terms about the learning opportunities afforded to him at CASM, Matt's situation was rather the opposite, with his higher knowledge level described as a limiting factor. Indeed, Matt's impression of greater content mastery is what principally accounted for his lack of engagement with exhibition components, and his (relatively) lower "I learned something new" rating of 'agree'. This is reflected in the following excerpt in which Matt and I discussed the item 'the artefacts were interesting':

Interviewer: *ok. So the artefacts were interesting, so that got an agree*

Participant*: Ya, uhm*

Interviewer: *What's the process there?*

Participant: *Well again for me, part of it was, they're neat and they're good but to me they felt a bit shallow*

Interviewer*: ok*

Participant: *There just isn't for me enough background ability to…*

Interviewer: *…dig in if you were interested*

Participant: *Dig in. You know like and there's...it doesn't encourage me to sit there and think about it or discuss it after I walked away from it. Like one of the hardest questions is "What did you learn?" I know I learned lots but I'd almost forgotten between leaving there and coming here some of the things that were you know big impressions to me.*

Lastly, Matt attributed the museum's lack of depth to its orientation towards the needs of children and families. However, this went beyond a content issue, as he also felt a general discomfort due to his position as a single adult male:

Matt: *Uhm, the only reason why I'm neutral on the…*

Interviewer: *atmosphere, ya*

Matt: *it is because again, your security concerns make this a scary place for people like me*

Interviewer: *(laughs) Ya, you really didn't feel like you belonged when you walked in right?*

Matt: *Well, I've also been known to borrow my sister's children to go to like*

Interviewer: *Disney movies or something*

Matt: *Disney movies (laugh) like actually*

Interviewer: *Ya*

Matt: *For the same reason. Like you walk in here, you know and you always, you have children running around that you know you really don't feel comfortable, like you want to interact with them because you don't want to have any misperceptions*

Returning to Antoine's accounts of learning, his position as an expert and enthusiast had quite the opposite effect. Indeed, in a funny turn, his emphatic 'strongly agree' with the "I learned something new on this visit" item was, as it turned out in the interview, not based on a concrete example available to him in language. This is encapsulated in the following passage:

Interviewer: *Uhm, "I learned something new on this visit" peux-tu me dire c'est quoi? Qu'est-ce-que t'as appris aujourd'hui?*

Participant: *Ah ben oui...euuhm...(soupir) ben on s'est assis dans le F-18 pis on a commencé à parler un peu, pis là j'ai commencé tout y expliquer à Guillaume toute les instruments qui y avait autour là, faire la comparaison avec la mienne...dire ben moi j'ai comme la même chose mais c'est plus p'tit. Alors... A part ça on a parlé un ti peu du Arrow, ehm... qué'quechose de spécifique...rien qui vient à l'esprit.*

Interviewer: *Ok, est-ce-que apprendre pour toi c'est qué'quechose d'assez spécifique ou t'as une définition, pis t'a quand même mis un strongly agree, faitque t'avais un sens que t'avais appris, mais y'avait pas un exemple spécifique que t'as dit ça j'ai appris c'te boute d'information là ou...*

Participant: *OK, ça j'savais pas ça pis là j'le sais...c'est pas mal dynamique mon affaire-là alors...(rire). Uhm...mouains...l'pourrais pas...j'essaie de penser là...euh...j'me concentrais beaucoup plus sur Guillaume...*

Interviewer: *Ouais...*

Participant: *pendant la visite, j'étais la beaucoup plus pour lui. Alors lui y'était pas mal étourdi, y savait pu ou se pointer...*

Interviewer: *(Rire) Fait-que, on pourrait peut-être dire que t'as eu une expérience d'apprentissage...*

Participant: *À travers lui. Ah absolument, absolument.*

[Interviewer*:* Uhm, "I learned something new on this visit" can you tell me what? What is it you learned today?

Participant: Ah well yes...ahm...(sigh) well we sat in the F-18 then we talked a bit, I started explaining to Guillaume all the instruments that were around us, comparing them to my plane…so saying well mine's the same but smaller. So then, we talked a bit about the Arrow, uhm, …something specific…nothing's coming to mind.

Interviewer: OK, well is learning something specific for you, could you define, well you put down 'strongly agree' so you had some kind of sense of learning but not a specific example like saying I learned this little bit of info here, or…

Participant: OK, that I didin't know and now I do…it's pretty dynamic my idea, so… (laughs). Uhm, ya…can't…I'm trying to think…uhm…I was much more focused on Guillaume…

Interviewer: Ya...

Participant: during the visit, I was more there for him, he was dizzy by the end…

Interviewer: (laughs). So could we say you had an educational experience…

Participant: Through him… Ah absolutely, absolutely.]

Further on and having forgotten this exchange, Antoine stated that it was impossible for him to visit the CASM (or any museum for that matter) without learning:

Interviewer: *Est-ce que tu penses toi que té capable de v'nir ici sans apprendre qu'ai-que chose? (rire).*

Antoine: *Sans? Non, non, toujours, j'vais toujours en prendre un petit morceau. Ça peut être des p'tits détails niaiseries la, eh non, j'peux pas prendre la position de me fermer à ça. J'peux pas, pis ça c'est pas ici là, c'est n'importe où, j'cherche toujours que'chose de nouveau.*

[Interviewer : Do you think you can come here without learning something? (laughing)

Antoine: Without? No, no, always, I'll always take a little piece. It can be some silly little things, but no I can't say I'm ever going to be closed to that. And that goes for other places, I always seek out something new.]

Illustrating the belief that self-reports are affected by many contextual factors, this section took particular note of institutional affiliations, feelings of belonging or not belonging, and impressions of content mastery at play in reports of learning by two self-declared experts. These were more powerful than the ability to make meaning from artefacts, or the inability to provide an interviewer with concrete examples of newly gained facts, ideas, or experiences.

4.4 Summary

Three sets of data were explored in this section: questionnaire responses, phenomenographic outcomes, and a discursive analysis of learning accounts. Questionnaire data showed that most CASM participants reported high levels of learning and low levels of familiarity with aviation

and aviation history. At CSTM, lower learning scores were reported, while most participants indicated intermediate levels of content expertise. Open-ended responses to a question about what had been learned showed similar examples being given at both sites.

The phenomenographic analysis identified six distinct ‘ways of talking about learning’. In order of most to least prevalent these were learning as consuming information; learning as cognitive acts, learning as embodied experiences, leaning as acts and actions, leaning as serendipitous, and learning as knowing self and others. Interconnected sub-components of these categories were defined and ordered in relation to their specificity to museum settings. Discursive analyses highlighted the use of interjections in descriptions of museum learning and proposed connections between these and respondents’ response processes. This was followed by an exploration of participants’ low sense of responsibility for their learning outcomes in relation to expectations that museums will provide facilitating environments. Finally, an analysis of two ‘expert’ respondents’ self-reports surfaced differences between their perceptions of the learning opportunities available at the museums, as well as weak relationships between their ability to recall factual gains and their actual learning self-reports. Practical and theoretical implications of these findings for self-report methods to assess and understand museum learning are the focus of the remaining chapters.

Chapter 5 Discussion

The theoretical base of this research is embodied in the belief that museum learning self-reports are not simply a function of whether or not participants can recall a fact or provide evidence (like a student asked to 'show her work'). Rather, both parts of the construct, i.e., 'museum learning' and 'self-reporting' are understood as complex, socially constructed, and contextual phenomena (Anderson & Ellenbogen, 2012; Denzin & Lincoln, 2005; Falk & Dierking, 2000; Fielding & Thomas, 2001; Fontana & Frey, 2005; Rennie & Johnston, 2004; Schwarz, 2007). This apparent complexity is grounded by a relational view of thought and language, described by Anderberg (2000) as *intentional-expressive*, arguing that there is only imperfect concordance between what one knows and experiences, and what one can conceptualize and express through words. As such, even closed-ended self-reports require one to conceptualize and make use of languaged thought. Moreover, once expressed conceptions are not only languaged but *discursive*; emerging at a given time, place, and socio-cultural setting that lend context and meaning to story (Fontana & Frey, 2005; Holstein & Gubrium, 2005; Peräkylä, 2005). For that reason, the conceptions of museum learning explored through phenomenographic means were accompanied by analyses of situated discursive practices.

In this chapter, results are considered by the light of the intentional and contextual perspectives that make up the theoretical framework. As they intersect with aspects of this discussion, some ideas explored in the literature review also resurface. Finally, notions of context are deconstructed, aided by phenomenographers Adawi, Anders, Shirley, and Ack's (2001) descriptions of 'prepared' and 'experienced' research contexts.

5.1 Knowing You Learned 'Something'

While most participants' accounts of learning began with the fairly passive idea of consuming information, the portrait of museum learning drawn from the phenomenographic analysis is nonetheless an active one. This includes both cognitive activity and the very literal sense that museum-going is done in relative freedom with one's body, emotions, and sensations[32]. In that, results relate well to phenomenographic descriptions of the intentionality of learning, meaning that learners' experiences are based in varied awareness of the *what* and *how* of learning (Marton & Booth, 1997).

However, in discussing the self-report exercise with participants, it is interesting how rarely the interviews brought the '*what'* aspects into sustained focus–or 'thematization' to use the phenomenographic term (Marton & Booth, 1997). Instead, learning in museums was more often talked about as varied encounters with *something(s)*; the '*what'* of which could be surprisingly unimportant. Indeed, while one CASM respondent's inability to recall any new information was no impediment to self-reporting learning with great certainty, other respondents' ability to recall facts, and discuss their reactions to them at length, did nothing to prevent their less enthusiastic assessments (section 4.3.3, pages 102-109). This vagueness of factual contents is therefore striking in relation to the more fleshed-out conceptions of museum learning as *forms* of engagement (e.g., active thinking, imagining, reading, or interacting) and as *qualities* of contents, such as newness, coolness, or quirkiness.

This lack of specificity is also reflected in the frequent use of interjections to both describe museum learning and account for learning self-reports. In that sense, the lesser emphasis placed

[32] There are, of course, many limitations placed on museum behaviour, however relative to a classroom environment visitors are for the most part on their feet and have access to a wider range of ways of acting.

on the '*what'* of learning was not wholly unexpected. Similar findings, also involving interjections, were articulated by Serrell, Sikora, & Adams (2013) in a study of how museum visitors interpreted the notion of a 'meaningful' exhibit experience. Moreover, the idea as a whole is very much in line with Anderberg's notion of the relationship between thoughts and their expression in language being quite unlike a direct transfer of ideas from inner to outer speech. Instead, for the author "there exists something that could be more or less expressed" (2000, p. 110). Views of museum learning articulated by Ellsworth (2005) also suggested that the physical, sensory, and emotional qualities of exhibitions would be important to the feeling of learning/having learned. Specifically, the author argued that museums' unique affective, narrative, and cognitive resources can[33] invite visitors into forms of connections difficult to put into words, even if keenly felt:

> When I think of my mind/body/brain in the midst of an experience of learning and ask what it does to qualify that experience as a learning experience, one thing stands out. It feels itself thinking. (…) it feels thought itself becoming sensible. My mind/brain/body in the midst of learning senses the inner movement that is a "conceptual groping of potential-to-be."(Massumi, 2002, p.242) Along with a sense of expectancy, my mind/brain/body senses the grid coordinates of what "I already know" shift, fringe, and draw outside of themselves as a potential learning – something as yet undetermined by the grid – addresses my learning self. (Ellsworth, 2005, p. 120)

Taken together, these perspectives suggest some important limitations to self-report methods aimed at learning in museums in that so much of the experience may not be accessible through language. However, these also suggest avenues worth exploring. Indeed, as a museum-goer who

[33] The author makes clear that this is not necessarily achieved by every exhibition (fully, partially or at all)

has been deeply shaken by encounters with artefacts (some of my memories are still vivid despite being decades old), Ellsworth's description of feeling one's learning self is personally arresting. As a researcher interested in what underlies responses to learning self-report questions, the recurrent theme of 'something-ness' raises interesting possibilities of asking after newness, quirkiness, and the other qualities that appeared to stand out to respondents as markers of museum learning in-the-making, rather than after the fact –what Ellsworth calls 'congealed' knowledge.

5.2 Addressing Context

This study was deliberately planned to explore learning self-reports and conceptualizations of museum learning in relation to various contexts. This included context in the concrete sense of different museums, different data collection approaches, and different respondent types as well as context in a more academic sense, one deeply related to this study's epistemology, theoretical framework, and methodology. In espousing an interpretivist view, context is essential to cultural constructions and the generation of meaning, both in the everyday and as part of the researcher's interpretive work (Denzin & Lincoln, 2005; Fay, 1996). In terms of how this study construes self-reporting, the *intentional-expressive* stance assumes that language use and languaged thought reflect their socio-cultural settings, eliminating the possibility of decontextualized self-knowledge and self-reports. Moreover, language and discourse are not only seen as contextual, but also reflexive; meaning they both respond to, and are generative of, the contexts in which they are put into practice (Fleming, 1986; Holstein & Gubrium, 2005; Lave & Wenger, 1991; Puddephatt, 2011).

In terms of methodology, phenomenographic approaches have an interesting and complicated relationship with notions of context and situation. Authors such as Säljö (1997)

argued that phenomenography lacked a developed understanding of the discursive and situated nature of its data collection processes; mistaking a limited number of setting-appropriate ways of talking about a phenomenon for the general existence of a limited number of ways of understanding any given phenomenon (see also Adawi, Berglund, Booth, & Ingerman, 2002; Fleming, 1986; Richardson, 1999).

In the wake of these arguments, Anderberg (2000) and Adawi et al. (2001) in particular, articulated more mitigated positions. Anderberg accomplished this by bringing to the fore the intentionality or 'aboutness' of conceptions, and by localizing acts of conceptualization in specific settings such as learning, studying, or teaching. Adawi et al. offered a multi-leveled frame with which to consider context as a methodological issue. Relative to participants' conceptualizations, they differentiated 'prepared' and 'experienced' contexts at play in the phenomenographic interview. These two elements are particularly relevant to this discussion, as the study employed interviews to investigate how a written self-report instrument, and two different museum settings, played upon respondents' conceptions of museum learning. As such, the notions of 'prepared' and 'experienced' contexts frame the remainder of this discussion.

5.2.1 Experienced contexts

For Adawi et al. (2002, p. 84), the experienced context is "what the participant experiences as being relevant for making sense of the situation at hand, this being interwoven with the experience of the phenomenon under consideration." Though never fully knowable by the researcher, the idea is useful in thinking through the relationships between and among visitor-participants, their situated conceptions of learning, the research instruments, the museum settings, and researchers' influences on study data. For example, questionnaire items probing

social and introspective dimensions of museum learning frequently ran afoul of the discourses surrounding the responsibilities of visitor-learners, as in the following exchange:

Interviewer: *...and then very unimportant, learning about other people in my group*

Participant: *Oh, I don't give a shit, no honestly I don't care about what people learn 'cause it's not my business*.

Interviewer: *Did you learn more about your parents? You were surprised your dad liked a museum…*

Participant: *Uhm ya I was surprised, ya. I guess. That was a surprise. But like, ya again I just liked that he liked it. But if it was anyone else I wouldn't care.* (i3, CASM)

Almost a 'sore spot' for visitor-participants, these (occasionally vehement) rejections of learning about self or others mirror aspects of Fleming's (1986) contention that accounting for learning recursively creates its own 'moral' pressures. Specifically, Fleming felt that researchers investigating learning needed to acknowledge that the "world of learning" (p.552) is a moral one, in which learners, teachers, and academics have internalized their obligations, and will up-hold these during interviews. However, this frame appears to be inverted in the present study. Indeed, items suggesting that visitors may/should be introspective, and learn about the people in their social group, elicited laughter and occasional derision, while the accountability for having or not having learned 'something' rested mostly with the museum.

Lastly, these ways of talking about museum learning, and what they suggest about the museums as 'experienced contexts' for learning research, make interesting foils for Lave and Wenger's (1991) model of legitimate peripheral participation, briefly discussed in section 3.2.2

(see pages 37-39). This is in the sense that museums grant easy[34] access to many intersecting knowledge-producing communities, including those of scientists, artists, and historians. Moreover, museum outcome schemes often address notions of identity development, of becoming science literate, and of fostering a well-informed citizenry (Bell et al., 2009; Falk et al., 2008; Falk & Needham, 2011; Hooper-Greenhill, 2007; Putman & Walker, 2010; Schauble et al., 1997). However, key to ease-of-access is the decidedly peripheral position of the individual visitor-learner during any one given visit. While museum-mediated engagements with science or history are within the bounds of canonical culturally legitimate learning (Bourdieu, 1984; Ellsworth, 2005; Grek, 2009; Lave & Wenger, 1991) these experiences pose very little risk of being rejected, or exposed as uninformed, by members of those knowledge communities. For visitor-participants, this seems to translate to feeling competent and able to assess their museum experiences, as 'failing' at being a visitor-learner is unlikely if the main task is construed as getting 'something' (i.e., virtually anything) out of the visit.

5.2.2 Prepared contexts

According to Adawi et al. (2002, p.84), the prepared context is defined (and also observed and experienced) by the researcher, as it is the manifestation of what s/he considers relevant for the interviewees to make sense of the situation before them. This study employed as its 'prepared context' a questionnaire featuring items probing visitor learning and other museum experiences. For the most part this featured closed-ended items rated on a number of five-point scales or response lists with two or three options. Two open-ended questions were also included, one

[34] To those who feel at ease in such surroundings, there being a good deal of critical scholarship examining museums' challenges with inclusivity (Ames, 1992; Bourdieu, 1984; Dean & Rider, 2005; Grek, 2009).

probing what (if anything) had been learned that day and the other asking after participants' impression of the museums' main or central messages. The range of question types were selected with the intention of introducing "variation around the question and phenomenon/a involved" (Adawi et al., 2001, p. 97).

While this was achieved, the use of the same questionnaire at two different sites anticipated that different types, and/or prevalence, of conceptions would emerge due to the museums' many physical, experiential, and subject matter differences. What emerged instead were different self-reported scores and different discursive practices, an outcome space that echoed (without being identical to) the structure and language of the questionnaire, and an interesting variety of ways in which participants reported coming to conclusions about their own learning. Illustrative of the complex ways the museum contexts and the 'prepared context' interacted, the following are three accounts of how participants arrived at their learning self-reports, each of which emerged during the interviews, as participants and I worked towards a mutual understanding of what had been 'going on in their heads'.

5.2.2.1 A categorical process

This first example joins together three excerpts. The respondent is a male primary school teacher and museum member who frequently visits the CSTM with his toddler. In the first instance he describes his reaction to self-reports (in the context of accounting for his response to "the museum has something for everyone") and in the second and third explains how *learning* self-reports are open to categorical answers.

Interviewer: *uhm, and 'agree.' What kept it from a strongly agree?*

Participant: *I try not to be too categorical*

Interviewer: *OK*

Participant: *On anything, uhm, it's a combination of what my opinion is for me, and what I probably think other people might come in here and...I, I'm sure some people come in here with, with and leave not thinking they've seen what they want to see, so that's why I wouldn't go with strongly agree.*

(….)

Participant: *So when I read that question, I...was there new information that went into my head today?*

Interviewer: *OK so that's a base definition of learning for you…*

Participant: *I would say so*

Interviewer: *…information going in*

Participant: *Ya*

(….)

Interviewer: *Ya OK, that makes sense. Uhm, but that was your only strongly agree. So was that just because you had a specific...*

Participant: *There was absolutely no doubt about whether or not I learned something, yes*

Interviewer: *OK, so you were able to be categorical there*

Participant: *Yes, to me it's a yes or no thing*

Interviewer: *OK*

Participant: *Yes, I've learned something, no I didn't*

Though certainly a simple interpretation of learning, what is interesting here is that the need to imaginatively take into account the perspectives of others on the issue of the museum having 'something for everyone' disappears when the topic shifts to learning and an explicitly factual

frame can be claimed. With that, this respondent could, with quasi-perfect assurance, state whether or not new information “went into” his head earlier that day.

5.2.2.2 An interjection-based process

In this example, the respondent appears to recall using a mix of interjections and self-talk to provide her self-reported rating. Unlike the previous, this account invokes memory-work and the assumption that not all forms of museum learning happen while you are aware of them. The excerpt begins as myself and the respondent, a museum member interviewed at CASM in the company of her young child, are discussing the open-ended “Did you encounter any new facts or new information while you were visiting the museum today?” question.

Interviewer: *OK, uhm. So, again unh, did you have to scratch your head at all for these, or...?*

Participant: *I did. I had to think what I learnt, ‘cause again I'm not paying attention to it, and I always do, like if I stop and pay attention I know I did. Like I didn't know that was the Snowbirds' plane and that it was originally a training plane, I didn't know that so I learned that today.*

Interviewer: *What, ah, and this is going to be a little bit of a funny, but could you sort of give me a clue of what went on in your head when you were thinking about that? Like...*

Participant: *When I learned something new? I went...cool I didn't know that, and then moved on.*

Interviewer: *Ya, so you had a "hunh!" moment or something like that.*

Participant: *Yes*

Interviewer: *So when you were reflecting on the question did you ask yourself if you'd had a "hunh"?*

Participant: *Yes. Because or else I wouldn't know if I learned something. I probably did, but just wouldn't have known it.*

A fairly ordinary and non-transformative example of something learned at the museum, it is nonetheless interesting to note how remembering an interjection operated as a kind of heuristic, as if the 'something' and the experience of it had been filed away under "cool or neat bits of information."

5.2.2.3 A place-based process

This last way of reflecting on whether or not learning occurred was generated by a museum member visiting with her school aged children, all of whom were very familiar with the CSTM. The only participant to 'disagree' with the "I learned something new on this visit" item, she described her reflection in terms of where they had been just prior to filling out the questionnaire. In that the places were familiar, she surmised that nothing new had been gained:

Interviewer: *Processus de réponse? T'as fait un scan dans ta tête..?*

Participant*: J'ai regardé aujourd'hui où que chu t'allé-on est allé aux trains pis eh, on est allé ou après..? La cuisine. Donc j'ai rien appris de nouveau (rire) les trains on a fait la même chose que d'habitude on a monté les escaliers (...) tiré une couple de manivelles pis on est ressorti. Pis dans la cuisine, ben non là. Comme j'suis pas allé faire la partie des tunnels, peut-être que... (...) Moi la demi-heure que j'ai passé ici, non on a rien appris de nouveau. J'ai tu faite un long scan dans ma tête? Non, parce qu'on a vraiment fait des choses très limitées.*

[Interviewer: Your response process? Did you do a 'scan' in your head?

Participant: I looked at today, where did I go; we went to the trains, then, ah, we went where? The Crazy Kitchen. So I learned nothing new (laugh) the trains we did the same thing as always, we went up the steps (garbled) pulled a few levers and went out. And in the Kitchen, well no. Like, I didn't go do the tunnels part, maybe if… For me, the half hour I spent, no we didn't learn anything new. Did I do a long scan in my head? No, because we did some really limited things.]

Unique among all the other ways of arriving at a response, this last example is interesting due to its frankness (throughout the interview this participant comfortably criticised the museum for being staid and unchanging) and the clear lines drawn between the environment and her responses. Suggesting that the museum's learning opportunities were maximized well before our conversation, this respondent needed nothing more than a brief reflection on the geography of the visit to provide a categorical self-report of learning.

5.3 Summary

This chapter considered the conceptions of learning described in Chapter 4 by the light of intentional-expressive and contextual perspectives. According to Anderberg (2000), conceptualizing is a process of imperfect transitions between thought and language. As they are expressed, conceptions relate intentionally to how someone experiences and thinks about the world, without being identical to either of these. Following that, notions of context as an issue in this style of research were explored in relation to Adawi et al.'s (2001) descriptions of both 'prepared' and 'experienced' research contexts.

Bringing these perspectives to accounts of learning made in the context of a museum-based self-report exercise raised interesting questions about the ways in which the instrument structured both responding processes and the subsequent interviews. However, these effects were

themselves complex and contextual. For instance, despite the most prevalent conception of museum learning being information consumption, self-reports were tied to memories and impressions of having learned ‘something’ in a given *way* as much, if not more so, than memories of *what* was learned.

Lastly, three examples of self-reported thought processes were used to illustrate different ways in which instruments, beliefs about learning, and the surrounding environments were put to use in generating participants’ assessments of their museum learning. These included a categorical and binary view of learning as the acquisition of facts–and ‘not learning’ as its opposite; using interjections as tools to help remember brief instances of self-aware learning; and finally an assessment of the possibility that learning occurred based on recalling where the visitor-participant had gone before sitting down to fill out the questionnaire.

Chapter 6 Conclusions, Implications, and Recommendations

While self-report methods are prevalent in visitor studies seeking to explore or assess learning in museums, the literature surrounding these practices is still largely concerned with accuracy, validity, and reliability; concerns that signal an underlying, and often implicit, orientation towards positivistic beliefs. Without contending that such views are invalid, this narrowness in the face of a diversity of theoretical and methodological frames for self-report methods is the principal issue addressed by this research study. This final chapter provides a summary of the key findings, alongside reflections on the study's limitations, implications for further research, contributions to theory, and recommendations for visitor studies practitioners.

6.1 Key Outcomes

Throughout this study self-reports and the thought processes underlying them were seen as inherently contextual and constructed in complex cognitive, linguistic, and socio-cultural ways. Indeed, self-completed questionnaires require multiple acts of interpretation as respondents make sense of the questions as well as the memories, feelings, and impressions stirred up by them (Karabenick et al., 2007; Schwarz, 2007). Data obtained via semi and undirected interviews were described as situated accounts, in the sense that stories are always told to someone, somewhere, and 'some-when', shaping the narrative as it unfurls (Denzin & Lincoln, 2005; Fontana & Frey, 2005). From these considerations, two research questions were outlined. The first addressed perceptions of learning associated to the data collection process and institutional settings. The second question looked to trace particular ways in which the research intervention itself shaped visitors' accounts and accounting practices.

6.1.1 Perceptions of learning in museums

From working with respondents as they accounted for their learning self-reports, 24 qualitatively different conceptions of learning were constructed and sorted into six emergent categories, briefly described below.

Learning as consuming facts and information: Encompassing five conceptions, this was the participants' most prevalent and immediate way of describing learning. The sub-sets include learning as gaining facts and information; learning as taking 'something' away; learning as encountering quirky/cool facts; learning as encountering curated information; and learning as the *how* and the *what* of museum artefacts. Every participant made at least one reference related to this category.

Learning as cognitive acts: Less passive than the previous, this category reflects respondents' descriptions of learning in relation to conscious and unconscious cognitive processes. This includes learning as remembering and forgetting, learning as active thinking processes, learning as the altering of one's knowledge or perceptions, learning as imaginative engagements, and learning as making meaning from artefacts. Three-quarters of the respondents made at least one statement related to this category.

Learning as actions and behaviour: This category echoed behaviourist models, equating learning with specific actions and/or using certain behaviours as a kind of short-hand for engagements that produce learning. The most common of these conceptions was learning as reading, followed by learning as physical or tactile exploration, learning as looking and seeing, and learning as examining artefacts.

Learning as embodied experiences: This category emerged from participants' descriptions of feelings, perceptions, sensations, and lived experiences associated with learning. These

include encountering newness (often facts or interesting artefacts), being in a multi-sensory environment, experiencing flow-like states, and being in the presence of impressive artefacts.

Learning as serendipitous: This reflects accounts of museum learning as unplanned and haphazard discoveries. This includes accidental or 'collateral' learning, mostly reported by parents helping young children to explore the museum, and happy accidents, i.e., when museum contents unexpectedly connect with visitors in a personally meaningful way.

Learning as knowing self and others: Last and most infrequent were conceptions of learning as forms of social and introspective engagements. These conceptions were also invoked to define what museum learning is *not*, as many respondents reported feelings of dissonance when prompted to think about museums as places where one may learn about oneself or about those with whom we are visiting.

These six 'ways of talking about learning' emerged in the encounter of visitor-participant, research instrument, setting, and researcher. While the institutional context was not as influential as originally expected, these outcomes resonate nonetheless with much of the museum scholarship articulated in the past fifteen years emphasising the uniqueness of museums' multi-modal environments and the varied ways of learning made available to visitor-learners (Anderson & Ellenbogen, 2012; Doering & Pekarik, 2002; Ellsworth, 2005; Falk & Dierking, 2000; Hein, 1998; Hooper-Greenhill, 2007).

6.1.2 Data collection: Methods in context

Between the two museums, differences in and among conceptions were not as pronounced as first anticipated. Rather than patterns tied to the museums' different characteristics, what emerged were different self-reported learning scores, different discursive practices, and an outcome space that echoes the structure and language of the questionnaire instruments (see

Appendix A, page 146). For instance, the conceptions of learning as factual gains and as social acts that bookend the outcome space (Figure 6, page 95) mimic the locations and the relative frequency with which they appear in the questionnaire. This structuring effect went unnoticed well into the data analysis; adding a potentially interesting argument to the interpretivist critique that closed-ended self-report instruments ask respondents to work from the worldviews of those who wrote the questions, and not their own (Collins, 2011; Fielding & Thomas, 2001; Fontana & Frey, 2005; Karabenick et al., 2007). However, as a counter-point it is worthy of note that despite this structuring, many participants expressed feelings of dissonance (and amusement) relative to questionnaire items probing social and introspective forms of learning, and appeared unafraid to question their basis in real-life museum-going outcomes.

Returning to the differences identified between the museums, self-assessed expertise scores from CSTM clustered around 'intermediate' while those of CASM clustered around 'novice'. At the same time, the scores related to the "I learned something new on this visit" item were higher at CASM than they were at CSTM. Interestingly, while the expert/enthusiast at CASM spoke in expansive terms about his learning opportunities, the experts at the CSTM did not. Indeed, being an 'expert' served as a discursive resource for these participants, who cited their greater knowledge bases to account for their lack of engagement with the museum's offerings. Finally, conversations surrounding this topic also provided interesting views of one's responsibility for learning, which for the most part was assigned to the museum and not the visitor-participant. Objects and exhibits were even allotted a kind of agency; described as 'calling to' or 'holding' participants, while even the museums' text panels were described in active terms, in the sense that some perceived the museum experience as a lot of information 'coming at them'.

6.2 Limitations of the Study

Employing a phenomenographic approach, coupled with discursive analyses of participants accounting for their learning self-reports, this study has attempted to shed some light on self-report methods as they are employed in museum settings. While this yielded interesting results, and potentially valuable contributions to visitor studies and education research, there are limitations to this study inherent in its design, data collection procedures, as well as the reflexive character of participants' contributions.

In particular, Anderberg (2000, p. 92) contends that studies such as this, with a strong "meta" character always face the same pair of limitations; the first that language cannot step outside itself, and the second that reports and analyses of thought processes are always incomplete. Both issues are indeed evident in participants' struggles to explain how they know they learned, especially when attempting to go deeper than remembered factoids, or moments when they said 'cool!' or 'hunh!'

These limitations also relate to important distinctions between ideas expressed during an interview and the working, pragmatic, and not fully conscious interpretations that inform questionnaire responses. Drawing on arguments made by Anderberg (2000), Fleming (1986), and Säljö (1997) these two forms of self-report data can be exquisitely interrelated but never equivalent, as each belong to their own setting.

On a larger scale, the fittingness of this study's outcomes, meaning the applicability of the findings in other contexts (Sin, 2010) is equally complicated and limited. The data collection procedures attempted to ensure that a wide variety of perspectives would inform the results, however no claims are made that these individuals are representative of the museums' typical audiences, or of museum goers in the English and French speaking worlds.

Finally, within visitor studies a long-standing and recurrent critique of both research and evaluation aimed at learning is the typically short lapse of time between visit and data collection which precludes more contextual understandings of what museum visits come to mean (Dawson & Jensen, 2011; Phipps, 2007; Rennie & Johnston, 2004). Though a deliberate choice, made in part because it is the more typical approach, this study remains yet another example of that practice. The implications, contributions to theory, and recommendations described below should therefore be read with these issues in mind.

6.3 Implications

Accounting for what she perceived as a lack of investigations into non-linguistic forms of learning Ellsworth (2005) argued quite pointedly that such efforts are "uneasy territory" for contemporary linguists, sociologists, and cognitive psychologist (major contributors to learning research and visitor studies) in that "Non- and prelinguistic ways of making sense of the world are an embarrassment to the social sciences because they put them up against the limitations of their scientific, philosophical, and political assumptions and practices" (Ellsworth, 2005, p. 2). This cuts quite close to the heart of this study, in that it tried to bring forward complex aspects of self-report methods and think critically about their reliance on language, their implicit assumption of correspondence between what one thinks and what one says, and their situated and contextual nature.

Under-explored and under-problematized in visitor studies despite their very wide use, self-reports of learning in museums were shown to be contextual and constructed in relation to an array of situational, experiential, and personal factors. Some of these were fairly predictable; for instance many participants were immediately disposed to think of museum learning as the consumption of facts and information, while others were less so. Surprising in the early stages of

data collection were the sometimes vehement rejections of the idea that museum learning involves introspection and/or developing greater knowledge about self and others. In the end, most likely to 'count' as learning were various experiences of pleasurable, active, not overly effortful, novel, and personally relevant encounters with *something*. Conceptions easily thematized in the interviews reflected 'how' and 'what's it like' aspects of museum learning, while the specific 'what' rarely developed much beyond a recitation of semi-remembered factual items.

For future self-report instruments aimed at visitor learning, the major implication is the need to continue exploring *with* respondents the salient features of their learning experiences. Along those lines, attention also needs to be paid to the discourses surrounding the responsibility of visitor-participants to 'be' learners. Relative to questionnaire items such as 'I learned something new today', findings suggest that a less than positive response would not indicate self-assessed 'failure' on the part of the individual, but rather the *museum's* failure, as an institution dedicated to self-directed learning, to provide engaging opportunities to 'get something' out of the experience.

6.4 Contributions to Theory

Specific to the workings of self-report methods as theorized in the wider social science literatures (qualitative inquiry in particular) this study aligns with, rather than questions, the interpretive frameworks explored in the later parts of the literature review (see sections 2.2.4 and 2.2.5, pages 23-30) as well as Anderberg's (2000) intentional-expressive perspective on the situated and imperfect relationship between thoughts and their expression in language.

However, in the arena of visitor studies, this study offers a significant contribution in that it proposes multiple and contextual understandings of 'museum learning' generated in

collaboration with study participants. Moreover, the research also reconstructed subject positions, i.e., visitor-participants and visitor-learners, to be considered when studies of learning dependant on self-report methods are planned. Running counter to market-driven tendencies to reduce visitors' identities down into stable clusters of needs and expectations (Dawson & Jensen, 2011) these subject positions are fluid, recursive, and inherently discursive in that they emerged in the confluences of visitors' experiences at the museum and what Adawi et al. (2001) termed the 'prepared' and 'experienced' contexts of a research act.

In that participants often used interjections to support their accounts of learning, and struggled to bring their self-reports into language, this study also invites further explorations of sensory and non-linguistic experiences, similar to those discussed by Ellsworth (2005), and the impacts of these on feelings of having learned. Finally, this study also provides space for reflecting on museum learning as a particular instance of situated learning; granting easy and legitimate, but also peripheral and self-regulated, access to the worlds of the arts and the sciences.

6.5 Recommendations

A) Going back to the review of the visitor studies literature, it is the case that absent from discussions of self-report methods are significant and sustained engagements with postmodern, interpretivist, and situated-cognitive approaches. While one form of inquiry is not necessarily better or more appropriate than another, the narrow range of explicit frames for using self-reports limits the productive debates and healthful tensions that a richer diversity of perspectives can foster. Diversification and an understanding of the contextual nature of self-reports would add to ongoing efforts to build broader, shared, and theoretically sound frameworks for the study of learning in museums (Dawson & Jensen, 2011; Falk & Needham, 2011; Phipps, 2007). This also

seems important given the complex sociocultural perspectives that presently occupy researchers interested in learning in museums, and in informal learning environments more generally (Anderson & Ellenbogen, 2012; Phipps, 2007).

B) From the perspective of a researcher interested in what is underlying responses to learning self-report questions, the frequent recourse to the word 'something' by participants raises interesting questions about the recognition of museum learning when it happens (whether fully conscious or not) and the process of responding to questions about it after the fact. Relative to these, Ellsworth's (2005) descriptions of learning as moments of self-alterations at the level of the mind, brain, and body, and of museums as environments that can[35] exceed or bypass linguistic ways of knowing are worth considering (see section 2.1.2, page 11).

C) On a practical level, the cognitive models of self-reporting described by Karabenick et al. (2007), Schwarz (2007), and Tourangeau (2003) provide interesting directions for working *with* the contextuality and situatedness of self-report methods. Related to the recommendation to keep exploring the 'somethiness' of museum learning, the emphasis these models place on aligning researchers' self-report instruments with visitor-participants' language and their implicit pragmatic understandings of learning would constitute a positive contribution.

D) Future research based upon the ideas articulated here could include exploring contextual factors beyond the two considered here (i.e., location and instruments) such as self-reports of learning as a function of gender, age, and socio-linguistic profiles. Other tools and methods, such as exit interviews and personal meaning maps (see section 2.2.3, p. 23), could also be investigated for their own relationships to the conceptualization of learning by visitor-participants.

---

[35] The author makes clear that this is not necessarily achieved by every exhibition (fully, partially or at all).

Bibliography

Adams, M. (2012). Museum evaluation. *The Journal of Museum Education*, *37*(2), 25–36.

Adawi, T., Berglund, A., Booth, S., & Ingerman, A. (2001). On context in phenomenographic research on understanding heat and temperature. Presented at the 9th EARLI Conference, Fribourg, Switzerland.

Åkerlind, G. S. (2005). Variation and commonality in phenomenographic research methods. *Higher Education Research & Development*, *24*(4), 321–334.

Allen, S. (2002). Looking for learning in visitor talk: A methodological exploration. In G. Leinhardt, K. Crowley, & K. Knutson (Eds.), *Learning conversations in museums* (pp. 259–303). Mahwah: Laurence Erlbraum Associates.

Allen, S. (2004). Designs for Learning: Studying science museum exhibits that do more than entertain. *Science Education*, *88*(S1), 17–33.

Ames, M. M. (1992). *Cannibal Tours and Glass Boxes, The Anthropology of Museums*. Vancouver: UBC Press.

Anderberg, E. (2000). Word meaning and conceptions. An empirical study of relationships between students' thinking and use of language when reasoning about a problem. *Instructional Science*, *28*, 89–113.

Anderson, D., Lucas, K. B., & Ginns, I. S. (2003). Theoretical perspectives on learning in an informal setting. *Journal of Research in Science Teaching*, *40*(2), 177–199.

Anderson, D., Storksdieck, M., & Spock, M. (2007). Understanding the long-term impacts of museum experiences. In *In principle, in practice: Museums as learning institutions*. Thousand Oaks: Altamira Press.

Anderson, & Ellenbogen, K. M. (2012). Learning science in informal contexts – Epistemological perspectives and paradigms. In B. J. Fraser, K. Tobin, & C. J. McRobbie (Eds.), *Second international handbook of science education* (pp. 1179–1187). Dordrecht: Springer Netherlands.

Atkinson, P., & Delamont, S. (2005). Analytic Perspectives. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 821–840). Thousand Oaks: Sage Publications.

Babian, S. (2008). *CSTM Origins*. Ottawa: Canada Science and Technology Museum Corp.

Ballantyne, R. (2003). Interpreting apartheid: Visitors' perceptions of the District Six Museum. *Curator: The Museum Journal*, *46*(3), 279–292.

Baumeister, R. F., Vohs, K. D., & Funder, D. C. (2007). Psychology as the science of self-reports and finger movements. Whatever happened to actual behavior? *Perspectives on Psychological Science*, *2*(4), 396–403.

Bell, P., Lewenstein, B., Shouse, A. W., & Feder, M. (Eds.). (2009). *Learning science in informal environments, people, places and pursuits*. Washington D.C.: National Research Council of the National Academies.

Bernstein, R. (1983). *Beyond objectivism and relativism: Science, hermeneutics, and praxis*. Philadelphia: University of Pennsylvania Press.

Bird, A. (2013). Thomas Kunh. In E. N. Zalta (Ed.), *Stanford Encyclopedia of Philosophy*. Retrieved June 14, 2013 from <http://plato.stanford.edu/archives/spr2013/entries/thomas-kuhn/>.

Bitgood, S. (1988). An overview of the methodology of visitor studies. *Visitor Behaviour*, *3*(3), 4–6.

Bourdieu, P. (1984). *The field of cultural production: Essays on art and literature*. New York: Columbia University Press.

Breakey, N. M. (2012). Studying world heritage visitors: The case of the remote Riversleigh fossil site. *Visitor Studies*, *15*(1), 82–97.

Brizeño-Garzon, A., Anderson, & Anderson. (2007a). Adult learning experience from an aquarium visit: The role of social interaction in family groups. *Curator*, *50*(3), 299–318.

Brizeño-Garzon, A., Anderson, & Anderson. (2007b). Entry and emergent agendas of adults visiting an aquarium in family groups. *Visitor Studies*, *10*(1), 76–89.

Bruni, C. M., Fraser, J., & Schultz, P. W. (2008). The value of zoo experiences for connecting people with nature. *Visitor Studies*, *11*(2), 139–150.

Bulmer, M. (2001). The ethics of social research. In N. Gilbert (Ed.), *Researching social life* (pp. 46–57). Thousand Oaks: Sage Publications.

Christians, C. G. (2005). Ethics and politics in qualitative research. In Y. S. Lincoln & N. K. Denzin (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 139–164). Thousand Oaks: Sage Publications.

Collins, R. (2011). Wiley's contribution to symbolic interactionist theory. *American Sociology*, *42*(2-3), 156–167.

Cooper, G. (2001). Conceptualising social life. In N. Gilbert (Ed.), *Researching social life* (pp. 1–14). Thousand Oaks: Sage Publications.

Corballis, M. C. (2011). *The recursive mind: The origins of human language, thought, and civilization*. Princeton: Princeton University Press.

Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches*. Thousand Oaks: Sage Publications.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. London: Sage Publications.

Dahlin, B. (2007). Enriching the theoretical horizons of phenomenography, variation theory and learning studies. *Scandinavian Journal of Educational Research*, *51*(4), 327–346.

Dawson, E., & Jensen, E. (2011). Towards a contextual turn in visitor studies: Evaluating visitor segmentation and identity-related motivations. *Visitor Studies*, *14*(2), 127–140.

Dean, D., & Rider, P. E. (2005). Museums, nations and political history in the Australian National Museum and the Canadian Museum of Civilization. *Museum and Society*, *3*(1), 35–50.

Denzin, N. K., & Lincoln, Y. S. (2005). Introduction: The discipline and practice of qualitative reseach. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 1–32). Thousand Oaks: Sage Publications.

Denzin, N. K., & Lincoln, Y. S. (2011). Introduction: The discipline and practice of qualitative reseach. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (4th ed., pp. 1–21). Thousand Oaks: Sage Publications.

Doering, Z. D. (1999). Strangers, guests or clients? Visitor experiences in museums. *Curator: The Museum Journal*, *42*(2), 74–87.

Doering, Z. D., & Pekarik, A. (2002). *Exhibitions and their audiences: Actual and potential* (pp. 1–22). Washington D.C.: Smithsonian Institution.

Driver, R. (1983). *The Pupil as scientist*. Philadelphia: Open University Press.

Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed self-assessment implications for health, education, and the workplace. *Psychological Science in the Public Interest*, *5*(3), 69–106.

Ellenbogen, K. M. (2002). Museums in family life: An ethnographic case study. In G. Leinhardt, K. Crowley, & K. Knutson (Eds.), *Learning conversations in museums* (pp. 81–102). Mahwah: Laurence Erlbraum Associates.

Ellsworth, E. (2005). *Places of learning: Media, architecture, pedagogy*. New York: Taylor & Francis.

Everett, M., & Barrett, M. S. (2009). Investigating sustained visitor/museum relationships: Employing narrative research in the field of museum visitor studies. *Visitor Studies*, *12*(1), 2–15.

Falk, J., Bronnenkant, K., & Heimlich, J. (2008). Using identity-related visit motivations as a tool for understanding adult zoo and aquarium visitors' meaning-making. *Curator*, *51*(1), 55–80.

Falk, J., & Dierking, L. D. (2000). The contextual model of learning. In G. Anderson (Ed.), *Reinventing the Museum*. Walnut Creek: Altamira Press.

Falk, J., Moussouri, T., & Coulson, D. (1998). The effect of visitors' agendas on museum learning. *Curator*, *41*(2), 107–120.

Falk, J., & Needham, M. D. (2011). Measuring the impact of a science center on its community. *Journal of Research in Science Teaching*, *48*(1), 1–12.

Fay, B. (1996). *Contemporary philosophy of social science*. Malden: Blackwell.

Fielding, N. (2001). Ethnography. In N. Gilbert (Ed.), *Researching social life* (2nd ed., pp. 145–163). Thousand Oaks: Sage Publications.

Fielding, N., & Thomas, H. (2001). Qualitative interviewing. In N. Gilbert (Ed.), *Researching social life*. Thousand Oaks: Sage Publications.

Fisher, J. (2002). Museal tropes in popular film. *Visual Communication Review*, *1*(2), 197–201.

Fleming, W. G. (1986). The interview: A neglected issue in research on student learning. *Higher Education*, *15*(5), 547–563.

Fontana, A., & Frey, J. H. (2005). The interview: From neutral stance to political involvement. In Y. S. Lincoln & N. K. Denzin (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 695–727). Thousand Oaks: Sage Publications.

Friedman, A. (2008). *Framework for evaluating impacts of informal science education projects [On-line]*. (p. 117). Retrieved from http://insci.org/resources/Eval_Framework.pdf

Garcia, B. (2012). What we do best. *The Journal of Museum Education*, *37*(2), 47–56.

Gilbert, N. (2001). Research, theory and method. In N. Gilbert (Ed.), *Researching social life* (pp. 14–27). Thousand Oaks: Sage Publications.

Graham, G. (2010). Behaviourism. In E. N. Zalta (Ed.), *Stanford Encyclopedia of Philosophy*. Retrieved May 13, 2013 from <http://plato.stanford.edu/archives/fall2010/entries/behaviorism/>

Grek, S. (2009). "In and against the museum": The contested spaces of museum education for adults. *Discourse: Studies in the Cultural Politics of Education*, *30*(2), 195–211.

Guba, E. G., & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In Y. S. Lincoln & N. K. Denzin (Eds.), *The Sage Handbook of Qualitative Research* (3rd ed., pp. 191–215). Thousand Oaks: Sage Publications.

Gutwill, J. P., & Allen, S. (2010). *Group inquiry at science museum exhibits*. San Francisco: Exploratorium.

Harvey, M. L., Hudson, B., & Tureff, B. (2003). Measuring the impact of interactive science programs on science learning. *Visitor Studies Today!*, *6*(2), 14–20.

Hein, G. E. (1998). *Learning in the museum*. New York: Routledge.

Holstein, J. A., & Gubrium, J. F. (2005). Interpretive practice and social action. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 483–505). Thousand Oaks: Sage Publications.

Hood, M. (1983). Staying away: Why people choose not to visit museums. In G. Anderson (Ed.), *Reinventing the Museum*. Walnut Creek: Altamira Press.

Hood, M. (1993). After 70 years of audience research, what have we learned? *Visitor Studies*, *5*(1), 16–27.

Hooper-Greenhill, E. (2007). Measuring learning outcomes in museums, archives and libraries: The learning impact research project (LIRP). *International Journal of Heritage Studies*, *10*(2), 151–174.

Jacob, P. (2010). Intentionality. In E. N. Zalta (Ed.), *Stanford Encyclopedia of Philosophy* (Fall.). Retrieved May 21, 2013 from <http://plato.stanford.edu/archives/fall2010/entries/intentionality/>

Jeffery, K. R. (2000). Constructivism in museums: How museums can create meaningful learning environments. In J. Hirsch & L. Silverman (Eds.), *Transforming Practice* (pp. 212–221).

Karabenick, S. A., Woolley, M., Friedel, J. M., Ammon, B. V., Blazevski, J., Rhee Bonney, C., … Musu, L. (2007). Cognitive processing of self-report items in educational research: Do they think what we mean? *Educational Psychologist*, *42*(3), 139–151.

Koran, J., Koran, M. L., & Foster, J. S. (1988). Individual differences in learning in informal settings. In *Visitor Studies -1988: Theory, research, and practice. Proceedings from the First Annual Visitor Studies Conference* (pp. 66–72). Jacksonville: Center for Social Design.

Lankford, E. L. (2002). Aesthetic experience in constructivist museums. *Journal of Aesthetic Education*, *36*(2), 140–153.

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

Lawrence, G. (1993). Remembering rats, considering culture: Perspectives on museum evaluations. In S. Bicknell & G. Farmelo (Eds.), *Museum visitor studies in the 90s* (pp. 117–126). London: Science Museum.

Leinhardt, G., & Knutson, K. (2004). *Listening in on museum conversations*. Walnut Creek: Altamira Press.

Leinhardt, G., Tittle, C., & Knutson, K. (2000). *Talking to oneself: Diaries of museum visits* (No. MLC 04). Pittsburgh: Museum Learning Collaborative. Retrieved from http://mlc.lrdc.pitt.edu/mlc

Lew, M. D. N., Alwis, W. A. M., & Schmidt, H. G. (2010). Accuracy of students' self-assessment and their beliefs about its utility. *Assessment & Evaluation in Higher Education*, *35*(2), 135–156.

Lindauer, M. (2004). Inside, out and back again: The relationship of new museology and curriculum studies to museum education. Presented at the Current Research in Museum Studies Conference, Washington D.C.: Smithsonian Centre for Education and Museum Studies.

Lindauer, M. (2005). What to ask and how to answer: a comparative analysis of methodologies and philosophies of summative exhibit evaluation. *Museum and Society*, *3*(3), 137–152.

Loomis, R. J., Harvey, M. L., & Marino, M. (1997). Design features which encourage psychological flow in museum visitors. *Visitor Studies*, *9*(1), 239–246.

Mallon, R. (2008). Naturalistic approaches to social construction. In E. N. Zalta (Ed.), *Stanford Encyclopedia of Philosophy* (Winter.). Retrieved May 27, 2013 from http://plato.stanford.edu/archives/win2008/entries/social-construction-naturalistic/

Marton, F. (1994). Phenomenography. In *The International Encyclopedia of Education* (Second edition, Vol. 8). Retrieved from http://www.ped.gu.se/biorn/civil/main/1res.appr.html

Marton, F., & Booth, S. (1997). *Learning and awareness*. Mawah: Laurence Erlbraum Associates.

Marton, F., & Pong, W. Y. (2005). On the unit of description in phenomenography. *Higher Education Research & Development*, *24*(4), 335–348.

McKernan, J. (2008). *Curriculum and imagination process theory, pedagogy and action research*. New York: Routledge.

McManus, P. M. (1993). Thinking about the visitor's thinking. In S. Bicknell & G. Farmelo (Eds.), *Museum visitor studies in the 90s* (pp. 108–113). London: Science Museum.

Munley, M. E. (1987). Intentions and accomplishments: Principles of museum evaluation research. In *Visitors Surveys: A User's Manual (1999)*. Washington D.C.: American Association of Museums.

Nichols, S. K. (1999). *Visitor surveys: A user's manual*. Washington D.C.: American Association of Museums.

Niewolny, K. L., & Wilson, A. L. (2009). What happened to the promise? A critical (re)orientation of two sociocultural learning traditions. *Adult Education Quarterly*, *60*(1), 26–45.

Packer, J. (2008). Beyond learning: Exploring visitors' perceptions of the value and benefits of museum experiences. *Curator: The Museum Journal*, *51*(1), 33–54.

Paulhus, D. L., & Vazire, S. (2007). Self-report methods. In R. F. Krueger, R. C. Fraley, & R. W. Robins (Eds.), *Handbook of research methods in personality psychology* (pp. 224–239). New York: Guilford Press.

Pekarik, A. (2010). From knowing to not knowing: Moving beyond "outcomes." *Curator: The Museum Journal*, *53*(1), 105–115.

Pekarik, A., Schreiber, J. B., Hanemann, N., Richmond, K., & Mogel, B. (2014). IPOP: A theory of experience preference. *Curator: The Museum Journal*, *57*(1), 5–27.

Peräkylä, A. (2005). Analyzing talk and text. In Y. S. Lincoln & N. K. Denzin (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 869–886). Thousand Oaks: Sage Publications.

Phipps, M. (2007). Research trends and findings from a decade (1997–2007) of research on informal science education and free-choice science learning. *Visitor Studies*, *13*(1), 3–22.

Podsakoff, P. M., MacKenzie, S. B., Podsakoff, N. P., & Lee, J. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903.

Procter, M. (2001a). Analysing survey data. In N. Gilbert (Ed.), *Researching social life* (pp. 252–268). Thousand Oaks: Sage Publications.

Procter, M. (2001b). Measuring attitudes. In N. Gilbert (Ed.), *Researching social life* (pp. 105–123). Thousand Oaks: Sage Publications.

Puddephatt, A. J. (2011). Language and the mind in the thought of G.H. Mead: Challenges from Chomsky's linguistics. In N. K. Denzin, L. H. Athens, & T. Faust (Eds.), *Blue Ribbon Papers: Studies in Symbolic Interaction* (Vol. 36, pp. 75–106). Bingley: Emerald Group Publishing.

Putman, M., & Walker, C. (2010). Motivating children to read and write: Using informal learning environments as contexts for literacy instruction. *Journal of Research in Childhood Education*, *24*, 140–151.

Rennie, L. J., & Johnston, D. J. (2004). The nature of learning and its implications for research on learning from museums. *Science Education*, *88*(S1), S4–S16.

Richardson, J. T. E. (1999). The concepts and methods of phenomenographic research. *Review of Educational Research*, *69*(1), 53–82.

Roberts, L. C. (1997). *From knowledge to narrative*. Washington D.C.: Smithsonian Institution Press.

Ross, S. R., & Lukas, K. E. (2005). Zoo visitor behaviour at an ape exhibit. *Visitor Studies Today!*, *8*(1), 4–12.

Säljö, R. (1997). Talk as data and practice — A critical look at phenomenographic inquiry and the appeal to experience. *Higher Education Research & Development*, *16*(2), 173–190.

Schauble, L., Leinhardt, G., & Martin, L. (1997). A Framework for organizing a cumulative research agenda in informal learning contexts. *Journal of Museum Education*, *22*(2/3), 3–8.

Schwandt, T. A. (2000). Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social construction. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 189–213). Thousand Oaks: Sage Publications.

Schwarz, N. (2007). Cognitive aspects of survey methodology. *Applied Cognitive Psychology*, *21*(2), 277–287.

Schwarz, N. (2012). Why researchers should think “real-time”: A cognitive rationale. In M. R. Mehl & T. S. Connor (Eds.), *Handbook of research methods for studying daily life* (pp. 22–42). New York: Guilford Press.

Schwarz, N., Oyserman, D., & Peytcheva, E. (2010). Cognition, communication, and culture: Implications for the survey response process. In J. A. Harkness, M. Braun, B. Edwards, T. P. Johnson, L. E. Lyberg, P. P. H. Mohler, … T. W. Smith (Eds.), *Survey methods in multinational, multiregional, and multicultural contexts* (pp. 177–190). Hoboken, NJ: Wiley and Sons.

Scott, C. (2003). Museums and impact. *Curator: The Museum Journal*, *46*(3), 293–310.

Sedgwick, P., & Edgar, A. (Eds.). (2002). Postmodernism. In *Cultural Theory, The Key Concepts* (pp. 294–298). New York: Routledge.

Serrell, B., Sikora, M., & Adams, M. (2013). What do visitors mean by “meaning”? *Exhibitionist*, *32*(1), 8–15.

Simmons, R. (2001). Questionnaires. In N. Gilbert (Ed.), *Researching social life* (pp. 85–104). Thousand Oaks: Sage Publications.

Sin, S. (2010). Considerations of quality in phenomenographic research. *International Journal of Qualitative Methods*, *9*(4), 305–319.

Smith, M. K. (2008). Informal learning. In *The Encyclopedia of Informal Education*. Retrieved September 21, 2013 from http://infed.org/mobi/informal-learning-theory-practice-and-experience/

Svensson, L. (1997). Theoretical foundations of phenomenography. *Higher Education Research & Development*, *16*(2), 159–171.

Tassinari, M. G. (2012). Evaluating learner autonomy: A dynamic model with descriptors. *Studies in Self-Access Learning Journal*, *3*(1), 24–40.

Tourangeau, R. (2003). Cognitive aspects of survey measurement and mismeasurement. *International Journal of Public Opinion Research*, *15*(1), 3–7.

Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological Bulletin*, *133*(5), 859–883.

Underhill, R. (2000). *Khrushchev's shoe and other ways to captivate an audience of 1 to 1,000*. Cambridge: Perseus.

Vagle, M. D. (2010). Re-framing Schön's call for a phenomenology of practice: A post-intentional approach. *Reflective Practice: International and Multidisciplinary Perspectives*, *11*(3), 393–407.

Weil, S. E. (1999). From being about something to being for somebody: The ongoing transformation of the American museum. *Deadalus*, *128*(3), 229–258.

Wells, M., & Butler, B. (2002). A visitor-centred evaluation hierarchy. *Visitor Studies Today!*, *5*(1), 5–11.

Appendices

Appendix A –Museum Questionnaires (English and French Versions)

These questions ask you to describe yourself.

1. Are you...? □Male □ Female

2. In what YEAR were you born? _____

3. What is your first language? _____

4. What is the highest level of education you have completed?
□ High School
□ College / Some University
□ Undergraduate Degree
□ Graduate Degree

5. Where do you live?
□ Ottawa or surrounding area
□ Gatineau or surrounding area

6. Including this visit, how many times in the last 12 months have you visited this museum? _____

The next questions are about your experiences at the museum.

7a. Which of the following areas have you explored in the museum today?
□ Main museum floor
□ The storage hanger
□ The engine display
□ The outdoor play area
□ Demonstration area at the back of the museum
□ Helicopter Studio
□ Living in Space Exhibition
□ RCAF Memorial

7b. Which did you enjoy the most?
□ Main museum floor
□ The storage hanger
□ The engine display
□ The outdoor play area
□ Demonstration area at the back of the museum
□ Helicopter Studio
□ Living in Space Exhibition
□ RCAF Memorial

8. Please rate the following according to how much you agree or disagree with the statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N | A
The museum has something for everyone	□	□	□	□	□	□
The museum atmosphere was inviting	□	□	□	□	□	□
The staff was friendly	□	□	□	□	□	□
The artefacts were interesting	□	□	□	□	□	□
The information was easy to understand	□	□	□	□	□	□
The information was accurate	□	□	□	□	□	□
I learned something new on this visit	□	□	□	□	□	□
I had fun during my visit to the museum	□	□	□	□	□	□

These questions will ask you to think about the kind of museum-goer you are.

9. Not all museum-goers visit for the same reasons. This is a list of common "visitor types" and their descriptions. Do any of the following closely resemble you? (Pick as many as apply)

□ Facilitator -I'm here so that my friends/my family have a good time

□ Experience Seeker -I'm here to see something unique to this museum

□ Explorer -I'm a generally curious person, here to "dig into" what the museum has to offer

□ Professional/Hobbyist -I'm here to see something that relates to my work or to an important hobby

□ Spiritual –I feel at peace in these surroundings

□ Other –please describe_____

□ None of these

10a. How much expertise you feel you have in aviation? Would you say…

Expert		Intermediate		Novice
1	2	3	4	5

10b. How much expertise you feel you have in aviation history?

Expert		Intermediate		Novice
1	2	3	4	5

11. Do you expect to learn when you visit a museum?
□ Yes, always
□ Sometimes -It depends on the museum
□ I don't give it much thought
□ No, never

12. The following is a list of experiences other visitors said were particularly satisfying about their visits to museums. How important are they to making your experience at this museum satisfying?

	Very Important	Important	Neutral	Unimportant	Very Unimportant	N/A
Gaining new information or knowledge	☐	☐	☐	☐	☐	☐
Reflecting on how technology shaped Canada	☐	☐	☐	☐	☐	☐
Seeing 'the real thing'	☐	☐	☐	☐	☐	☐
Spending quality time with family or friends	☐	☐	☐	☐	☐	☐
Seeing my children having fun	☐	☐	☐	☐	☐	☐
Having everyone in my group enjoy themselves	☐	☐	☐	☐	☐	☐
Imagining other times or places	☐	☐	☐	☐	☐	☐
Being pleasantly occupied	☐	☐	☐	☐	☐	☐
Learning about myself	☐	☐	☐	☐	☐	☐
Learning about the other people in my group	☐	☐	☐	☐	☐	☐

13. Which experience do you consider most important? If more than one applies to you, please rank your top 3. Write "1" by the most important one, "2" by the second most and so on.

	Gaining new information or knowledge
	Reflecting on how technology shaped Canada
	Seeing 'the real thing'
	Spending quality time with family or friends
	Seeing my children having fun
	Having everyone in my group enjoy themselves
	Imagining other times or places
	Being pleasantly occupied
	Learning about myself
	Learning about the other people in my group

These last questions are about different things you may have thought about while you were visiting the museum.

14. Did you encounter any new facts or new information while you were visiting the museum today?
□ Yes □ No

If yes, what?
_____
_____
_____
_____

15. Do you think there is a message, or a main idea, that the museum is trying to convey about the technologies that allow humans to fly?
□ Yes □ Unsure □ No

If yes, can you describe what that message might be?
_____
_____
_____
_____

These questions ask you to describe yourself.

1. Are you...? □Male □ Female

2. In what YEAR were you born? _____

3. What is your first language? _____

4. What is the highest level of education you have completed?
□ High School
□ College / Some University
□ Undergraduate Degree
□ Graduate Degree

5. Where do you live?
□ Ottawa or surrounding area
□ Gatineau or surrounding area

6. Including this visit, how many times in the last 12 months have you visited this museum? _____

The next questions are about your experiences at the museum.

7a. Which of the following areas have you explored in the museum today?
□ Innovation Canada
□ The locomotives
□ Canada in Space
□ Science Zone (Crazy Kitchen area)
□ Demonstration Stage
□ Power to Choose (exhibit with the eel tanks)
□ The Titanic Display
□ TechnoZone (with the braille display and the eye operation video)

7b. Which did you enjoy the most?
□ Innovation Canada
□ The locomotives
□ Canada in Space
□ Science Zone (Crazy Kitchen area)
□ Demonstration Stage
□ Power to Choose (exhibit with the eel tanks)
□ The Titanic Display
□ TechnoZone (with the braille display and the eye operation video)

8. Please rate the following according to how much you agree or disagree with the statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N | A
The museum has something for everyone	□	□	□	□	□	□
The museum atmosphere was inviting	□	□	□	□	□	□
The staff was friendly	□	□	□	□	□	□
The artefacts were interesting	□	□	□	□	□	□
The information was easy to understand	□	□	□	□	□	□
The information was accurate	□	□	□	□	□	□
I learned something new on this visit	□	□	□	□	□	□
I had fun during my visit to the museum	□	□	□	□	□	□

These questions will ask you to think about the kind of museum-goer you are.

9. Not all museum-goers visit for the same reasons. This is a list of common "visitor types" and their descriptions. Do any of the following closely resemble you? (Pick as many as apply)

□ Facilitator -I'm here so that my friends/my family have a good time

□ Experience Seeker -I'm here to see something unique to this museum

□ Explorer -I'm a generally curious person, here to "dig into" what the museum has to offer

□ Professional/Hobbyist -I'm here to see something that relates to my work or to an important hobby

□ Spiritual –I feel at peace in these surroundings

□ Other –please describe_____

□ None of these

10a. How much expertise you feel you have in science? Would you say…

Expert		Intermediate		Novice
1	2	3	4	5

10b. How much expertise you feel you have in the history of science?

Expert		Intermediate		Novice
1	2	3	4	5

11. Do you expect to learn when you visit a museum?
□ Yes, always
□ Sometimes -It depends on the museum
□ I don't give it much thought
□ No, never

12. The following is a list of experiences other visitors said were particularly satisfying about their visits to museums. How important are they to making your experience at this museum satisfying?

	Very Important	Important	Neutral	Unimportant	Very Unimportant	N/A
Gaining new information or knowledge	☐	☐	☐	☐	☐	☐
Reflecting on how technology shaped Canada	☐	☐	☐	☐	☐	☐
Seeing 'the real thing'	☐	☐	☐	☐	☐	☐
Spending quality time with family or friends	☐	☐	☐	☐	☐	☐
Seeing my children having fun	☐	☐	☐	☐	☐	☐
Having everyone in my group enjoy themselves	☐	☐	☐	☐	☐	☐
Imagining other times or places	☐	☐	☐	☐	☐	☐
Being pleasantly occupied	☐	☐	☐	☐	☐	☐
Learning about myself	☐	☐	☐	☐	☐	☐
Learning about the other people in my group	☐	☐	☐	☐	☐	☐

13. Which experience do you consider most important? If more than one applies to you, please rank your top 3. Write "1" by the most important one, "2" by the second most and so on.

	Gaining new information or knowledge
	Reflecting on how technology shaped Canada
	Seeing 'the real thing'
	Spending quality time with family or friends
	Seeing my children having fun
	Having everyone in my group enjoy themselves
	Imagining other times or places
	Being pleasantly occupied
	Learning about myself
	Learning about the other people in my group

These last questions are about different things you may have thought about while you were visiting the museum.

14. Did you encounter any new facts or new information while you were visiting the museum today?
□ Yes □ No

If yes, what?
_____
_____
_____

15. Do you think there is a message, or a main idea, that the museum is trying to convey about science and technology?
□ Yes □ Unsure □ No

If yes, can you describe what that message might be?
_____
_____
_____

Les questions suivantes vous permettront de vous décrire un peu.
1. Êtes-vous... □ un homme? □ une femme?

2. Quelle est votre ANNÉE de naissance? _____

3. Quelle est votre langue maternelle? _____

4. Quel niveau de scolarisation avez-vous atteint?
□ École secondaire
□ Collège/cours universitaires
□ Diplôme de premier cycle
□ Diplôme d'études supérieures

5. Où vivez-vous?
□ à Ottawa ou dans les environs
□ à Gatineau ou dans les environs

6. En comptant cette visite, combien de fois avez-vous visité ce musée au cours des 12 derniers mois? _____

Les questions suivantes portent sur votre visite au musée.

7a. Lesquelles des zones suivantes avez-vous visitées aujourd'hui?
□ L'aire d'exposition principale au rez-de-chaussée
□ Le hangar d'entreposage
□ La vitrine d'exposition des moteurs
□ La zone de jeu extérieure
□ La zone de démonstration située à l'arrière du musée
□ Le Studio hélicoptère (pour enfants)
□ L'exposition « Vivre dans l'espace »
□ Le hall d'honneur de l'ARC

7b. Quelles sont les zones que vous avez préférées?
□ L'aire d'exposition principale au rez-de-chaussée
□ Le hangar d'entreposage
□ La vitrine d'exposition des moteurs
□ La zone de jeu extérieure
□ La zone de démonstration située à l'arrière du musée
□ Le Studio hélicoptère (pour enfants)
□ L'exposition « Vivre dans l'espace »
□ Le hall d'honneur de l'ARC

8. Veuillez noter les éléments suivants.

	Tout à fait d'accord	D'accord	Neutre	Pas d'accord	Absolument pas d'accord	Sans objet
Le musée est à la portée de tous	□	□	□	□	□	□
L'atmosphère du musée était engageante	□	□	□	□	□	□
Le personnel était aimable	□	□	□	□	□	□
Les artefacts étaient intéressants	□	□	□	□	□	□
L'information était facile à comprendre	□	□	□	□	□	□
Les renseignements étaient exacts	□	□	□	□	□	□
J'ai appris quelque chose pendant la visite	□	□	□	□	□	□
J'ai passé un bon moment durant ma visite au musée	□	□	□	□	□	□

Ces questions vous amèneront à réfléchir au type de visiteur que vous êtes.

9. Les visiteurs n'ont pas tous les mêmes points d'intérêt. Vous reconnaissez-vous clairement dans l'un ou plusieurs des types de visiteurs suivants?

□ L'animateur : je viens pour que ma famille ou mes amis puissent s'amuser.

□ L'excursionniste : je suis là pour voir une chose qu'on ne trouve que dans ce musée.

□ L'aventurier : curieux de nature, je suis là pour découvrir ce que le musée a à offrir.

□ Le professionnel/l'amateur : je viens pour voir quelque chose qui est en lien avec mon travail ou une passion.

□ Le spirituel : j'aime venir ici parce que je m'y sens bien.

□ Autre (veuillez préciser) : _____

□ Aucune de ces réponses

10a. Connaissez-vous bien le domaine de l'aviation? Quel est selon vous votre niveau?

Expert		Intermédiaire		Débutant
1	2	3	4	5

10b. Quel est selon vous votre niveau de connaissance de l'histoire de l'aviation?

Expert		Intermédiaire		Débutant
1	2	3	4	5

11. Vous attendez-vous à apprendre quelque chose lorsque vous visitez un musée?
□ Oui, toujours.
□ Parfois (ça dépend du musée).
□ Je n'y pense pas vraiment.
□ Non, jamais.

12. Voici une liste d'expériences qui ont particulièrement plu à des visiteurs de musées. Dans quelle mesure contribuent-elles selon vous à enrichir la visite de ce musée?

	Très important	Important	Neutre	Pas important	Absolument pas important	Sans objet
Acquérir des faits ou des nouvelles connaissances	☐	☐	☐	☐	☐	☐
Comprendre le rôle de la technologie dans l'histoire du Canada	☐	☐	☐	☐	☐	☐
Voir les choses en vrai	☐	☐	☐	☐	☐	☐
Passer du bon temps en famille ou entre amis	☐	☐	☐	☐	☐	☐
Voir les enfants s'amuser	☐	☐	☐	☐	☐	☐
Voir que toutes les personnes de mon groupe passent un bon moment	☐	☐	☐	☐	☐	☐
Imaginer comment les choses se passaient avant ou ailleurs	☐	☐	☐	☐	☐	☐
S'occuper de manière ludique	☐	☐	☐	☐	☐	☐
Apprendre à mieux me connaître	☐	☐	☐	☐	☐	☐
Apprendre à connaître les autres personnes de mon groupe	☐	☐	☐	☐	☐	☐

13. Parmi les expériences suivantes, laquelle vous semble la plus importante? Si vous choisissez plusieurs réponses, écrivez « 1 » à côté de la plus importante, « 2 » à côté de la deuxième, et « 3 » à côté de la troisième.

- [ ] Acquérir de nouvelles connaissances
- [ ] Comprendre le rôle de la technologie dans l'histoire du Canada
- [ ] Voir les choses en vrai
- [ ] Passer du bon temps en famille ou entre amis
- [ ] Voir les enfants s'amuser
- [ ] Voir que toutes les personnes de mon groupe passent un bon moment
- [ ] Imaginer comment les choses se passaient avant ou ailleurs
- [ ] S'occuper de manière ludique
- [ ] Apprendre à mieux me connaître
- [ ] Apprendre à connaître les autres personnes de mon groupe

Ces dernières questions portent sur des réflexions qui ont pu vous venir à l'esprit pendant votre visite.

14. Avez-vous découvert de nouvelles choses ou de nouveaux éléments aujourd'hui durant votre visite?
□ Oui □ Non

Dans l'affirmative, veuillez préciser.

_____
_____
_____
_____

15. Pensez-vous que le musée cherche à faire passer un message concernant les technologies qui permettent à l'homme de voler?
□ Oui □ Peut-être □ Non

Dans l'affirmative, quel serait selon vous ce message?

_____
_____
_____

Les questions suivantes vous permettront de vous décrire un peu.

1. Êtes-vous... □ un homme? □ une femme?

2. Quelle est votre ANNÉE de naissance? _____

3. Quelle est votre langue maternelle? _____

4. Quel niveau de scolarisation avez-vous atteint?
□ École secondaire
□ Collège/cours universitaires
□ Diplôme de premier cycle
□ Diplôme d'études supérieures

5. Où vivez-vous?
□ à Ottawa ou dans les environs
□ à Gatineau ou dans les environs

6. En comptant cette visite, combien de fois avez-vous visité ce musée au cours des 12 derniers mois? _____

Les questions suivantes portent sur votre visite au musée.

7a. Lesquelles des zones suivantes avez-vous visitées aujourd'hui?
□ Innovation Canada
□ Les locomotives
□ Le Canada dans l'espace
□ Zone science (la Cuisine bizarre)
□ Scène de démonstration
□ Le pouvoir de choisir (exposition avec les anguilles)
□La réplique du Titanic
□ TechnoZone (avec la vitrine sur le braille et la vidéo sur l'opération des yeux)

7b. Quelles sont les zones que vous avez préférées?
□ Innovation Canada
□ Les locomotives
□ Le Canada dans l'espace
□ Zone science (la Cuisine bizarre)
□ Scène de démonstration
□ Le pouvoir de choisir (exposition avec les anguilles)
□La réplique du Titanic
□ TechnoZone (avec l'expo sur le braille et la vidéo sur l'opération des yeux)

8. Veuillez noter les éléments suivants.

	Tout à fait d'accord	D'accord	Neutre	Pas d'accord	Absolument pas d'accord	Sans objet
Le musée est à la portée de tous	□	□	□	□	□	□
L'atmosphère du musée était engageante	□	□	□	□	□	□
Le personnel était aimable	□	□	□	□	□	□
Les artefacts étaient intéressants	□	□	□	□	□	□
L'information était facile à comprendre	□	□	□	□	□	□
Les renseignements étaient exacts	□	□	□	□	□	□
J'ai appris quelque chose pendant la visite	□	□	□	□	□	□
Je me suis bien amusé pendant la visite	□	□	□	□	□	□

Ces questions vous amèneront à réfléchir au type de visiteur que vous êtes.

9. Les visiteurs n'ont pas tous les mêmes points d'intérêt. Vous reconnaissez-vous clairement dans l'un ou plusieurs des types de visiteurs suivants?

□ L'animateur : je viens pour que ma famille ou mes amis puissent s'amuser.

□ L'excursionniste: je suis là pour voir une chose qu'on ne trouve que dans ce musée.

□ L'aventurier : curieux de nature, je suis là pour découvrir ce que le musée a à offrir.

□ Le professionnel/l'amateur : je viens pour voir quelque chose qui est en lien avec mon travail ou une passion.

□ Le spirituel : j'aime venir ici parce que je m'y sens bien.

□ Autre (veuillez préciser) : _____

□ Aucune de ces réponses

10a. Connaissez-vous bien le domaine des sciences? Quel est selon vous votre niveau?

Expert		Intermédiaire		Débutant
1	2	3	4	5

10b. Quel est selon vous votre niveau de connaissance de l'histoire des sciences?

Expert		Intermédiaire		Débutant
1	2	3	4	5

11. Vous attendez-vous à apprendre quelque chose lorsque vous visitez un musée?
□ Oui, toujours.
□ Parfois (ça dépend du musée).
□ Je n'y pense pas vraiment.
□ Non, jamais.

12. Voici une liste d'expériences qui ont particulièrement plu à des visiteurs de musées. Dans quelle mesure pensez-vous qu'ils contribuent à rendre intéressante votre visite au sein de ce musée en particulier?

	Très important	Important	Neutre	Pas important	Absolument pas important	Sans objet
Acquérir des faits ou des nouvelles connaissances	☐	☐	☐	☐	☐	☐
Comprendre le rôle de la technologie dans l'histoire du Canada	☐	☐	☐	☐	☐	☐
Voir les choses en vrai	☐	☐	☐	☐	☐	☐
Passer du bon temps en famille ou entre amis	☐	☐	☐	☐	☐	☐
Voir les enfants s'amuser	☐	☐	☐	☐	☐	☐
Voir que toutes les personnes de mon groupe passent un bon moment	☐	☐	☐	☐	☐	☐
Imaginer comment les choses se passaient avant ou ailleurs	☐	☐	☐	☐	☐	☐
S'occuper de manière ludique	☐	☐	☐	☐	☐	☐
Apprendre à mieux me connaître	☐	☐	☐	☐	☐	☐
Apprendre à connaître les autres personnes de mon groupe	☐	☐	☐	☐	☐	☐

13. Parmi les expériences suivantes, laquelle vous semble la plus importante? Si vous choisissez plusieurs réponses, écrivez « 1 » à côté de la plus importante, « 2 » à côté de la deuxième, et « 3 » à côté de la troisième.

- [ ] Acquérir de nouvelles connaissances
- [ ] Comprendre le rôle de la technologie dans l'histoire du Canada
- [ ] Voir les choses en vrai
- [ ] Passer du bon temps en famille ou entre amis
- [ ] Voir les enfants s'amuser
- [ ] Voir que toutes les personnes de mon groupe passent un bon moment
- [ ] Imaginer comment les choses se passaient avant ou ailleurs
- [ ] S'occuper de manière ludique
- [ ] Apprendre à mieux me connaître
- [ ] Apprendre à connaître les autres personnes de mon groupe

Ces dernières questions portent sur des réflexions qui ont pu vous venir à l'esprit pendant votre visite.

14. Avez-vous découvert de nouvelles choses ou de nouveaux éléments aujourd'hui durant votre visite?
□ Oui □ Non

Dans l'affirmative, veuillez préciser.

_____
_____
_____

Dans l'affirmative, quel serait selon vous ce message?

_____
_____
_____

Appendix B –Interview Guides (English and French Versions)

Interview Guide

Thank you for filling out the questionnaire. Now we will start the interview, I'm turning on the recording device.

This is going to be what researchers call a "semi-directed interview", meaning that what we'll do is have an organized conversation about learning in museums, and about the evaluation exercise I just asked you to do. Does that sound alright with you?

<u>Themes and Prompts</u>

The Visit on This Day
-What did you do today? (Look at the list from the survey)
-Did you enjoy yourself? (Look at the survey question that asks about fun)

Motivations to Visit Museums
–What normally motivates a visit to this museum?

Previous Experiences with Self-Report Surveys
-You were willing to participate in this study, do you like answering questionnaires?
-What kind(s) do you remember filling out?
-Do you think the information tends to be accurate?

Previous Experiences with Self-Assessments
-Have you ever used self-assessment tools in school, or at work? (*Interviewer explains if no, to make sure that they get the question.*)
-How good do you think you are at "knowing what you know"?

Cognitive Aspects of the Survey Experience

-Talking about this set of questions (interviewer points to…); what is this part of the survey trying to find out from you?

- Go through the different types of question formats: open-ended, rating scales, Satisfying Experiences List

-Did any of the questions make you feel confused?

Perceptions of Own Learning

-In the questionnaire, you said you are expert/intermediate/novice. What does (that term) mean to you?

-What do you mean by learning?

- Is it different because you're in a museum? How?

- You "agreed" that you learned something new...what would it have taken for you to say you "strongly agreed"?

-A lot of the questions in the survey focused on learning about "the museum's stuff", what about learning about yourself, or learning about the people you brought to the museum?

Personal Learning and the Social Context

-You normally come to the museum with children. Does that change your own expectations about your learning?

-You normally come to the museum with people your own age. Does that influence your expectations about your own learning?

Personal Learning and the Physical Context

-Does the setting of this museum give you the impression that a certain kind of learning is expected? How?

-Do you think you approach learning in the same way at other museums, or science centres?

Guide d'entrevues

Merci pour vos réponses sur le questionnaire. On va maintenant passer à l'entrevue. Je viens de mettre en marche « l'enregistreuse ».

L'entrevue d'aujourd'hui sera « semi structurée » ce qui veut dire qu'on aura plutôt une conversation un peu organisée sur l'apprentissage dans les musées, et sur le questionnaire que vous venez de compléter. Est-ce que ça vous va? Avez-vous des questions avant de commencer?

Thèmes et questions

La visite d'aujourd'hui
-Qu'avez-vous visité aujourd'hui? (Consulter la liste dans le questionnaire)
-Comment était la visite? (Consulter la question sur le plaisir)

Musée et motivations
–Normalement, qu'est-ce qui motive une visite? Plus souvent qu'autrement, qu'est-ce qui déclanche une sortie dans un musée?

Les sondages « auto évaluatifs » et vous
-Vous avez accepté de prendre part à cette étude, en général aimez-vous répondre aux questionnaires?
-A quel point croyez-vous que l'information tirée de questionnaires sont valides ou représentatifs?

Dimensions cognitives des sondages
-Si on se concentre sur cette partie-ci du sondage (chercheur indique une section), que croyez-vous que le chercheur avait en tête? Qu'est-ce *le mot/la phrase* signifie selon vous?

- Passer à tour de rôle les différents formats

-Y avait-il quelque chose dans le questionnaire qui vous a embêté ou qui vous semblait un peu étrange/difficile à comprendre?

Perceptions de « mon apprentissage »

-Pour vous, qu'est-ce que ça signifie « apprendre »?

- Est-ce que le contexte, le fait d'être dans un musée, change votre perception du mot?

- Vous étiez « d'accord » que vous avez appris quelque chose de nouveau pendant la visite. Qu'est-ce que ça prendrait pour que vous cochiez « complètement d'accord »?

« Notre » apprentissage et le contexte social

-Plus souvent qu'autrement vous visitez le musée avec des enfants. Pensez-vous que ça change vos attentes par rapport à votre apprentissage?

-Plus souvent qu'autrement vous visitez le musée accompagnés d'adultes. Pensez-vous que ça change vos attentes par rapport à votre apprentissage?

« Notre » apprentissage et le contexte physique

-Est-ce que ce musée-ci, dans la façon que c'est organisé, dans le genre de matériel, vous donne l'impression qu'il y a un genre d'apprentissage qui est attendu?

-Pensez-vous que vos attentes/ façons d'approcher/approches envers l'apprentissage sont pareils dans le contexte d'autres musées ou des centres de science?

Appendix C–Recruitment Materials (English and French Versions)

–Members Monthly eNewsletter
Voluntary participants needed for a study on: "The self-assessment of learning in museums". Taking part will help the museums develop better programs and exhibitions.

A research study is being planned with the members of the Canada Science and Technology Museum that might interest you. The museums and the University of British Columbia are working together on a study of learning and it's self-assessment in museums.
The focus is on understanding how regular visitors like you talk and think about the kinds of learning that can take place in museums. Participating involves visiting either the Canada Science and Technology Museum or the Canada Aviation and Space Museum, filling out a brief questionnaire, and taking part in a one-hour interview. If you are accompanied by children we can arrange for a staff member to provide a fun activity.
This project is the PhD research for one of the museums' employees. Members who sign up will be entered in a draw for one of three free renewal of their membership.

If you are interested in participating please let me know by clicking on the link below!
Fraser

-Sample Facebook Post
Members needed for a study on: "The self-assessment of learning in museums". Taking part will help the museums develop better programs and exhibitions!

This new project, the PhD research of one of the museums' employees, is focused on understanding how visitors assess their own learning. Participating involves coming for a visit, filling out a short questionnaire and participating in an interview.

For more information on the study and on how to get involves click here.
(The link will lead to the eNewsletter information above)

-Sample Tweet
Members needed for a new study on: "The self-assessment of learning in museums". Taking part will help the museums develop better programs and exhibitions! For more info: (link)
(The link will lead to the eNewsletter information above)

New Cohorts
–Museum Professionals (contact email)
Title: Study on "The self-assessment of learning in museums"
Dear (first name),
As you may know, I'm in the data collection phase of my doctoral program, working on a study of the self-report and self-assessment of learning in museums. The goal is to better understand how people think about, and make sense of, the questions we use in museums to assess visitor learning.

In order to include a variety of perspectives, the plan is to interview museum members, general museum-goers, and museum professionals. Taking part involves visiting a section of either the Science and Technology or the Aviation and Space Museum, followed by a short self-assessment questionnaire and an interview. The whole process takes one hour and a half. More detailed info is included in the documents attached.

Your participation would be valuable to the project, however if you would prefer not to, please feel free to decline. If this is of interest, kindly let me know via email or by calling the number below.

Thanks!
Gabrielle (*researcher contact information removed*)

–General public (contact email)
Title: Study on "The self-assessment of learning in museums"
Dear (first name),
As you may know, I'm currently working towards a PhD at the University of British Columbia, studying how museum-goers assess their own learning. The research is taking place here in Ottawa, at the Canada Science and Technology Museum and at the Canada Aviation and Space Museum.

I'm looking for participants, specifically for people who have visited any museum, gallery, historic site, or science centre in the past two years, and who would be willing to take part in this study.

Participating involves visiting either the Science and Technology or the Aviation and Space Museum, followed by a short self-assessment questionnaire and an interview. The whole process takes one hour and a half. More detailed info is included in the documents attached. If you are not interested please don't feel obliged. However, if you are, or know someone who might be, my contact information is listed below.

Thanks!
Gabrielle (*researcher contact information removed*)

-General public Facebook post (on co-investigator's wall)
Participants needed for a study on: "The self-assessment of learning in museums".

Hi all!
I'm looking for participants for a study I'm doing as part of my doctorate. The research is focused on how museum-goers assess their own learning. If you've visited a museum, a gallery, a historic site or a science centre in the past two years and would like to take part in my research please get in touch!

–Bulletin électronique des membres
Participants recherchés pour une étude sur « L'auto-évaluation de l'apprentissage dans les musées ». Vos contributions aideront les musées à améliorer leurs programmes et leurs expositions.

Nous sommes en train de planifier une étude avec les membres des Musées des sciences et de la technologie du Canada. Les Musées collaborent avec la University of British Columbia pour enquêter l'apprentissage et l'auto évaluation. L'étude cherche à comprendre la façon dont les visiteurs réfléchissent et s'expriment au sujet de ce qu'ils apprennent dans un musée. Les participants seront invités à visiter *soit* le Musée des sciences et de la technologie du Canada *ou* le Musée de l'aviation et de l'espace, suivi par un bref questionnaire et une entrevue d'à peu près une heure. Les enfants qui accompagnent les participants auront accès à une activité divertissante pendant l'entrevue.

Ce projet est dans le cadre du doctorat d'une des employées des musées. Les membres qui participent courront la chance de gagner un renouvellement gratuit de leur adhésion.
Si ceci vous intéresse, veuillez m'en faire part! Cliquez le lien si dessous.

- Facebook
Membres recherchés pour une étude sur « L'auto-évaluation de l'apprentissage dans les musées ». Vos contributions aideront les musées à améliorer leurs programmes et leurs expositions.

Dans le cadre du doctorat d'une de nos employées, ce projet se concentre sur la façon dont les visiteurs réfléchissent et s'expriment au sujet de ce qu'ils apprennent dans un musée. Les participants seront invités à visiter un musée, suivi par un bref questionnaire et une entrevue.

Pour plus d'information sur l'étude ou sur comment s'impliquer cliquer ici.

- Tweet
Membres recherchés pour une étude sur « L'auto-évaluation de l'apprentissage dans les musées ». Vos contributions aideront les musées! Pour plus d'info cliquez!

New Cohort
(Note : The "museum professionals" as well as the Facebook post will be in English only)

–General public (contact email)
Titre: Étude sur « L'auto-évaluation de l'apprentissage dans les musées »
Cher (prénom),
Comme vous le savez peut-être, je suis en train de compléter mon doctorat à l'Université de la Colombie-Britannique. Mon étude, qui se déroule à Ottawa au Musée des sciences et de la technologie du Canada ainsi qu'au Musée de l'aviation et de l'espace du Canada, se concentre sur comment les visiteurs dans les musées évaluent leur propre apprentissage.
Je suis présentement à la recherche de participants, le critère principal étant d'avoir visité un musée, une galerie d'art, un site historique, ou un centre de science au moins une fois dans les dernières deux années. Participer implique une visite à l'un des deux musées et, par la suite, de répondre à un bref questionnaire écrit et de compléter une entrevue. Le processus au complet requiert une heure et demie. Des informations détaillées sont disponibles dans les fichiers joints.
Si participer ne vous intéresse pas, il n'y a aucun problème. Par contre, si vous ou quelqu'un que vous connaissez seriez enclins, je vous prie de me contacter par courriel ou par téléphone.
Merci beaucoup!
Gabrielle (*researcher contact information removed*)

Appendix D –Flyers (English and French Versions)

UBC Department of
Curriculum and Pedagogy

Canada Science and Technology Museums Corporation
Canada Agriculture Museum
Canada Aviation and Space Museum
Canada Science and Technology Museum

Voluntary participants needed for a study on: "The self-assessment of learning in museums"

Taking part will help the museums develop better programs and exhibitions.

We are looking for individuals willing to share their perspectives on learning in museums.

Taking part involves a visit to *either* the Canada Aviation and Space Museum *or* the Canada Science and Technology Museum, followed by a short questionnaire and a half-hour interview.

Participants will receive a free family pass for the museum.

Children visiting with participants will be offered an activity while their grown-ups are being interviewed!

If you are interested please contact:

(*Contact information removed*)

UBC Department of
Curriculum and Pedagogy

Société des musées de sciences et technologies du Canada

Musée de l'agriculture du Canada
Musée de l'aviation et de l'espace du Canada
Musée des sciences et de la technologie du Canada

Participants recherchés pour une étude:
« L'auto-évaluation de l'apprentissage dans les musées »

Vos contributions aideront les musées à améliorer leurs programmes et leurs expositions.

Nous sommes à la recherche de personnes qui aimeraient partager leurs perspectives sur l'apprentissage dans les musées.

Participer implique une visite soit au Musée de l'Aviation et de l'espace du Canada *ou* au Musée des sciences et de la technologie du Canada, suivi par une entrevue d'une heure.

Les participants recevront une passe familiale gratuite.

Les enfants qui accompagnent les participants auront accès à une activité divertissante pendant que leurs adultes prennent part à l'entrevue.

Si ceci vous intéresse, veuillez contacter **:**

(*Contact information removed*)