

Museum Educators' Personal Theories of Teaching: A Multi-Case Study



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This study is dedicated to my grandmother, Lila Xatzitoliou,
and
my parents, Marianna Xatzitoliou-Vildiridis and George Vildiridis,
for the unconditional love and support they show me.

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ABSTRACT

This multi-case study creates a better understanding of the relationship between four museum educators' personal theories of teaching and their practice in university museums. The question that frames this study is, "How, in a university museum setting, do museum educators' personal theories of teaching relate to their educational practices?" The aim was to produce an account of museum educators' personal theories and practices in university museums and interrogate what factors may influence the relationship between the two. While there is some literature about the personal theories and practices of museum educators, no studies have been found that examine museum educators working in university museums in the United Kingdom. This study addresses this gap by exploring four museum educators' personal theories and practices in three museum educational programmes in two university museums in a university city.

This study is positioned within a qualitative tradition. Data for this study was collected using semi-structured interviews and observations. In total four pre-interviews, 24 observations and 24 post-interviews were conducted with four museum educators in two university museums in a UK city. Thematic analysis was the approach taken for the analysis of each case study.

Findings in relation to the museum educators' personal theories suggest that there were important similarities in the museum educators' personal theories. All the museum educators' personal theories consisted of elements relative to knowledge, learning and learners, and the facilitation of a positive learning environment. The museum educators' personal theories of teaching relative to the nature of knowledge, learning and learners, varied per the discipline of the museum they taught in.

It was found that personal theories were influenced by the museum educators' shared background as former school teachers and, for some, their accumulated experience teaching in university museum settings. Thus, they tend to foster educational settings with characteristics typical of formal learning environments.

The key finding in relation to the research question of this study, is that in a university museum setting, the personal theories of teaching of the museum educators

were often aligned with their practices; in some cases, they were not. Whether the museum educators could align their practices with their personal theories of teaching appeared to depend on the sociocultural context they worked in. Despite, as previously noted, similarities in the four personal theories of teaching (i.e. relative to knowledge, learning and learners and the facilitation of a positive learning environment), there were differences in how these were translated into practice by each museum educator.

This research contributes to the field of museum education by: i) enhancing our understanding of museum educators' personal theories of teaching and practice in university museums; ii) providing fresh insights into the relationship between the personal theories of teaching and practice of museum educators working in university museums and; iii) adding to our understanding of the breadth of learning environments in museum education. The findings of this study are significant because they enrich the empirical knowledge and understanding of museum educator teaching in university museums. This study provides insights that may benefit the training and professional development of museum educators in university museums.

CHAPTER ONE: INTRODUCTION

Rationale, Contribution, and Study Outline

1.1 Contextual rationale

The past five decades have seen several developments in the conceptualisation of the educational role of museums. While some studies assess programmes in terms of student learning, the personal theories of teaching and consequent practices of museum educators in university museums¹ has received scant attention in the literature. The present study explores documents, and analyses personal theories of teaching and how this relates to the practices of museum educators in programmes for visiting school children ²in university museums.

¹ In the context of this study, the term “university museum” refers to a repository of collections of all disciplines run by an institution of higher education (ICOM, 2017). This term is often interchangeably used in American literature with the term “academic museum” (see Association of Academic Museums and Galleries). However, as the museums sampled in this study are members of UMAC (ICOM international committee for university museums and collections) the term “university museum” will be used in this study to refer to museums run by universities. Historically the focus of university museums has been to use their collections for didactic purposes (Hamilton, 1995; Mansard, 2014; Verschelde and Adriaens, 2016). To this day a core mission of university museums remains to support the mission of their parent institutions, i.e. teaching, research and the preservation of collections within the institution of higher learning they are affiliated to (Hartz, 2017; ICOM, 2017). However, the role of university museums has been gradually evolving and opening up to include broader educational and cultural aims shared by the museum community overall, e.g. the creation of public educational outreach programmes (Hartz, 2017). Due to historical antecedents, depending on the discipline of the university museum, the learning environment facilitated may vary from a more formal to a more informal learning environment (King and Marstine, 2006).

² In the context of this study, the term “visiting school children” refers to primary school children participating in museum programmes during a class visit with their schoolteachers.

This study looks at the relationship between museum educators' personal theories³ and practices in three museum educational programmes at two university museums. Four case studies have been compiled of the same number of museum educators in this multi-case study.

Two developments in museum education make this study relevant.

The first and main, stimulated by progress in learning theory, is the recent focus in museum research of factors influencing learning in museums (Macdonald, 2011). The role of the museum educator is accepted as a significant influence on the learning process and educational experience of museum visitors (Falk and Dierking, 2000). Despite the need to better understand museum educators' teaching, only a few studies have focused on practices and pedagogical thinking (e.g. beliefs or personal theories) of museum educators. No studies have been found that focus on this topic for museum educators working in **university museums in** the United Kingdom.

The second development is related to the ongoing debate in the field of museum education about the pedagogical character of museum education for children and young people. There are different positions as to what pedagogical approaches predominate in museum education now. We currently do not understand the pedagogical approach museum educators in university museums express in their teaching, or what kind of learning environments they facilitate. Some authors, such as Hein (2008) and Hooper-Greenhill (2007b), argue that learning in museums was teacher-centred and the focus has now shifted to learner-centred approaches.

³ Personal theory is conceptualised as “an underlying system of constructs” (Sendan, 1995, p.60) relative to studies that teachers “draw upon in thinking about, evaluating, classifying, and guiding pedagogic practice” (Sendan, 1995, p.60). Matsagouras (2011), Tann (1993), Handal and Lauvas (1987) identify this system of constructs as the beliefs, including values, attitudes and practical knowledge held by an educator. Leatham's (2002) understanding is that what guides practice are “the fundamental elements that make up our personal philosophies and ideologies” (p.12).

Although this may be the case for some museums, it is argued in this study, in line with other authors (Ravelli, 2006; Robins, 2013; Witcomb, 2003), that the boundaries between pedagogical approaches in museums are not **clear-cut**. Rather than perceiving approaches in contemporary museum education as the result of a shift or shifts, it is more accurate to say that elements from teacher and learner-centred approaches have been present throughout the history of museum education. Despite some authors portraying such developments as recent (Hein, 2000; Hooper-Greenhill, 2007b; Watermeyer, 2012), they have mostly failed to consider examples of innovative practices over the course of museum education and tend to perpetuate inaccurate generalisations (Robins, 2013). This argument is developed in the Literature review chapter (see section 2.2). It is important, therefore, to examine the personal theories and practices of museum educators in university museums to understand what pedagogical approach influences their teaching and what type of learning environments they create as a consequence.

The following subsection provides an overview of the two advances noted above and highlight their salient features.

1.1.1 The importance of researching museum educators

In this subsection, an argument is made for the importance of studying the personal theories and practices of museum educators, an aspect neglected in the past in favour of research focussed around visitor surveys and programme evaluations, etc. (Hooper-Greenhill, 1991). While there have been studies of the factors influencing visitor learning processes, the work of museum educators, and what drives them, has received less research attention (Falk and Dierking, 2000). “It has proven quite difficult to...decide what direction to go and how to enhance the profession because

currently we don't understand museum teaching much" (Arts Council England Heads of Museum Education Conference, 2013).

Marland (1998) argued for school teachers, and the same could be said about museum educators in university museums, that to improve teaching performance or adopt new approaches, researchers and educators must first understand the personal theories of teaching influencing teacher actions. Researchers that have conducted several reviews into teaching thinking in mainstream education (Calderhead, 1996; Carter, 1990; Clark and Peterson, 1986; Pajares, 1992; Fenstermacher, 1994; Richardson, 1996; Fang, 1996; Verloop et al., 2001) agree that it is important to capture the voices of teachers and look at the world from their perspective while examining teaching practices (Fenstermacher, 1994).

Over the last half century or so, museum education (or "museum studies") research has consisted primarily of efforts to assess the history and principles of museum education, examine visitor behaviour and learning in museums or conduct programme evaluations. Scant attention is paid to the parameters and contexts that determine visitor learning, even though museum educators are a key influence in visitor education in museums (DeWitt and Hohenstein, 2010; Hein, 2008; Hooper-Greenhill and Moussouri; 2001; Pedretti, 2002; Rennie and McClafferty 1996; Rennie and Stocklmayer, 2003). This has seen conclusions drawn of limited value to museum educators and researchers hoping to better understand museum education practice.

Calls for such research came from museum educators after this gap was highlighted in 1986 by Eisner and Dobbs. They, like Worts in 1990, posited that unless museum educators' values, beliefs, and assumptions about learning and teaching in museums were identified and understood, the intellectual basis and

theoretical foundation to strengthen and develop museum education programmes was missing. Rasmussen and Winterrowd (2012), Burnham and Kai-Kee (2005) called for a better understanding, based on rigorous research, of the teaching of museum educators. Evidence of the need for this research is found in a literature review conducted by Hooper-Greenhill and Moussouri (2001). An overview of the research available on museum educators' practices and thinking is available in the Literature Review chapter of this study (see section 2.4).

The few studies covering taught programmes in museums for school-children, that have looked at the relationship between museum educators' personal theories and practices in a theory driven way are Castle (2001), Taylor and Neill (2008), Tran (2004), King (2009) and Pringle (2008). These studies focus on a different type of museum educator (e.g. artist educators, volunteers, educators in nature centres) and/or different types of museums (e.g. art galleries, nature parks and non-university museums) than the current study.

By examining, in this study, the personal theories and practices used by museum educator's working in university museums, opportunities to understand their teaching become possible (Shulman, 1987). This helps us to understand teaching from the museum educators' perspective, in a manner that echoes investigations in the broader field of teaching.

1.1.2 How museums provide education for children and young people

This subsection argues that there is a debate about the pedagogical approaches that characterise contemporary museum education and that we lack a good understanding of museum educator teaching in university museums. This argument is developed and exemplified in the Literature review chapter (see section 2.2).

In Britain, the educational opportunities provided by museums for the public were recognised in the nineteenth century (Nikonanou, 2009). In the early decades of museum education, the focus was on knowledge-transfer based on predetermined didactic political and historical views (Macdonald, 2011). Despite this, some innovative participation practices evolved with Ruskin (1875), Dana (1909-1929), and D'Amico (1937-1967) in museums. These paved the way for widespread changes in the following decades.

Toward the middle of the twentieth century, the educational role of museums became part of a broad discussion that is still active. The social revolution of the 1960s and artist interventions paved the way for an extensive re-evaluation of alternative educational practices and the recognition of more progressive approaches in museum education (Hooper-Greenhill, 2002).

The liberal political culture of the first sixteen years of the twenty-first century encouraged progressive approaches (Hein, 2008), even though, it could be argued that a didactic knowledge transfer model still exists in museum education (Hooper-Greenhill, 2007b).

Robins (2013) cautions, like Ravelli (2006) and Witcomb (2003), that even though,

There have been clearly discernible trends in the late twentieth and early twenty-first centuries towards alternative, less didactic paradigms that acknowledge both the subjectivity of curatorial decision-making and the uncertainty of knowledge itself. However, it would be misleading to suggest that these... have occurred everywhere. There are still plenty of didactic, un-authored, yet debate-

worthy interpretations of art and artefacts to be found in museums
(p.157).

The extent to which progressive theories and learner-centred approaches have been put into practice or have influenced the personal theories and practices of museum educators in university museums is not well understood (Hooper-Greenhill, 2007b; Macdonald, 2011). By describing and characterising museum educators' personal theories and practices, and in exploring the relationship between the two, this study takes important first steps towards that direction. Taught museum programmes in university museums, as a pedagogy, require further research to understand and assess future potential (Hooper-Greenhill, 2007b).

This study fills a gap in existing studies by identifying, documenting, and exploring the personal theories of museum educators working in university museums and attempting to understand how this influences their practice.

1.2 Aims and contribution

The aim of this study, is to document and explore the relationship between personal theories and practices used by museum educators in educational programmes for primary school children in university museums. This study hopes to contribute to further developments in museum education and teacher thinking by:

- i) adding to the corpus of literature about the personal theories that contribute to teaching and practice by exploring the cases of specialist educators (i.e. museum educators in university museums);
- ii) contributing to the field of literature about museum educators working in university museums. This study adds to the literature an

understanding of their personal theories and practices and the relationship between the two;

- iii) enriching the empirical knowledge of museum education and providing insights that may benefit professional practice and training.

This study does not claim to be definitive or exhaustive, yet offers a way forward for future research. The pedagogical value of the museum educators' personal theories and practices in this study, and the effect they have on school children's learning, goes beyond the scope of this study. It could contribute to future research concerning personal theories and practices of museum educators in university museums to enrich future museum educator training and professional development. The next section provides an outline of the study with a summary of each chapter.

1.3 Outline of the study

This section outlines the structure of the study. It describes the contents of each chapter, the sections in each, and the links between each.

Chapter One: Introduction

Chapter One situates museum learning in the wider educational context and explains why it is important to explore museum educators' personal theories and practices (and the relationship between the two) in university museums. It also defines the aims, scope, and contribution of this study to the field of museum studies.

Against the backdrop of the rationale and arguments of this study - namely, the dearth of research about museum educators' personal theories and practice in university museums, and developments in museum education – this section shows

how this research attempts to fill the gaps in the current literature, and contribute to museum education.

Chapter Two: Literature review

Chapter Two establishes the context and rationale for this study and demonstrates the gap in the literature, thereby justifying the relevance of the present research focus. This chapter is divided into six sections: 2.1 Introduction; 2.2 The history and development of museum education; 2.3 Theories and practices in contemporary museum education; 2.4 Research about museum educators' practices and thinking; 2.5 Usefulness of exploring personal theories of museum educators and practice and overview of relevant literature in mainstream education; and 2.6 Theoretical framework.

After the Introduction, the Second Section provides a historical background to museum education, accounting for changes in aims, pedagogical approach and practice. It maps the debates and challenges in contemporary museum education, and provides an overview of the different types of museums and pedagogical approaches that make up the contemporary museum scene.

Section Three, is divided into three subsections with the first arguing that Free-Time Pedagogy underlines the educational character of museums. This is followed by a discussion on the typology of educational and learning contexts in museum education (formal, informal, progressive and informal). There is a detailed discussion of the learning theories and practices relevant to this study that prevail in contemporary museum literature and research on museum educators teaching school programmes in science and humanities museums.

Section Four, provides an overview of research on museum educators' practices and thinking to contextualise the present study. It is contended that there are no studies on museum educator's personal theories and practices in university museums in the United Kingdom.

In Section Five, the author interrogates the usefulness of exploring educators' personal theories and practice, and how this applies to the present study. The term "personal theory," used in this study is defined and studies that use personal theory as a theoretical framework are reviewed. There is also an overview of research into the relationship between teacher thinking and practice.

Section Six, provides the theoretical framework of this study. It presents and describes arguments for the use of Leatham's (2006) framework to understand the relationship between practice and personal theory.

Chapter Three: Methodology

This chapter describes the aims of the research, the methodological rationale for a multi-case study design, the sample selection, and the data collection techniques. It discusses ethics and validity, and concludes with the analysis process used for the data sets of 24 observations and 28 interviews.

The qualitative approach to case study in this research helped explore the under-researched topic of personal theories and practices of museum educators in university museums. The parameters of this multi-case study are:

- i) Two university museums: A humanities-oriented museum and a natural science museum in a U.K. city.

- ii) Three taught museum programmes: Programme 1 is jointly delivered by the humanities and natural science museums, and Programme 2 and 3 are in the natural science museum for class visits by primary school children.

Semi-structured interviews and observations were used to collect data. An iterative, thematic analysis approach analysed the data collected from interviews and observations, to understand the relationship between museum educators' personal theories and observed practices in university museums.

Chapters Four to Seven: Findings

The findings chapters from each of the four museum educators are presented in Chapters Four to Seven. The findings from each case study are described. They address the research question of this study by using data derived from the analysis of pre-interviews, observations, and post-interviews of this study.

The pre-interviews and post-interviews of museum educators provide each museum educator's personal theory. Observations explore the relationship between personal theory and practice to demonstrate the relationship between personal theories expressed in pre-interviews with observed museum educator practice. Post-interviews were a rich source of information and enhanced the author's understanding of the complex relationship between a museum educator's overall personal theory of teaching and his or her practices.

Chapter Eight: Discussion

Chapter Eight provides a critical analysis of the data across the four case studies. It discusses the salient themes emerging from the study in relation to

literature about museum education and the personal theory or beliefs, and practice of teachers and museum educators. This chapter discusses how museum educators' personal theories and practice interweave with theories presented in the Literature Review. It explores the relationship between personal theories and practice and in doing so, examines the affordances and limitations that the sociocultural contexts in which the museum educators work, place on the museum educators' ability to translate their personal theories into practice. There are four key findings in this study:

- i) There were important similarities in the museum educators' personal theories: all the museum educators' personal theories consisted of elements relative to knowledge, learning and learners, and the facilitation of a positive educational environment. The museum educators' personal theories of teaching relative to the nature of knowledge and learning and learners, varied according to the discipline of the museum they taught in.
- ii) The professional experiences of these museum educators influenced the content of their personal theories. They were influenced by their common background as former school teachers and, for some, their accumulated experience as museum educators in university museum settings.
- iii) In university museums, the personal theories about teaching of the museum educators were most often aligned with their practices and, in a few cases, these were not due to contextual influences.
- iv) Despite similarities in the four personal theories of teaching, there were differences in how these were individually translated into practice by each museum educator due to personal preferences.

Chapter Nine: Conclusion

This chapter has four sections. After the Introduction, Section Two presents the key findings answering the research question and discusses the contributions of this research. The following section looks at the potential implications of this study and recommends areas for future research. The final section delineates the limitations and strengths of this study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction to Literature Review

Chapter Two establishes the context and rationale for this study and demonstrates the gap in literature about the personal theory and practice of museum educators working in university museums. It also presents the theoretical framework used in this study. This chapter has six sections: After the Introduction, the Second Section explores the history and development of museum education. The Third, discusses relevant theories in contemporary museum education. The Fourth, provides an overview of research on museum educators' practices and thinking. The Fifth, examines the usefulness of exploring the personal theories of museum educators and their practice and gives an overview of relevant literature in mainstream education. The last section presents the theoretical framework of this study.

After the Introduction, the section that follows opens with the historical context of museum education and the changes in pedagogical approach, practice, and aims since the 19th century primarily in Britain. It maps the debates and challenges in contemporary museum education. At present, there is no consensus on the aims and educational character of museum education, and so an overview following is necessary of the different types of museums and educational approaches to give insight into contemporary museums.

Section Three provides key theories that predominate in contemporary museum education literature. These are discussed in three parts. The first, argues that free-time pedagogy underlines the educational character of museums. This is followed by a discussion about definitions used to describe educational contexts and whether the educational context of museum education is formal, informal, participatory, or

non-formal. Finally, there is a detailed discussion of the learning theories and practices that prevail in contemporary museum literature and research on museum educators teaching school programmes in science and humanities museums.

Section Four, provides an overview of studies about museum educators' practices and thinking to contextualise the present study. It is contended that there are no studies on museum educator's personal theories and practices in university museums in the United Kingdom.

The author then interrogates the usefulness of exploring educators' personal theories and practice and how this applies to the present study. The term "personal theory" is defined as used in this study and studies are reviewed that use personal theory as a theoretical framework. An overview follows of research into the relationship between teacher thinking and practice.

Section Six provides the theoretical framework of this study. It presents arguments for the use of Leatham's (2006) framework to understand the relationship between practice and personal theory.

2.2 Historical development of museum education

The history and development of museum education from the advent of public museums during the Victorian era to the present provides a historical context and an overview of the evolution of museums and museum education.

The term "pedagogical approach" is defined in this study as the notion, theory or justification, of museum educators or museums underpinning the choice of teaching practice (King, 2009). "Practices" are defined in this study as the practical methods used by museum educators or museums to facilitate learning.

The literature review is organised chronologically, tracing the evolution of museum education in Britain within a broad socio-political context. An attempt to display relationships between changes in educational theory, practice and policy is made. Authors such as Hein (2000), Hooper-Greenhill (2007b) and Watermeyer (2012), argue that for most museums, paradigms of learning theory and practices in museum education have transitioned from a predominantly didactic approach to a constructivist, participatory, and learner-centred focus. For example, Watermeyer (2012) notes, museum education “has evolved from repository of cultural artefacts to experience based process of knowledge acquisition and production...transformed from isolated and passive to collective and participatory...the learner is consequently recast from passive recipient of information-bites to choreographer, translator and innovator” (p.1-3). However, many exceptions and examples of progressive and participatory educational practice have existed throughout the history of museum education, especially in art galleries (Robins, 2013).

Despite recognising that throughout the history of museums there have been “shifting priorities for learning” (Robins, 2013) for some museums, this study argues, in line with other authors (Ravelli; 2006; Robins 2013; Witcomb; 2003), that the boundaries between pedagogical approaches in museums are not **clear-cut**. Rather than perceiving the approach in contemporary museum education as the result of a shift, it is more accurate to say that elements from both teacher and learner-centred approaches have been present throughout the history of museum education. This study emphasises the historical binary between a didactic and learner-centred pedagogical approach, as portrayed by some museum education authors, might not be a nuanced representation of the history and current status of museum education.

2.2.1. What is museum education?

Museum education is an educational service (Hooper-Greenhill, 1991) that includes practices dedicated to enrichment, including research, the planning and display of exhibitions, special events, the production of educational material and teaching. The scope of this study is restricted to taught sessions by museum educators using programmes for primary school children during school museum visits in university museums. Even though the focus of the historical overview in this study is on museums, material derived from art galleries has been included. Throughout history the policies, management and educational approaches across institutions are informed by similar ideas. This follows the example set by other authors in the field of museum pedagogy (Black, 2005; Durbin, 1996; Hein, 1998; Hooper-Greenhill, 1991; Nikonanou, 2009).

2.2.2 History of museum education

The history of museum education examined in this study extends from the birth of the public museum in the Victorian period to the present. Literature in museum education suggests the following themes:

- i) the goals of museum education and underlying educational approaches;
- ii) influences shaping museum education; and
- iii) practices.

This review is not definitive or exhaustive about the arc of museum history and interlinked educational goals (Alexander and Alexander, 2007). The corpus of literature on museum education identifies changes in museum education in: i) the 19th century; ii) the 20th century through to World War II; iii) end of World War II (1945)

to 1989; iii) 1989 to 1997 as representing major shifts in politics and; iv) the late 1990s to the present.

2.2.2.1 19th Century: Birth of the public museum

Schnapp (1996) suggested that “museums derived from a human desire to keep objects and develop special relationships with them. This varies according to the historical period” (p.43). The so-called “prehistory of museum education” (Impey and MacGregor, 1985) in Europe starts in ancient times and continues to the mid-16th century when we see the start of collections. The 17th century saw the spread of cabinets of curiosity or private artefact collections among the privileged, these were precursors to museums where encyclopaedic collections of objects were displayed (Impey and MacGregor, 1985). Eighteenth century Europe reflected the Enlightenment doctrine that organising and understanding knowledge is a central value (Impey and MacGregor, 1985).

The history of museum education starts in the 19th century with the advent of the “public museum” (Nikonanou, 2009). The ascent of Queen Victoria to the British throne is seen as a turning point in the educational intent of museums (Woodson-Boulton, 2008). Public museums were owned either by a government entity or a not-for-profit institution with collections of artefacts for educational purposes and accessible to the general populace for the first time in history.

i) Goals of museum education in the 19th century

Museums sought to provide opportunities for people across all social classes to educate themselves with artefacts from the arts and sciences. In the early 19th century, this self-educational element had encyclopaedic and symbolic content: it

allowed diverse knowledge of the latest developments in the arts and sciences while seeking to inspire civic pride, nationhood, and cultural awareness (Hooper-Greenhill, 1991). Education aimed to promote social interaction between the classes “by making people visible to one another” (Hill, 2005). Toward the end of the 19th century, the goals of museum education were affected by the relationship between museums and schools. Compulsory schooling and the popularity of “object lessons” as a teaching methodology saw school curricula include museum visits. Thus, the educational aspect of museums began to tilt towards school children.

ii) Influences on the goals of museum education and government policy in the 19th century

Dramatic economic changes brought about by the Industrial Revolution and then the Victorian ethos of self-improvement, education, and leisure (Wiener, 2004) was typified by the Royal Collections in 1824. This signified a shift from elitism to public education and the citizen’s right to knowledge. Another reason underlying the government initiative to use museums as public education institutions was the paucity of schools or adult learning institutions (Lawson and Silver, 2007). Influenced by the successful introduction of public museums in France, the Conservative Government under Sir Robert Peel established the legal basis for museums in Britain. The passing of the 1845 *Museum Act* led to the founding of more museums.

Using objects as learning resources marked a shift in education from the written word to material objects preferred by the less-educated mass of the population. To that end, object learning was considered an appropriate pedagogical approach to educate the illiterate, making museum collections ideal learning tools (Hooper-Greenhill, 1991). The education of children also received attention during

the second half of the 19th century; the Haslemere Museum, for example, built in 1888 was designed specifically for children (Hooper-Greenhill, 1991). The introduction of compulsory education in 1870, and the stipulation that museum visits constituted educational activities, meant that didactic teaching with the aid of objects for children were implemented in museums (Hooper-Greenhill, 1991).

iii) Socio-economic context

Numerous influences permeating Victorian politics and society, contributed to the belief that museums aided the moral and intellectual improvement of the public (Carbonel, 2012). Historians concluded that a mixture of middle-class exclusiveness and the increase of new commercial entertainment prohibited the social reform (Rodrik, 2000) intended by some museum advocates. There were shining examples, such as Ruskin who succeeded in creating learning environments for communities unfamiliar with museums (see below).

iv) Museum educational practices in the 19th century

Museum practices during the Victorian era, with few exceptions, were didactic and focused on transmitting information. They occasionally incorporated active object-teaching methods (Starn, 2005). General museum education practice was to place artefacts in display cases, label them, and thematically arrange them. Visitors were expected to make sense of the material on their own. Further support was provided by inexpensive catalogues and museum lectures. The use of objects transformed museums “from being a mere unintelligible lounge for idlers into an impressive schoolroom for everyone” (Minihan, 1977, p.112). London’s South Kensington Museum (renamed the Victoria and Albert Museum in 1899) had free admission for half the week and opening hours extended into the evening (Hudson,

1975). Refreshment rooms were instituted to encourage “rational recreation” and provide an alternative to public houses (Altick, 1978).

Rhetoric suggested that education was widely available in museums, but the reality did not always correspond to the ideal. The British Museum resisted opening at night, even though it encouraged visits by working people (Hudson, 1975). The National Gallery excluded workers on most days because of their ‘poor hygiene’ and ‘lack of appreciation of art’ (Altick, 1978). Lectures and catalogues were available in only some museums. Even though the pedagogic rationale of the civilising effect of museums on society continued to hold sway during the 19th century, there were tensions concerning the museum’s role among some social reformers (Robins, 2013) like John Ruskin, who was informed by his progressive (Roellinger, 1950) social reform (Stankiewicz, 1984) preoccupations. Ruskin founded Saint George’s Museum in 1875, which opened its doors to communities unfamiliar with museums. Even though Ruskin believed that art was the solution to social ills, he challenged the elitism of museum education and extended it to disadvantaged parts of towns. Waithe (2013) explains that Ruskin described this museum as a “working man’s Bodleian Library” (p.324) with the aim of facilitating ‘liberal education,’ aesthetic taste and to use art instruction to improve character (Waithe, 2013). Ruskin proposed an alternative programme for museums to “recover the creativity, authenticity, and exuberant workmanship epitomized in Gothic architecture” (Thomas, 2003, p.49) for all potential audiences.

Museum education expanded to support broad-based school education to assist schoolteachers in instructing their pupils. The “object lesson” was a staple of the primary school curriculum in Victorian England. As part of science class, daily

objects (e.g. a globe, apple, candle, etc.) or museum loan objects were used by teachers to train students to observe and describe – this led to museum education adopting similar practices (Hooper-Greenhill, 1991). This resulted in two innovations: the loan boxes service (1889) and object-focused school museum visits led by schoolteachers or curators (end of the 19th century) (Hooper-Greenhill, 1991).

Loan boxes consisted of a small educational loan collection circulated to schools. Henry Higgins, the president of the newly-formed Museums Association, was the first person to establish loan services in 1889. Higgins stipulated the objective of the loan service was to train children how to learn rather than teaching them facts only, he also wanted them to achieve happiness through habits of observation. This was believed to have a refining influence on children (Hooper-Greenhill, 1991).

The object-focused school museum visit was implemented in a variety of ways. In some museums, where touching artefacts was an option, teachers encouraged students to handle and observe objects, while in other instances artefacts in display cases were a point of reference. Toward the end of the 19th century, discussion turned to who should teach in the museum environment: curators or teachers. Various solutions were tried including hiring extra museum staff and providing training for teachers. In leading museums, “a [museum] department dedicated to school group visits in museums was gradually set up at the end of the nineteenth century” (Alexander and Alexander, 2007).

v) Influences impacting on 19th century museum education practice

General museum education practices were predominantly influenced by the didactic educational institutions of the 19th century (Woodson-Boulton, 2008).

Educational goals were defined as encyclopaedic, moral, and social (Hooper-Greenhill, 1991; Woodson-Boulton, 2008).

Overall, museum development and practice was uneven. Differences existed in the audiences targeted, admittance policies, and educational practices used. Geographical differences emphasised national pride and achievement, while smaller provincial institutions made provision for the education of children, especially in areas where schools lacked resources (Hooper-Greenhill, 1991).

Museum education was rudimentary and all too often followed a library model with static displays and a singular narrative (Hooper-Greenhill, 1991). However, regardless of the varying levels and successes of educational provision, “the establishment of a museum...was... an educational act “ (Hooper-Greenhill, 1991, p.15).

2.2.2.2 World War I: Museums as tools of social welfare

World War I impacted on museum education in the way museum resources were used to respond to the social needs of the public (Hooper-Greenhill, 1991). This period saw further evolution in exhibition practice and museum education for school children. School children spent half their day in museums since many schools were given over to military purposes. Teachers, specially trained by curators, were provided by the city education committee, because there was a shortage of teachers due to the war (Hooper-Greenhill, 1991). This had a long-term impact on museum education (Hooper-Greenhill, 1991).

Museums used displays of artefacts with accompanying text, to provide information on everyday topics such as hygiene, health, and nutrition. The style was

didactic and informational, but also tried to improve morale and help people cope with wartime restrictions (Dierking and Saunders, 2004). Even though museum education was mostly didactic, the emergence of the progressive educational movement in 1900 provided museum education with a framework for development (Carbonell, 2012). The progressive movement, led by John Dewey, described ideas and practices that portrayed education as a tool of democracy, this contributed to museum education recognising learning as a lively interaction between children and objects (Nikonanou, 2009). Major proponents were Dewey and Maria Montessori; their impact was seen more in European technological museums and the United States (Nikonanou, 2009). In the United States, John Cotton Dana, who directed New Jersey's Newark Museum between 1909 and 1929 (Duncan, 2009), "favoured a model where the museum would focus on community and serving the everyday needs of visitors" (Robins, 2013, p.36).

Dana created educational environments for working class communities unfamiliar with museums. The basis of his participatory philosophy was to unite art with labour to counter social fragmentation, oppose elitist and conservative activities in contemporary museums, such as the Metropolitan Museum of Art in New York and reimagine museums as inclusive institutions for the public good (Maffei, 2000). Some of the practices he used to educate and emancipate local workers was through "process exhibits, displays that revealed the stages of craft manufacture and industrial production" (Maffei, 2000, p.302). He extended opening hours into the evenings to encourage visits from working people. The principles that underlined his practice were explained in his 1913 manifesto, *The Good of the Museum* where he wrote: "accessibility, popular education and meeting local needs" (Maffei, 2000, p.303) were essential to museums.

He was hailed by Forest in 1929 as “an inspiring and redoubtable leader in awakening our art museums and libraries to their real opportunities and in inspiring effective action” (Maffei, 2000, p.314). Maffei (2000) explains that Dana is acknowledged as a progressive pioneer who challenged America’s conservative museum community, “through his work... [Dana] hoped to reform the museum community, society and industry. He saw his museum’s activities as a progressive response to the problems of increased industrialisation, an expanding culture and the country’s search for a national aesthetic based on the machine” (p.301). He followed Ruskin’s footsteps.

After World War I, the *Education Act of 1918* raised the minimum school-leaving age to 14-years and recommended progressive, child-centred approaches over traditional didactic methods (Hooper-Greenhill, 1991).

2.2.2.3 Interwar period: Museums in a period of transition

The period between World War I and World War II was an important transitional period. Museum education became less important and the primary goal of museums shifted to curating collections (Alexander and Alexander, 2007). This was influenced by curators, who contested the educational basis of museums in favour of prioritising collecting and conservation – this led to rivalry between educational and curatorial aims (Hooper-Greenhill, 1991).

i) Goals of museum education and influences during the interwar period

Museum education was not initially a function separate from its curatorial role. The separation of the two functions happened gradually, (Hooper-Greenhill, 1991) resulting in competing understandings of what the main functions of museums

should be. An inspiring educational institution was the central mission of most museums until the 1920s, coming second to the curatorial role of the museum (Alexander and Alexander, 2007). A reluctance by museums to develop links with the Local Education Authorities (LEA) or to strengthen cooperation with schools was supported by The British Association for the Advancement of Science's committee (BAAS).

ii) Influences on museum education during the interwar period

By 1938, with war looming, school visits were hosted by only a fifth of museums. Educational specialists and guides became rare. In two reports commissioned by the government (Miers, 1928; Markham, 1938), public museums were critiqued for being “dull and lacking in imagination” (Babbidge, 2005, p.16).

Miers (1928) attributed failures in establishing an educational role to a “hampering” lack of policy. The Markham (1938) report recognised the responsibility of the government towards education of children in museums. Gradually, to accommodate school needs, LEAs seconded teachers to museums, loan box services were developed, and displays were improved (Hooper-Greenhill, 1991).

2.2.2.4 World War II

Government used museums as tools of social welfare during World War II. Pioneering and innovative methods of teaching and organisation emerged, as illustrated by a three-year experiment with a Schools Museum Service in 1941 between the Art Gallery and Museums Committee and the city of Glasgow Educational Committee (Babbidge, 2005).

i) Museum education during WWII

The goals of museum education during WWII were influenced by a government need to assist citizenry with ways to cope with political conflict (Hooper-Greenhill, 1991). Aside from educating the public about survival information, museums were used to teach citizens about hygiene to prevent the spread of disease (Hooper-Greenhill, 1991).

ii) Practices of museum education during WWII

The two World Wars provided an opportunity for museums to explore creative services to society. The pioneering Glasgow Schools Museum Service included object handling, slides and film. They encouraged the use of deductive thinking. There was cooperation between museum education officers and teachers, pre-museum class preparation, thematic topics, links between the work in the classroom and the museum, “find the object worksheets,” and practical art classes. This led to similar initiatives in Wales and some English counties.

In the United States, innovative participatory practices took place. Victor D’Amico at New York’s Museum of Modern Art (MoMA) from 1937–1967 was that museum’s first director of education at (MoMA). He was an influential art educator committed to democratic values and broad public education “yet his influence is little known and seldom discussed” (Rasmussen, 2010, p.451). He was part of a circle of progressive educators in New York who experimented with new teaching practices influenced by play theories, an interest in children’s creative growth, motivation, developmental levels and learning styles, and child psychology (MoMA, 1951). D’Amico was one of the first art educators

to apply Jean Piaget's theories of cognitive development and child-centred pedagogy to art education... [D'Amico] believed that all children could benefit from art education and emphasised the creative potential of each child. His philosophy of creative teaching connected creativity to innovation and to preparing children to live in a democratic society (Rasmussen, 2010, p.452).

D'Amico's most acclaimed works were the Children's Art Carnival (1942–1969) which travelled to Europe and the art education television series *Through the Enchanted Gate* (1952–1953). “The Carnival tested D'Amico's ideas about the development of creative environment, child-centred teaching practices, free-choice learning opportunities, and the expressive possibilities that emerged from interactions with carefully selected and presented media” (Rasmussen, 2010, p.455). The television series was filmed at NBC's studios with children participating in classes at MoMA.

After World War II, increasing support for a purely curatorial role for museums began to threaten the educational function of museums. This tension would persist for several decades (Hooper-Greenhill, 1991).

2.2.2.5 1945 to 1989

This era is identified as the beginning of modern museum education (Moore, 1982). Gradually, philosophical and theoretical debates as well as artist interventions in museums resulted in widespread changes in practices. Also, expansion in educational provision to and with schools occurred (Hooper-Greenhill, 1991). Education departments within museums became common and museum staff specialised as curators, designers, and teachers (Hooper-Greenhill, 1991). The need

for educational work was supported by government studies, the most influential of which were the Wright Report (1973) and the Drew Report (1979).

i) Goals of museum education from 1945 to 1989

At the end of World War II, the primary function of museums was curatorial, focused on collecting and conservation of objects (Rosse, 1963). Nevertheless, different models of educational provision evolved, ranging from services supplied by local educational authorities (LEAs), by museums alone, or a combination of the two (Hooper-Greenhill, 1991). In provincial museums, normally LEA-supported and funded, educational work was limited to school visits and loan services. In national museums, educational work was limited to guided lecture tours of collections (Hooper-Greenhill, 1991). During this period, there were innovative and progressive pedagogical initiatives, which relied on the educational enthusiasm of individual museum professionals (e.g. Molly Harrison at the Geffrey Museum in London, Rene Marcouse at the Victoria and Albert Museum, and Barbara Winstanley in Derbyshire), artists and LEAs (e.g. in Leicester and London) (see section vi below).

These initiatives, funded from local authorities, governmental agencies, and the Carnegie United Kingdom Trust (CUKT), aimed to encourage museums to recognise their educational role. A specialist group of people later known as the Group for Education in Museums (GEM) (1970) were appointed for educational work in museums.

Widespread changes in educational practices in museums reflected societal dynamics, artist interventions and developments in pedagogical theory. Museum educators entertained a robust dialogue concerning the philosophy, methods, and practice of museum education. This period saw more progressive approaches in

museums, especially in museums with art collections (Roberts, 1997; Nikonanou, 2009).

ii) Influences on museum education from 1945 to 1989

From 1945 until 1989, four major factors influenced the development of museum education: museum educators, the general progressive climate of the 1960s and artists' interventions, curators and government policy.

a) Museum educators

Museum education was not evenly developed or organised in the United Kingdom (DES report 1971, Museums in Education, Education Survey no. 12) and, despite some exemplary models of good practice, most services were mediocre (Hooper-Greenhill, 1991). From the 1960s, teachers were appointed to work with school children in museums (Cheetham, 1984). The role of museum educators widened to include lectures, gallery talks, handling sessions, demonstrations, and role-play (Hooper-Greenhill, 1991). As school visits increased, more economical methods, such as resource packs, were devised to facilitate learners' museum experiences without requiring museum educators.

Most museum educators wanted to open museum education to groups other than schools and to include progressive pedagogical approaches. Harrison and Marcouse offered philosophical insights in their books, *Learning out of School* (1954) and *The Listening Eye: Teaching in an Art Museum* (1961), as well as innovative practices stemming from their work in the Geffrye Museum and the Victoria and Albert Museum (Hooper-Greenhill, 1991). Harrison (1954) was a proponent of progressive educational ideas. Her analysis of the educational potential of museums

centred on “the use of objects as evidence, the development of an aesthetic awareness, and social education” (p.52).

Marcouse (1961) emphasised the importance of using senses and imagination. The importance of follow-up work, such as drawing, was stressed. These individuals influenced educational approaches in museums, although it would take two decades more for their work to achieve widespread recognition (Hooper-Greenhill, 1991).

b) The 1960s and artist interventions

The climate of the late 1960s was one of social revolution. There was criticism of the traditional autocratic, didactic educational systems in public education (Hooper-Greenhill, 2007b). This paved the way for a widespread re-evaluation of alternative educational practices, and the development of progressive approaches. In many museums, there was a move towards more active, less didactic, and a more learner-centred pedagogy.

An important influence towards a participatory approach in museums was artist interventions (Robins, 2013). Artist interventions offer examples of “distinctive approaches to intervening in the orthodox practices of museums...[and] have significance that goes beyond aesthetic concerns and can be read as part of a process of constructing meaning within a given society/culture” (Robins, 2013, p.47).

The artist interventions in the 1960s and 1970s, for example, Oiticica, Piper, Beuys, Ruppertsberg amongst others were significantly influenced by earlier interventions during the 1920s and 1930s (Bishop, 2006). Duchamp’s *Fountain* in 1917, Max Ernst and Johannes Baargeld’s exhibition at the Dada Spring Awakening

(1920) and the Surrealists' (1931) collaboration with the Communist Party (Robins, 2013) paved the way for artists to challenge museum practice.

During the 1960s and 1970s, interventionist approaches usually took the form of critique about “curatorial strategies, display methodologies, exhibitions, funding policies and pedagogical approaches” (Robins, 2013, p.63). In the spirit of progressive and participatory ideology they were, “concerned with constructions of meaning and with opening out possibilities for meaning-making in order to provide alternative, often more socially situated meaning which contrast with the fixity of an ‘official’ interpretation offered historically to museum visitors” (Robins, 2013, p.155) and strove “to collapse the distinction between performer and audience, professional and amateur, production and reception” (Bishop, 2006, p.10).

It is argued, that “in the long term, this extended to the creation of new interpretive methodologies and a reconceptualization of policies and practices in some galleries and museums” (Robins, 2013, p.63). However, some critics say that artists might “see discursivity and sociability in rosy terms” (Foster, 2006, p.195). Foster (2006) claims that during collaborative projects “entire exhibitions are often given over to messy juxtapositions of projects...and occasionally the effects are more chaotic than communicative” (p.192). Attempts to involve the audience might place “too great a burden ...on the viewer...at times, ‘the death of the author’ has meant not ‘the birth of the reader’, as Roland Barthes speculated, so much as the befuddlement of the viewer” (p.192), Foster wrote. Despite criticism on the legacy and importance of artist interventions, they received academic recognition by the 1990s as a major influence on museological practices and interpretation (Robins, 2013).

c) Curators

Curators were concerned about exhibition displays (Carbonell, 2012). Often their bias tended to cause them to see the value of collections as research or aesthetic objects as opposed to potential educational tools (Hooper-Greenhill, 1991; Nikonanou, 2009). It would be true to say that museum education was looked upon with considerable suspicion for many years by some curators in the museum profession despite the origins of museums as educational institutions (Hooper-Greenhill, 1991).

d) Government policy

The position of government during this period was controversial. On the one hand, policy emphasised the educational obligation of museums toward schools but did not challenge the centrality of the curatorial concerns. The Rosse Report of 1963 was dedicated to curatorial matters, and the chapter on educational activities covered only museum services for schools and the training of schoolteachers, reinforcing the shift towards curatorial goals. The report stressed cooperation between museums and local authorities to develop school museum services. It highlighted the way the museum educational role would be fulfilled was by instilling in future generations the significance of objects in museums (Rosse, 1963). By the end of the 1960s, many education departments under LEAs offered visits adapted to school curricula, schoolteacher training services and employed more teachers (Alexander and Alexander, 2007).

By the 1970s, museum education was more established and as the drive toward professionalisation continued, the British government identified a set of objectives in a series of reports (e.g. *Report of the Museums Association Working*

Party on Museum in Education Report, 1971; Wright Report, 1973; Drew Report, 1979). These reports focused on improving museum education and increasingly suggested idealistic innovations in education, reflecting, amongst other things, the desire to expand museum education to adults, diverse groups, and to systematically train school teachers.

The most influential reports were The Wright Report (1973) and The Drew Report (1979) because they successfully pushed for important issues such as government grants and the development of a structured national museum service.

The Wright Report was produced by the Arts Committee of the Department of Education and Science. The most important contribution of this report was the identification of the need for a National System of Museum Services to raise standards of museums throughout the United Kingdom. Another important contribution of the Wright report was arguing for the funding and development of provincial museums (Thomson, 1984). The influence of this report is illustrated by the fact that the Government met both key recommendations. It increased funding for museums and set up a committee chaired by Sir Arthur Drew, chairman of the Standing Commission on Museums and Galleries at the time, to pursue the recommendations for the new framework in support of museums made in the Wright report (Thomson, 1984).

The Drew report significantly furthered the strategic concepts and proposals initiated in the Wright report regarding the development of a framework for a national museum service. The Drew report succeeded in producing a preliminary plan for a National System of Museum Services in collaboration with Area Councils, local authorities and museums. Of the 39 recommendations, it made, perhaps the most

important concerned the setting up of a museums council representative of all museums in the country. This allowed the museum profession to express their ideas collectively and advise the government on all matters relevant to the sector (Thomson, 1984).

The Drew report was well received by museum management and the newly elected government in 1979 led by Margaret Thatcher which made structural changes to accommodate the recommendations in this report. The Drew report is still considered one of the most influential reports of this period (Thomson, 1984), because it provided a solid reference point for government planning regarding museums and “[set] guidelines for generations to come” (Hansard, 1979 col. 436).

2.2.2.6 1989 to 1997: The tendency toward a visitor-centred approach

By the 1990s, the accumulation of a solid body of practice and the professionalisation of museum educators led to a recognition of the significance of museum education. The priority became visitor needs and experiences during the early 1990s, when newly-elected Conservative leader, John Major, emphasised entrepreneurship in museums. Radical changes in the education system and leisure patterns of the population contributed towards changes in museum education.

i) Goals of museum education from 1989 to 1997

In 1989, then Minister for the Arts, Richard Luce identified the enhancement of museum education as a policy objective for the Conservative Government (Luce, 1989). Luce said museum educational services should attract visitors from all sociocultural backgrounds. Making the museum experience pleasurable to visitors became key and non-formal education opportunities for adults were provided. New

educational programmes encouraged learning through enjoyment, comfort, relevance to visitors' everyday life, and a motivation to learn and return to the museum (Hooper-Greenhill, 1991). The role of museums for children was not neglected; rather, it was to be achieved by provision for formal education. Formal education was realised by linking museum activities to curriculum aims (Hooper-Greenhill, 1991).

ii) Influences on museum education from 1989 to 1997

The tendency towards a visitor-centred approach can be attributed to three main factors: the consequences of government policy, the introduction of curriculum changes and socio-economic challenges. Policies implemented by the Conservative and Labour governments aimed to make museums less dependent on public funding and caused them to attempt to generate revenue from visitors (Alexander and Alexander, 2007). Museums came under pressure to use business principles and compete with other leisure options. The change in wider educational policies and thinking promulgated by the *Education Reform Act* in 1988 (e.g. National Curriculum) bolstered the status of museums, which were now seen as relevant to general school practices (Hooper-Greenhill, 1991).

a) Government policy

Conservative government policy aimed to reduce the dependence of museums on public funding. It urged museums to adapt to “the spirit of the age” (Luce, 1989) and become more entrepreneurial, which led to the introduction of admittance charges. Museums realised their unique selling point was providing entertainment of an educational character. It became clear that visitor satisfaction and quality of the museum experience was key to stimulating repeat visits and to having visitors spend money in the museum.

b) School curriculum

The introduction of the National Curriculum in 1988 centralised educational objectives and materials for schools throughout the country and provided opportunities for museums and school visitors (Hooper-Greenhill, 1991). It focused on the needs of school children, and ensured government support to research and develop practices (Alexander and Alexander, 2007). Programmes for schools stressed the principles of the new school curriculum which encouraged personal and social development, equal opportunities, and multicultural issues (Blenkin et al., 1992). Specific skills including communication, numeracy, information technology, problem solving, and thematic learning. Despite this encouraging picture, school visits declined. Under the 1988 *Education Reform Act*, Local Management of Schools (LMS) was introduced (Hooper-Greenhill, 1991). Money was allocated to schools, but they did not necessarily spend it on museum visits. This emphasised the need for museums to put themselves forward as an attractive and cost-effective option for school visits, with programmes linked to the national curriculum (Hooper-Greenhill, 1991).

c) Socio-economic context

Change in leisure patterns during the 1990s opened new opportunities for museums (Hooper-Greenhill, 1991). Changes mirrored shifts in leisure and social meaning in terms of what people thought was culturally important (Foley and McPherson, 2000). One change in leisure patterns was related to more leisure time for a large portion of the British public. This provided an opportunity for museums to appeal to these audiences.

One example was the increase in leisure for older and more wealthy people (Middleton, 1991). Recreational time increased for this potential audience segment due to changes in work patterns, such as increases in early retirement and part-time work after the age of fifty-five (Hooper-Greenhill, 1994). Research suggests that people at this stage in their lives are inclined to invest in experiences offered by museums (Hiemstra, 1981).

Another example, was the increase of free time for families to pursue leisure activities. Despite an increase on hours of paid work for the average family, improved technologies created more free time as there was a decline in the hours spent on household maintenance. This was an important factor, as the largest group visiting museums was in the 25-44 age range, including many visitors with families.

For another segment of the population, full-time working male and female professionals, despite working hours increasing and free time decreasing, demands for social meaning through educational activities pursued in the available free time increased (Tribe, 1995). This was due to notions of success for this segment of the audience being dependant on cultivating knowledge and therefore seeking “‘value-added’ leisure experiences (which is another way to say leisure that has some kind of learning component)” (Macdonald, 2011, p.332).

As spare time increased for segments of the British public and search for leisure activities increasingly became more important for other segments, competition in the leisure industry increased. A commercial leisure industry with access to sophisticated audience research and big budgets provided fierce competition to museums. Museums had to play to their strengths and become sensitive to what

visitors would enjoy – and invest in- to attract a high number of visitors (Black, 2005).

iii) Museum educational practices from 1989 to 1997

The development of a “market sensitive approach” (Anderson, 1989) saw museum education become a multi-layered experience capitalising on museum collections. To attract more visitors, programmes were designed to appeal to a wide age-range, such as gallery sections for under-fours, or programmes using reminiscence therapy, a technique which involves "the use of life histories – written, oral, or both – to improve psychological well-being" (Van Den Bos, 2006, p.101) for elderly people (Beevers et al., 1988). “Visitor analysis” – understanding visitor patterns and behaviour through the collection and analysis of relevant data – became fashionable-(Macdonald, 2011).

Attention was paid to the cost of educational provision in relation to measurable factors such as learning outcomes, the rise in visiting trends, and revenue produced by visitors (Hooper-Greenhill, 2007b).

In a climate where museums began to re-examine what education meant for them, David Anderson’s report (*A Common Wealth*) in 1997 was influential because it set the agenda for the educational potential of museums (Macdonald, 2011; Museums Association, n.d). In what was the “first comprehensive report to examine their [museums’] educational role in full” (Anderson, 1999, p.v), Anderson made the case that “ museums could offer much better services to learners of all kinds, from family groups to pupils and students pursuing courses at all levels. Anderson argued that education needed more resources and needed a higher profile within museums” (Museums Association, n.d).

Anderson's report had a paradigm shifting significance for museum learning because on the one hand it stressed museums as contributors to cultural development in society based on the principles of inclusion, access, social justice, participation, lifelong learning, personal meaning making, inspiration and creativity (Anderson, 1999; Bellamy and Oppenheim, 2009). On the other hand it endorsed a renewed purpose for museums as places for informal and self-directed learning (Anderson, 1999; Bellamy and Oppenheim, 2009).

The influence of this report was widespread as "since its publication, many of the ideas in the Anderson report have become mainstream" (Museums Association, n.d.). Based on this publication, several professional bodies for those working in museum education (e.g. the Group for Education in Museums and Engage) developed standards and practice among their members (DCMS, 2000, p.14). Equally national and regional museum bodies (e.g. the Museums Association, Regional Arts Boards) responded to the challenge set by the report to advance museum education (DCMS, 2000, p.14). Most notable was the Campaign for Learning through Museums and Galleries "formed to follow through the report's recommendations and raise awareness of museum education among decision-makers" (DCMS, 2000, p.14).

The various forums set up by museum professionals, such as journals and conferences, saw ideas debated and good practice disseminated (Airey, 1980).

By the 1990s most museums had educational departments for activities ranging from workshop sessions, training and advisory courses for teachers, resources to plan classes, self-guided tours, loan services, lectures, demonstrations, and events for children, families and adults (Hooper-Greenhill, 1995).

2.2.2.7. 1997 to 2017

In 1997, the newly-elected Labour Party refined museum education goals and set the tone for the relationship between cultural policies and museums. It called for a broad, nation-building mandate for museums. Museums were to be a tool for social integration and creativity (Alexander and Alexander, 2007). “For most of the last 40 years’ government policy for museums has been *ad hoc*, and it is only since 1997 that museums have been the subject of strategic direction” (Babbidge, 2005).

i) Goals of museum education 1997 to 2017

Labour Party cultural policy set out to create a universal national identity by fighting social inequalities and inspiring creativity (Alexander and Alexander, 2007). Curators, designers and educators were charged with producing an educational environment that maximised learning opportunities and which would be joyful, interesting, and motivating (Hooper-Greenhill, 1997b).

ii) Influences on museum education from 1997 to 2017

Pressure for change in museum education came from the government’s sociocultural agenda for “democratic and humanitarian” principles (Hooper-Greenhill, 1991, p.135), which was already part of Labour party policy. These shifts in understanding the role of the museum had tangible impacts on practices in museum education.

iii) Museum educational practices from 1997 to 2017

Because of developments in pedagogical theory and practices popular in general education (Hooper-Greenhill, 2007b), a focus on holistic educational

experiences emerged. A tendency toward child-centred methods such as object learning, experiential learning, and enquiry was evident. For school-age children, the aim was to broaden the educational experience beyond being merely complementary to school curricula. Life-long learning was a goal. Adults were encouraged to continue their education in museums (Hooper-Greenhill, 2007b).

Most museums with educational departments delivered programmes in the museum galleries or in a special room. Where school visits were organised by teachers, museums provided training about the collections and practices used in museum education (Hooper-Greenhill, 2007b). Outreach programmes, including mobile museums, workshops in schools or community centres, and loan services increased the appeal of museums and museum education.

Watermeyer (2012), echoing Heath and Vom Lehn's (2008) opinion, argues that "in recent years, substantial funding of the museum sector has facilitated methodological innovations informing how expert knowledge is communicated and made available to the public in explicitly participatory ways" (p.1). This was mirrored in the semantic change from "museum education" to "museum learning" (Hooper Greenhill, 2007b). However, as Meecham (2010) and Robins (2013) highlight, there was not a binary shift from teacher-centred to learner-centred approaches in museum education, rather a continuum. The boundaries between the two approaches are not **clear-cut**.

Robins (2013) cautions, with Ravelli (2006) and Witcomb (2003), that even though

there have been clearly discernible trends in the late twentieth and early twenty-first centuries towards alternative, less didactic paradigms that acknowledge both the subjectivity of curatorial decision-making and the

uncertainty of knowledge itself. However, it would be misleading to suggest that these... have occurred everywhere. There are still plenty of didactic, un-authored, yet debate-worthy interpretations of art and artefacts to be found in museums (p.157).

As Meecham (2010) posits, despite a tendency towards less didactic learning theories, this is not the case for all museums.

2.2.2.8 The contemporary state of museum education

This review has shown how pedagogies in museums have developed since the 19th century. Museums have always had an educational role. However, the significance and aims assigned to this role and attendant practices have varied (Hooper-Greenhill, 1991). Around the time of the publication of the seminal paper, *The American Association of Museums Committee on Education's Statement On Excellence in practice* (2002), there were debates among curators, teachers, and museum educators about new directions for museums and the pedagogical character of museum education (Hein, 2008; Macdonald 1998). Limited understanding of museum educators' teaching raises questions of how to fulfil the educational mission of museums.

An overview of the theoretical literature on museum education shows three educational approaches that characterise contemporary museums: "The Traditional," "The Modernist," and the "Post-Modernist" museum. Each "type" of museum is characterised by a specific pedagogical approach; namely, a view on educational aims, learning, teaching practices, and epistemology. The development of each type of museum can be traced back to a historical moment in museum history. These are discussed in this study to provide an overview of the plurality of diverse pedagogical

approaches stemming from the heritage of museum education in contemporary museums.

i) The Traditional Museum

Traditional museums first appeared in the 19th century. Their main role was to store, protect, and create a “rich library” (Seling, 1967) where the public could study different disciplines based on representative objects from various eras displayed in a chronological order. Contemporary museums that stem from this tradition have, as a fundamental objective, the preservation of items for collections that may represent national heritage and identity (Hooper-Greenhill, 1987). For example, in museums related to social sciences and history, artefacts are presented as national treasures narrating a national history (Horne, 1984) like an “encyclopaedia” (Seling, 1967) and aim to reinforce homogeneity and heritage.

This approach of “the object as a source and carrier of knowledge” (Nakou, 2001, p. 188) epistemologically disallows any departure from a single and “objective” truth (Bennett, 1995). The exclusivity of truth relates to the positivist notion of the authentic knowledge embedded in objects (Horne, 1984). This approach exhibits a mono-dimensional perception of reality (Nakou, 2001). It reflects a contextualist epistemology, which views knowledge as relatively unchanging and objective (Olafson and Schraw, 2006).

There is a tendency to inform visitors in a passive, academic manner using displayed objects in cabinets and accompanying texts. Learning is viewed as the accumulation of knowledge. This approach takes for granted the capacity of the museum object or the museum educator to transfer predetermined notions and knowledge. The museum educator’s role in such institutions is that of someone who

transmits knowledge about the object. One can trace this educational approach to the didactic teaching approaches of the early 20th century, which if used in isolation are no longer accepted as adequate for learning in a museum (Hooper–Greenhill, 1996).

ii) The Modernist Museum

The modernist museum is characterised by an interest in the museum audience and the use of collections for their interactive education and entertainment.

Fundamental to this museum is the epistemological view that truth does not correspond to one single unchallenged understanding of the world. Knowledge is perceived as the result of a complex process of making connections using logic and scientific methodology (Kuhn, 2012). The modernist museum is an institution that propagates that which can be examined, counted, classified, and named according to scientific methodology, presenting a universally reliable and trustworthy view of the world (Hooper–Greenhill, 1999).

Hein (1998) discusses the “discovery museum,” which arguably captures the pedagogical approach of the modernist museum. Here, the learner is given the chance to construct knowledge through a directed discovery approach. The process of interpretation is usually based on questions set by the museum educator. Moreover, tools and means of relaying information – such as texts, labels, sounds, videos, slides, scents and so forth – provide learners with information about the objects (Nakou, 2001).

Even though there are usually pre-determined learning outcomes, the learner is not passive, nor is the museum educator considered completely authoritative (Hein, 1999a). Cameron’s model of feedback loop (Hooper–Greenhill, 1996) provides an interpretation of the nature of communication taking place between the museum

educator and learner within the modernist museum. The objective is to guide learners to a scientific truth. Museum educators' roles are limited to guiding the learners' discovery and providing feedback to facilitate discovery (Hooper-Greenhill, 1996). This approach mirrors a process-oriented approach to education (Tsai, 2002).

Even though museum educators have a central role as somewhat of a "specialist authority, who define the interpretive approach" (Hooper-Greenhill, 1999, p.9), in contrast to the traditionalist museum, they are mediators of learning using "scientific language" and methodology (Hughes, 1998).

In the modernist museum visitors are not only learners but also consumers (Hooper-Greenhill, 1992). This newfound role arises from the museum's need to secure its financial sustainability from dependence on government grants and subsidies (Black, 2005). Voices opposing this new development have argued that museums function in a vulgar market fashion (Macdonald, 2011).

iii) The Post-Modernist Museum

The post-modernist museum is, according to contemporary museum education theorists (Hooper-Greenhill, 2007a; Hein, 1995; Ebitz, 2007), the most evolved and suitable type of museum for modern times. This derives from the tradition of "New Museology" (Vergo, 1997), which encourages visitors to develop a personal discourse (Noutsos, 1979; Fragoudaki, 1985) that is linked to their own social and cultural environment (Nakou, 2001; Kokkinos, 1998). The main aim of this museum is to accommodate the needs and interests of individuals and is characterised by a desire to satisfy society's social and cultural needs (Nakou, 2001). Learners are recognised as members of different groups with distinct backgrounds, characteristics, motivation and needs. Their values, prior knowledge and experience, as well as expectations, are

integral to the post-modernist museum's educational approach (Hooper-Greenhill, 2004). The development of visitor studies since the 1970s has contributed to the collection of information on visitor profiles, which has helped museums better gear their services.

Although the post-modernist museum role remains ambiguous and is much debated, Hooper-Greenhill (2007a) argues that the post-modern museum signifies a shift on several educational and epistemological fronts: from teacher-centred to student-centred pedagogy; education to learning; single discipline knowledge to integrated knowledge; knowledge as truth to knowledge as relative; and rote learning to reflective and constructive learning.

With regards to the epistemological views that permeate the post-modernist museum, the existence of reality is questioned as a stable notion and the existence of plurality is embraced (Rorty, 1991). This is close to a relativist epistemological view of knowledge, where each learner "constructs a unique knowledge base that is different but equal to other learners" (Olafson and Schraw, 2006, p.73). Also, it is close to a criterialist approach to knowledge, according to which the construction of multiple interpretations is "based on evidence, and developed through the use of criteria and arguments" (Voet and De Wever, 2014, poster). Hein (1998) observes that the "post-modernist museum," a term coined by Hooper-Greenhill (1999) and labelled by Hein (1998) as the "constructivist" museum, recognises "the limits of human knowledge, a belief that all knowledge inevitably constitutes a product of our own cognitive acts" (Confrey, 1990, p.108).

The difference in the two terms, which are used interchangeably in museum literature, as in this study, is one of emphasis (Silverman, 1995). The post-modernist

museum asserts that the pedagogical aim of museums is to not only foster personal learning but to cultivate a pluralistic cultural and social identity. The post-modernist museum promotes self-awareness and knowledge as a means of accomplishing a more democratic society (Hooper-Greenhill, 2007a) by, “empowering citizens to make more informed decisions” (Hein, 2005). The educational approach in post-modernist museums draws on progressive and critical pedagogy (Dodd, 1992) where the aim of learning is for museum educators to help learners create personal relationships with objects. The aim of the constructivist museum is to include social action as described by Dewey (1959), an approach that Hein (1991) refers to as “social action philosophy.” However, the constructivist museum differentiates itself in terms of emphasis by enhancing the meaning-making process of learners in a personal way (Hein, 1999).

In the post-modernist museum, objects are understood as testimonies of material culture with complex meanings and multiple interpretations that are open to negotiation. Learners are perceived as active producers of knowledge (Hooper-Greenhill, 1992). The post-modernist museum aims to enable visitors to select the exhibits that capture and motivate their interest, and to interact with these exhibits. The post-modernist museum educator takes on the role of facilitator and mediator between audience and museum (Nakou, 2001). This relationship between museum and visitor is active, dynamic, and flexible (Hooper-Greenhill, 1991).

The communicative model typical of the post-modernist museum has been described by Hooper-Greenhill (1995) as “the cultural communication model.” Communication is perceived as a participatory process which approaches a negotiated, constantly fluctuating reality. Hooper-Greenhill (1999) says this results in

the visitors' construction of different meanings through messages that are independent of those planned by the exhibition designers or museum educators.

Empowered visitors are now “architects and regulators” and, “authors and owners of an increasingly personalised museum experience and individualized account of science” (Watermeyer, 2012, p.5). However, this educational approach has been heavily criticised for downgrading the importance of objects to merely a medium for the educational focus of the museum (Ghose, 2005). It is also challenged for not focusing on the relationship between humans and objects (Cannon-Brookes, 1992) in a way that honours the importance of collecting, conserving and displaying objects. The reconceptualisation of the relationship between audience and museum constitutes a fundamental challenge for the contemporary museum (Hooper-Greenhill, 2000).

Each type of museum examined in this section expresses the epistemological approach towards knowledge and prevalent educational concepts of the respective eras that gave birth to them (Nakou, 2001). Each museum type has its followers and adversaries.

This study, in exploring and shedding light on museum educators' personal theories and practices in university museums, paves the way for future understanding and development in museum education.

The historical review in section 2.2 attempted to show how pedagogical approaches and practices in museums have developed and how this has resulted in different types of museums with distinct pedagogical approaches. As suggested in the section on contemporary museum education, debates about the direction of contemporary museums and museum education remain active as we currently do not

have a clear idea of museum educators' practice. Section 2.3. will discuss theoretical work in museum education and learning theories, practices or approaches that seem to influence museum educators' teaching primary school programme in science and humanities museums, and which might influence the personal theories and practices of the museum educators' participating in this study.

2.3 Theories and practices in contemporary museum education

This section presents key museum theories and practices prevalent in museum education literature on taught school programmes in science and humanities museums, which may influence this study's museum educators' personal theories and practices. Subsection 2.3.1 discusses Free-Time Pedagogy as a means of understanding and highlighting the significance of educational entertainment in the context of museum education. Subsection 2.3.2 examines the typology of educational environments in museum education (e.g. formal, non-formal, participatory or informal); it argues for the use of Roger's (2004) typology and discusses the variety of learning environments that may be found in museums. Subsection 2.3.3 discusses learning theories and practices in museum educational literature. The selection criteria are introduced at the beginning of section 2.3.3.

2.3.1 Context of "Free-Time Pedagogy"

This subsection argues that because museums are often based on free-choice learning and are part of the leisure industry (Macdonald, 2011) their mission and pedagogical approach is underlined by the principles of Free-Time Pedagogy (*Freizeit Pädagogie*). In line with studies suggesting that museum educators value fun, a positive learning experience and motivation (King, 2009; Taylor, 2006; Taylor, Neill and Banz, 2008), it is likely that museum educators' personal theories and practices

might be influenced by the principles of Free-Time Pedagogy. Countering criticism that these aims have no educational value, this section makes the case that a strong educational character underlines the entertainment experience in museums. In Ancient Greece, the term “*psychagogy*” was used to convey methods of creative involvement to create enjoyment and to educate the soul by providing enriching emotional and intellectual stimulation.

Visitor studies indicate that entertainment and intellectual stimulation are high priorities for museum visitors (Sheng and Chen, 2012). These are central expectations that schoolteachers have during school visits with their classes (Tal and Morag, 2007). “Learning as we have broadly defined it, has become so pervasive that it is rapidly becoming the single largest leisure activity... [people] choose to do for enjoyment... This is not the type of learning we were used to getting in school, but the one we expect to receive [in museums]” (Falk and Dierking, 2002, p.5).

In museum education, the concept of Free-Time Pedagogy encompasses a view of learning that is broad, including skills and knowledge acquisition while catering to curiosity, motivation and entertainment for the creation of a positive learning experience (Falk and Dierking, 2002).

Free-Time Pedagogy is translated into practice in museum education through “motivational teaching” (Xohellis, 1997). Research has shown that individuals learn better when they are motivated, and “when complex information is presented in a way that is enjoyable – intrinsically rewarding – the person is motivated to pursue further learning” (Csikszentmihalyi and Hermanson, 1999, p.67). This explains, in pedagogical terms, the museums’ rationale of entertainment, as a “hook” to involve children in learning (Hooper-Greenhill, 2007b).

The possibility of a balanced co-existence between education and entertainment has been questioned (Hooper-Greenhill, 2007b). For example, in line with Shortland (1987) some authors argue that “when education and entertainment are brought together under the same roof, education [is] the loser” (p.213). However, a museum approach that combines education and *psychagogy* accepts that learning and pleasure can be married, and reflects an interpretation of the contemporary museum which, per Hooper-Greenhill (2007b), constitutes a more inclusive and potentially democratic model, rejecting the modernistic either/or approach in favour of the post-modern both/and.

The principles of Free-Time Pedagogy are an ubiquitous view in museum education (Carr, 1991; Falk and Dierking, 2000; Hooper–Greenhill, 1992) based on the notion that museum education should encompass every aspect of learning – cognitive, emotional and psychokinetic – to provide a holistic approach to education (Boud et. al., 1993).

2.3.2 The context of museum education: Typology of educational environments in museum education

This subsection discusses the plurality of educational environments in museums and argues that they cover a spectrum from formal, non-formal, progressive to informal. Despite museums often being conceptualised in the literature as informal educational environments, there is evidence to suggest that museums facilitate a variety of learning environments. Each learning environment is characterised by diverse educational aims and principles.

The first part below, discusses the key issues, challenges and debates of defining educational contexts as formal, non-formal and informal and argues for adopting

Rogers' typologies. The second part, argues that learning environments in museums are often differentiated according to the type of museum visit (unstructured versus structured), programme (e.g. school programme versus family programme), museum type (university museum versus independent museum) and museum educator background (e.g. differentiations based on professional and academic background)

2.3.2.1 Typologies of educational and learning environments

This part unpicks the terms used to describe educational and learning environments in museums and argues that it is problematic to define them based on the setting the learning process takes place in. It advocates for the use of Roger's typology of educational and learning environments according to which environments are distinguished based on the degree of flexibility, participation and contextualisation that characterises the learning context. This typology recognises the plurality of educational and learning environments that may be facilitated in a museum. According to Rogers, educational environments range in a continuum from formal, non-formal to participatory educational environments and informal learning.

The discourse on educational environments has its roots in growing concern about a "world educational crisis" (Coombs, 1968; Illich, 1973). During the late 60s and early 70s, in some developing countries there was disillusion with formal education (Coombs, 1968). In most of the developed world, by contrast, the intent was to prepare learners for a post-industrial economy by establishing lifelong learning (Argyris and Schon, 1978; Faure et. al, 1972; Jarvis, 2001). These concerns about education voiced by the World Bank and UNESCO culminated in categorisation of learning systems or environments (Fordham, 1993). The best-known statement of this categorisation, which has infiltrated museum literature, comes from the work of

Coombs and Ahmed (1974, p.8). According to this typology, learning systems were divided into formal, informal and non-formal education. According to Coombs and Ahmed (1974) these were defined as:

Formal education: ...is, of course, the highly institutionalised, chronologically graded and hierarchically structured 'education system,' spanning lower primary school and the upper reaches of the university.

Non-formal education: ... is any organised, systematic, educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population, adults as well as children.

Informal education: as used here is the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment- at home, at work, at play; from the example and attitudes of family and friends; from travel, reading newspapers and books; of by listening to the radio or viewing films or television. Generally, informal education is unorganized and often unsystematic. (p.8)

This popular typology uses the setting for learning as a distinctive factor. That is, formal education is linked with schools; non-formal with organised educational institutions other than schools such as community groups; and informal includes interaction with friends and family, television etcetera (Smith, 2001). Similarly, to Coombs and Ahmed's (1974) tripartite categorisation of educational environments, many authors (e.g. Hein, 1999a, Hooper-Greenhill, 2007b) in museum education

literature distinguish educational environments based on the location of learning. They often use the term formal to describe learning taking place at school and informal for learning in museums.

Over the years these typologies and definitions have been identified as problematic. Reflecting these concerns, Heimlich and Falk (2009) argue that based on the current definitions, “terms such as informal, non-formal, and formal learning are problematic because they assume that the critical variable in learning is the educational setting ...rather than attributes of the learner” among other things underlying the learning process (p. 14). For example, the type of learning taking place in schools can mirror characteristics traditionally not associated with formal learning (Hein, 1999a) e.g. learners’ degree of choice. Another example, is that many museum school programmes may span in-between the range of formal to informal (Griffin, 2007) categories because they have particular learning goals and structure. The fact that museum education is typically characterised as “informal” (Black, 2005; Nakou, 2001) can be misleading. Through the lens of “informal education,” museum education is perceived as voluntary, visitor-centred, non-hierarchical, open-ended and with scant structure (Bock and Bock, 1989; Courtney, 1991; Ewert, 1989; Marsick and Watkins, 2001; Merriam and Caffarella, 1999; Wellington, 1990). Though these characteristics may ring true for the ad-hoc learning of museum visitors who do not participate in educational programmes it ignores the educational context of taught museum education programmes, which can be highly structured (Griffin and Symington, 1997).

Another problem lies in confusion around the definition of the terms “non-formal.” Coombs and Ahmed’s (1974) definition of the term non-formal is imprecise,

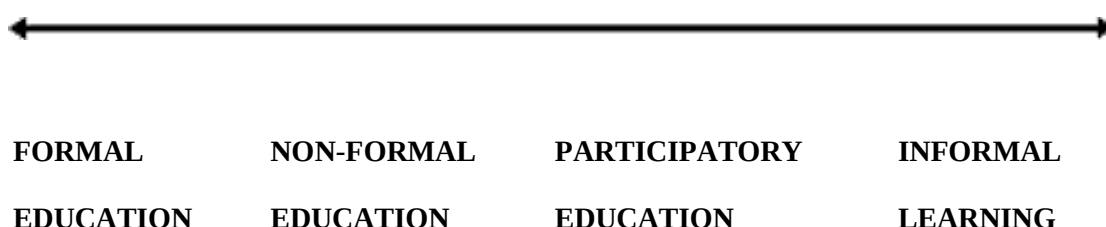
because rather than stating what it entails, it is defined as every educational activity outside of formal. Yet, the term formal education “was never closely defined” (Rogers, 2004, online). Mirroring the sentiment of other authors in the field, Rogers criticises the definition of “formal environment” given by Coombs and Ahmed (1974) by stating, “the use of the words ‘of course’ in this quotation shows that it was assumed that everybody could recognise the formal system of education” (Rogers, 2004, online). This confusion over the term ‘non-formal’ led to the use of this term, often interchangeably with the term “informal,” to cover diverse programmes that were not considered formal. Falk, et al. 2009 argue in reference to museum education literature that as a result “although definitions exist that distinguish these two terms [informal/non-formal], they are frequently used as synonyms” (p.5).

This is problematic because it obscures major differences between these two terms. Researchers pointed out that it is an oxymoron to use the word “education” for something that they define as unplanned, when referring to informal learning. Rogers (2004, online) voiced this concern, “Like everybody else, they define ‘education’ as planned and purposeful learning; and say ‘informal education’ is all learning outside any planned learning situation- such as cultural events.”

These points highlight the problematic use of current typologies and definitions of educational and learning environments. This lack of agreement over terminology brought alternative conceptualisations for the categorisation and definition of learning and educational environments adopted in this study. Rogers (2005), a renowned scholar, tried to move beyond rigid and unclear labels based on educational setting to characterise learning environments. He proposed distinctions based on the characteristics of the learning processes:

- i) flexibility: the programme's responsiveness to local needs;
- ii) participation: shared decision making between educator and learner;
and
- iii) contextualisation: degree of standardisation of the educational process
(Rogers, 2005).

The educational continuum Rogers proposes is:



At one end of this continuum lies “formal education” defined as “education, which does not change when new participants join” (Rogers, 2004, online). That is, the activities, curriculum and learning material are predetermined, and do not entail the involvement of the learner group in designing the activity or learning outcomes. Usually learning is based on transmission of predetermined information to the learners. Such an example, would be a school history curriculum set by educational agencies.

“Non-formal education” is defined as flexible schooling. “Some parts of the programme will be determined by the participants and others given by the providing agency” (Rogers, 2004). In comparison to formal education, it is less standardised, flexible, with some participatory elements and more responsive to local interest and needs (Rogers, 2005). Such an example, might be a museum school programme with

predetermined activities and materials which adapt to the personal learning characteristics of learners giving them control over construction of meaning or choice over some of the activities.

“Participatory education” (Mocker and Spear, 1982; Campbell and Burnaby, 2005), includes learning activities and teaching material, “chosen or created for this one learning group alone with considerable involvement of the learner group in the design of both curriculum and learning materials” (Rogers, 2004, online). Such an example, is adult education, where adults choose what they want to learn, are encouraged to learn through individual meaning making and the curriculum is based around their interests.

“Informal learning” is defined as “all that incidental learning, unstructured, unpurposeful but the most extensive and most important part of all the learning that all of us do every day of our lives” (Rogers, 2004, online). The definition overlaps with the term “free-choice” coined by Falk and Dierking (2000) to describe unstructured and voluntary learning in museums by “casual visitors, not pre-arranged, institutionally organized groups” (Falk et al., 2009, p.5). A free-choice learning environment is one where, “the experience is generally voluntary, non-sequential, and highly influenced by the features of the setting” (Falk et al., 2009, p.5) and is used to, “describe the learning that occurs in... education settings when the learning is largely under the choice and control of the learner - most casual visitors who do not participate in structured programs engage in free-choice learning” (Falk et al., 2009, p.5). Goals are not often shared between the learner and institution and learning is constructed through the learner’s independent meaning-making process (Heimlich and Storksdieck, 2007).

According to this framework, types of education are based on the ways they best reflect certain characteristics. “Most educational programmes, of course, lie somewhere between these two extremes...some forms of schooling find ways of including the particular interests of the different classes within the learning programme.... And most programmes will move along this continuum in both directions from time to time” (Rogers, 2004, online).

2.3.2.2 Typologies of educational contexts in museums

In this subsection, an analysis is made of the various types of education and learning environments found in museums. These are differentiated according to the: i) type of visit (e.g. unstructured visit or structured visit in the context of programme); ii) type of programme (e.g. lecture versus school programme etc.); iii) type of museum (e.g. university versus independent etc.); and iv) professional and academic background of museum educators. This description draws on examples from museum education literature.

Firstly, the literature indicates that the type of visit may determine the characteristics of the learning environment in a museum. Some museum visits are casual and not part of a structured educational programme. These mirror Roger’s category of “informal learning,” because visitors choose their experience and control their learning. It is the visitor’s personal agenda that determines their focus on ideas, aesthetic appreciation, interests, entertainment, or social interaction etc. (Schauble et al., 1996).

An example of informal learning is family visits to museums. Families are “a unique learning group of mixed ages and backgrounds bound together by a complex shared system of past experiences, beliefs and values” (Ellenbogen, 2007, p.17). The

museum experience of families is mostly driven from the “family agenda” versus the “museum agenda” (Ellenbogen, 2007, p.23). Learning with families is informal in the sense that their experience is driven by what they choose to take from the museum (Hilke, 1987). “Family members come to make meaning through their interaction in a setting, rather than the setting dictating those interactions and any subsequent learning” (Ellenbogen, 2007, p.25). Families are understood “as a learning institution, utilising the free-choice learning resources of an extensive learning infrastructure in order to construct and affirm individual and collective identities” (Ellenbogen, 2007, p.25). Parents choose ways to interact with their children ranging from play, teaching about content, or connecting it with prior experiences (Diamond 1986; Borun and Dristas, 1997; Swartz and Crowley, 2004). These choices are driven by parental perceptions of their children’s needs and abilities (Dockser, 1989) or their own knowledge about the content of the museum (Schauble et al., 2002).

In contrast with the type of educational experience outlined above, visits can be part of a structured programme and, as will be argued below, vary from fostering a formal to non-formal and participatory educational environment. The type of structured educational programme offered influences the educational environment in a museum.

Lectures or presentations are a programme characteristic of formal education environments. Lectures are defined as “well-prepared presentations about selected objects or subjects given by a qualified docent, curator or instructor” (Sachatello-Sawyer et al., 2002, p.23). Guided tours may also reflect the ethos of a formal education environment. Guided tours are defined as, “a brief overview of the entire museum or a more intensive tour of a main gallery, exhibit hall, or special exhibit”

(Sachatello-Sawyer et al., 2002, p.26). In light of Roger's characteristics, lectures and guided tours are usually standardised because they do not take into consideration the audience's background, and limit interactive participation - they also lack flexibility (Sachatello-Sawyer et al., 2002). If there is more interaction with visitors or changes made to a tour to mirror the group's interests or knowledge these types of programmes acquire elements of non-formal education.

School programmes are often characteristic of non-formal education, characterised by “organised, intentional and explicit efforts to promote learning” (Heimlich, 1993) with an open and flexible structure (Dib, 1988). Museum school programmes are usually designed to support the pre-determined content of school curricula as school teachers value programmes that echo academic goals (Garcia, 2012, p.48). They are often more flexible in accommodating the needs and interests of students (Tran, 2004).

Some school programmes lean toward more formal education characteristics (Garcia, 2012). These programmes can be highly structured, have clear learning objectives, and provide learning support through museum educators or specifically designed material (Griffin and Symington, 1997). Even though it is generally recognised that there is some value in aligning museum programmes with aims usually prioritised in formal education contexts, many authors in museum education have raised concerns about school programmes that serve the curriculum agenda, calling it a “disservice” to museum education goals (Garcia, 2012, p.48). This is founded upon the understanding that formal education is based on measuring performance against quantitative indicators with certain unchanging characteristics, namely value for achievement, external motivation and prescription, which clashes

with the vision of museums as informal learning environments characterised by “constructivist, free-choice learning, and intrinsic motivation” (Garcia, 2012, p.49) that could lead to transformational learning (Foreman-Peck and Travers, 2013).

Falk et al. (2009) clarify that the main difference between “informal” or “free-choice” learning and other types of educational environments is the lack of choice and control afforded to learners. They write, “when children in school groups take field trips where there is a predefined and highly structured lesson with limited or no choice or control over goals and activities, this is not free-choice learning.” (Falk et al., 2009, p.6).

Programmes for adults usually foster a participatory education environment. Adult learning programmes “involve learning events that can expand the range of opportunities for adults with practical applications to an individual’s profession, personal interests, and community” (Dudzinska-Przesmitzki and Grenier, 2008, p.11). These range from engaging in an educational activity to fulfil “an innate desire for developing new skills, acquiring new knowledge, improving already assimilated competencies, or sharpening powers of insight” (Brookfield, 1986, p.11). These programmes often facilitate a participatory educational environment (Rogers, 2004) that fosters self-directed learning, shared decision making between adults and educators, and responsiveness to adult needs. Literature reports that programmes facilitating a participatory educational environment are the most successful with adults because they respect their unique learning needs, motivations and preferences (Sachatello-Sawyer et al., 2002). When participation in terms of flexibility and responsiveness to local need is limited, adult learner programmes are seen as non-formal education (Dudzinska-Przesmitzki and Grenier, 2008). Examples are

organised programmes for specific audiences in higher education and workshops for professionals (Sachatello-Sawyer et al., 2002).

It is suggested that the type of educational or learning environment facilitated during a visit may vary from formal to informal according to the museum type e.g. either a university or independent museum.

For example, **university museums** focus on research and dissemination of “subject specific, observational, practical and other transferable skills” (Chatterjee et al., 2016, p.1) to university students and the public. Their mission can be traced to the historical roots of university museums: “natural history, science, technology, and anthropology museums usually came into existence on campuses to maintain collections. From the beginning, they bore the weighty responsibility of preserving vast specimen collections and providing research opportunities for scientists” (King and Marstine, 2006, p.267-268). Recently, it is argued, that **university museums** embrace their public role in similar ways to non-university museums: “university museums...represent sources of inspiration, enjoyment and could play a potentially important role in health, wellbeing and therapy” (Chatterjee, 2008, p.1). There are some examples illustrated by case studies conducted by the International Committee for University Museums and Collections (ICOM) to support that claim. However, there is also evidence to suggest that historically, university museums want to advance and disseminate research to a wider public as well as be an integral part of university teaching and research. This points to a more structured educational environment that is closer to formal or non-formal education.

Unlike university museums that have to adhere to standards set by the universities there are small museums that have a different ethos. During the 1970s and

1980s many new independent museums opened in the United Kingdom. Candlin (2016) coined the term “micromuseums” to describe them. They bear three characteristics “they [are] small...independent, and [are] concentrated on single subjects or themes that [fall] outside of the academic disciplines” (Candlin, 2016, p.1). The ethos of those museums in terms of their public role is different to that of national or university museums. For example, such a museum may lean towards informal learning due to the lack of staff and availability of structured activities. However, there is limited research in micro museums, to pinpoint to the particular educational environment they create.

Literature suggests that variety in the professional and academic background of museum educators might be a factor accounting for the plurality of educational environments fostered in museums (Bevan and Xanthoudaki, 2008; Ebitz, 2005; Tran and King, 2007). Even though “there are few, if any, learning situations where either informal or formal elements are completely absent” (Colley et al., 2002), literature suggests that an important factor influencing whether museum educators gravitate towards the facilitation of more formal or informal learning environment may be their academic and professional background (Bevan and Xanthoudaki, 2008; Castle, 2001; Ebitz, 2005; Tal and Morag, 2007; Tran, 2004; Tran and King, 2007).

The profession of museum educators includes professionals with diverse characteristics. Museum educators may also be referred to as museum guides, docents, explainers and their job descriptions vary from institution to institution (Taylor and Neill, 2008). Bevan and Xanthoudaki (2008) assert that the background of museum educators, “span a wide range of prior experiences, professional training, skills, capacities, and interests” (p. 109). They range from volunteers to full-time paid

professionals with a background in teaching, science, history, art history and fine art to name a few (Bevan and Xanthoudaki, 2008). For example, in the field of science museums, Bailey (2006) explains that the professional background of museum educators she interviewed varied from formal teachers, to scientists and science enthusiasts. Pringle and DeWitt (2014) assert that drawing “upon a wide range of knowledge domains and ... individuals with diverse career trajectories” (online, paragraph 11) is a characteristic of gallery education as a profession. Ebitz (2005) explains that in art museums despite the majority of educators coming from an art history academic background, many educators have training in fine and applied art, hold degrees in other subjects such as philosophy and museum education, or are volunteers with diverse backgrounds. Pringle and DeWitt (2014) affirm that this diversity creates a positive contribution to the educational practice of art galleries as approaches to learning are informed by a variety of skills and expertise.

Some authors find this diversity and **lack** of a common knowledge base amongst museum educators problematic, while others celebrate and encourage this diversity. For example, Tran and King (2007) argue in relation to science museum educators that due to the diversity of their background they “do not share a common understanding of best practice” (p.131), which they view as problematic because they exhibit a lack of consistency in the quality of their educational role. Charman (2005) argues in relation to art gallery education that it is a profession that gains its strength from the variety of museum educators.

Some researchers suggest that the museum educators’ experiences as young learners may also be a factor influencing the type of learning environment they facilitate in museums. Griffin (2007) claims that because most museum educators

learn on the job they draw on their experience as learners to inform their practice. It is argued that this can result in “teacher centred” pedagogy and learning environment with minimal student interaction. Tran and King (2007) as well as Bevan and Xanthoudaki (2008), support this claim by saying that museum educators usually turn to their prior experiences in formal education to teach in museums, resulting in teacher centred approaches and the facilitation of a formal educational environment.

Even though there is evidence to suggest that the prior educational experiences of museum educators might influence their personal theory and practice towards the facilitation of a more formal educational context, there is also evidence to suggest that the museum educators academic and professional background are equally, if not more, decisive factors with regards to the kind of educational environment they will choose to foster (Castle, 2001).

Pringle (2008) argues that museum educators with an academic and professional background in fine art or artistic practice tend to favour participatory learning environments. Pringle (2008) attributes this to the fact that museum educators primarily base their personal theory about teaching in art museums on their perception and training as artists.

Research on science museum educators seems to confirm that the professional background of museum educators might be a decisive factor in the type of environment they want to foster. Findings show that science museum educators with a background as school teachers tend to prefer formal educational environments in comparison to those with no background in formal teaching (Cox-Petersen et al., 2003; Tal and Morag, 2007; Tran, 2004).

Due to the limited research on museum educator personal theory and practice in relation to their academic or professional background, it is difficult to pinpoint how this influences their practice on a larger scale, “specifically in the domain of science, limited attention has been paid to the role and practice of museum educators” (Tran and King, 2007). More research is needed to understand how the background of museum educators influences their personal theories and practice which in turn seems to shape the type of educational environment they facilitate.

2.3.3 Learning theories and practices in museum education literature

The aim of this subsection is to present the learning theories and practices that might influence the personal theories and practices of the museum educators sampled in this study (i.e. museum educators working in science and humanities university museums delivering school programmes to primary school students). To that end, the selection criteria for the material included in this section is based on including learning theories and practices linked in museum literature and research on museum educators’ thinking and practice with the teaching of young learners during taught school programmes in science and humanities museums. (Castle, 2001; Cox-Petersen et al., 2003; Hein, 1999b; Hooper-Greenhill, 2007b; King, 2009; Nikonanou, 2009; Roberts, 1997; Tal and Morag, 2007; Tran, 2004).

Contemporary pedagogy has influenced the theoretical framework for museum education; namely, its educational aims, learning theories and practices (Hooper-Greenhill, 2007b). However, museum education has a theoretical discourse of its own. There is a plethora of theories and practices used in museum education. These vary according to the collection, museum management, programme and visitor target group etc. Hein (1991) suggests that museum learning and epistemological

theories can be divided into four categories: traditional, behaviourist, discovery, and constructivist. In line with each category are practices such as lectures, knowledge transmission, pen and paper activities, modelling, questioning, role-play, discovery learning practices, constructivist learning practices, arts and crafts activities etcetera (Hein, 1991; Hooper-Greenhill, 2007b; Nikonanou, 2009). Other models of learning that can be found in museum and gallery education are the co-construction and critical pedagogy model of learning (Pringle, 2008; Simon, 2010). Examples of approaches in gallery education are Housen and Yenawine's (2001) Visual Thinking Strategies (VTS). This is "a theoretical model mapping the five primary stages of aesthetic development leading to visual literacy" (Housen and Miller, 1992, p.3) and Pringle's (2006) Contemporary Gallery Education model (CGE) led by freelance creative practitioners among others. Another example, of an approach for interpretation in national parks is Tilden's (1957) six principles for interpretation.

This part focuses on learning theories and practices used in museum education, and not gallery education, as the two have differences and discussing those is beyond the scope of this study. The researcher of this study shares Pringle's (2008) view that: "Gallery education undoubtedly shares some of the principles and pedagogic and social theories that inform education in museums, but differences are present in the approaches taken by gallery educators, the learning experiences and expected outcomes of education activities...there is insufficient space here to examine details of these different practices" (p.28). The intention "is not to polarise galleries and museums, but rather to productively identify" (Pringle, 2006, p.6) in this study the specific learning theories and practices within museums relevant to this study.

The selection is based on a review of the most prominent learning theories and practices in contemporary museum education literature and research on museum educators, regarding the teaching of young learners in taught school programmes of science and humanities museums (Castle, 2001; Cox-Petersen et al., 2003; Hein, 1999b; Hooper-Greenhill, 2007b; King, 2009; Nikonanou, 2009; Roberts, 1997; Tal and Morag, 2007; Tran, 2004). This part presents constructivist learning theory, socio-cultural learning theory, experiential learning theory, enquiry and discovery learning theory, transmission model of learning, and the theory of play. It concludes with learning from objects, because understanding the value of object handling and object-based learning is critical to understand the character of pedagogy in museums (Pye, 2007).

2.3.3.1 Constructivist learning theory

Since the 1990s, the prevailing educational theory in contemporary museums has been constructivism or learning through a process of personal construction of knowledge (Resnick and Klopfer, 1989). Constructivism is advocated as the appropriate learning theory for museum education because it allows a deep understanding of displayed objects (Hein, 1991) and is allied with object-based learning (Chatterjee and Noble, 2016). However, Black (2005), in line with Russell (1994), challenges the view that constructivism as a learning theory on its own can offer more to museum learners than approaches such as didacticism. Black (2005) cautions that necessary pre-requisites in facilitating learners' construction of meaning, is that museums create a suitable physical setting and atmosphere to provide opportunities for interaction and construction of personal meaning and that learners "bring with them at least: i) the level of interest, motivation and attitudes conducive to

such engagement [with displays and object]; ii) some appropriate level of prior knowledge and/or experience to which they can add and, therefore, construct new meanings; and iii) the learning skills and initiative required to actively construct their own meanings and understandings” (p.141).

According to constructivism, learning is a mental process stemming from the actions performed by an individual to satisfy personal needs (Piaget, 1954). Prior knowledge, meaning-making and motivation are three primary factors in the construction of learning in a museum (Kelly, 2007):

- a) Prior knowledge and experience in the learning process was recognised as significant by Dewey (1959) and Paris (1997). Paris argues that “people learn best when they actively manipulate the information to be learned and when that information builds on previous knowledge” (Paris, 1997, p. 22). Cole (1995) and Russell (1994) say that visitors come to museums with an “entrance narrative” about the world (Kelly, 2007) and that experiencing objects through new relationships “acquires new meaning” (Sotto, 1994, p. 75).
- b) Meaning-making is a central tenet of constructivism because “to learn meaningfully, a person must integrate new knowledge into his or her conceptual structure in a way that allows personal meaning-making” (Jeffery-Clay, 1998, p.3). Learning from an object is included in a framework of meaning-making by the learner (Gallagher, 1992). This touches upon the well-established notion in museum pedagogy that activities that involve the mind as well as the senses lead to learning (Duckworth et al., 1990). Sensory experiences encourage learning because

the learner “need[s] to revisit ideas, ponder them, try them out, play with them and use them” (Hein, 1998, p.158).

Each educational theory has different perspectives on individual meaning-making, as exhibited in Table 1. The status within constructivist learning theory is such that a museum educator must “acknowledge personal meaning-making” and accept “that ideas, prejudices, opinions, memories or world-views visitors bring with them [need] to be considered in developing an educational plan” as Hein suggests (1999b, p.17).

Table 1. Meaning making and educational theory (Hein, 1999b, p.17)

Status of meaning-making	Attitudes towards meaning-making	Educational theory
Meaning-making is a consequence of human interaction with nature and culture.	Ignore or suppress.	Traditional, content-centred.
	Tolerate or suppress.	Discovery, active learning, learner-centred.
	Encourage or embrace.	Constructivism

- c) Motivation is a cornerstone of learning (Hein, 1991) that facilitates the construction of personal meaning through learning (Csikszentmihalyi and Hermanson, 1999; Pressick-Kilborn and Walker, 2002; Roschelle and Teasley, 1995). Csikszentmihalyi and Hermanson (1999) in their research on motivations for learning in museum settings conclude that when a museum visitor is motivated, their optimal experience or “flow” is reached, allowing them to achieve personal growth. The learner’s right to make

choices, on *what* exactly they will do or *how* they will do it, also encourages learning motivation (Dewey, 1959; Vygotsky, 1978), especially in the museum setting (Falk and Dierking, 2000; Griffin, 1998; Hein, 1998; Paris, 1997). Griffin (1998) argues that when school children visit a museum they are capable of being self-directed learners and when they make decisions based on personal choice they enjoy the museum experience more.

Richardson (2003) suggests that although constructivism as a learning theory goes back a few decades, it is commonly accepted that the methods through which it can be implemented have not yet been identified (Phillips, 2000). Hein (1998) suggests it is challenging for a theory to be translated into teaching practice (Hein, 1998; Richardson, 2003). Constructivist learning constitutes a tautology (Hein, 2002) and there are questions regarding the appropriate teaching strategies that educators should embrace to successfully respond to a constructivist world (Apple et al., 1979). What is available as a foundation for practice are principles that characterise this theory of learning. These are:

- a) attention to individuality by building on learners' previous knowledge and experiences (student-centred process) (Piscitelli and Weier, 2002);
- b) facilitating communication and interaction among classmates or participatory learning (Richardson, 2003);
- c) introducing formal domain knowledge in planned and unplanned ways, through direct instruction, reference to text, exploration of websites and other means (Richardson, 2003);

- d) providing options to provoke and challenge, reject, enhance, change or maintain previous beliefs and views (Richardson, 2003);
- e) motivating learners meta-cognitively to form personal views (Richardson, 2003);
- f) using positive emotions to motivate the learner (Csikszentmihalyi, 1997);
- g) interaction with the museum environment and incorporating personal cultural and social attitudes to process, understand and interpret (Hein, 1991; Nakou, 2001); and
- h) involving the learner in problem-solving and decision-making (Paris, 1997; Sykes, 1992).

The constructivist approach to museum education embraces the notion that learning is a process of knowledge construction facilitated by the museum educator through personal meaning-making based on prior knowledge, object handling, and motivation.

2.3.3.2 Socio-cultural learning theory

Socio-cultural learning theory is related to constructivism and is an important interpretive tool to make sense of the educational process in a museum environment. An example of how socio-cultural learning theory explains learning in museums is Falk and Dierking's (2000) Contextual Model of Learning. Learning in school programmes, like those sampled in this study, takes place within group activities facilitated by museum educators.

At the centre of socio-cultural theory is the student and how he or she learns within his or her social and cultural environment (Flem et al., 2000; Riddle and

Dabbagh, 1999; Rueda et al., 1992; Rueda et.al., 2001; Shambaugh and Magliaro, 2001; Tharp and Gallimore, 1988). Learning is “meaning construction that is socially mediated... a consequence of dialogue among the curatorial premise, the supporting tools of signage and other symbol systems, the museum educators and the visitors themselves” (Leinhardt et al., 2003, p. 25). The main advocate of sociocultural theory is Vygotsky, who believed that community is central to the creation of meaning (Von Glasersfeld, 1974).

Socio-cultural theory influences the way the museum educator is viewed in museum pedagogy (Wertsch, 1991). The student-teacher relationship, according to this theory, is collaborative with learning as an objective achievement (Flem et. al., 2000; Shambaugh and Magliaro, 2001). Museum educators use learners’ prior knowledge, beliefs and values to develop broader intellectual skills (Riddle and Dabbagh, 1999; Rueda et al., 2001). Museum educators create opportunities for collaboration to strengthen the museum experience and promote learning (Jensen, 1994; Paris, 1997). Learning should be done in line with each learner’s zone of proximal development (ZPD) (Riddle and Dabbagh, 1999; Subban, 2006).

The ZPD is a central concept in socio-cultural theory (Roberts, 1997). It is “the area between the things that a learner can do on his own and the things that he cannot yet do, even with assistance” (Orey and Branch, 2010, p.49). This suggests that learning occurs when learners engage in social behaviours with others slightly ahead of them developmentally (Aschermann, 2001). The educator acts as a facilitator through the support he or she provides, so that the learner can achieve results within his or her ZPD (Blanton et al., 1998; Kearsley, 2005; Riddle and Dabbagh, 1999; Rueda et al., 1992).

Falk and Dierking (2000) developed the Contextual Model of Learning to describe learning as an interactive experience between three spheres of influence, see Figure 1 below:

Contextual model of learning

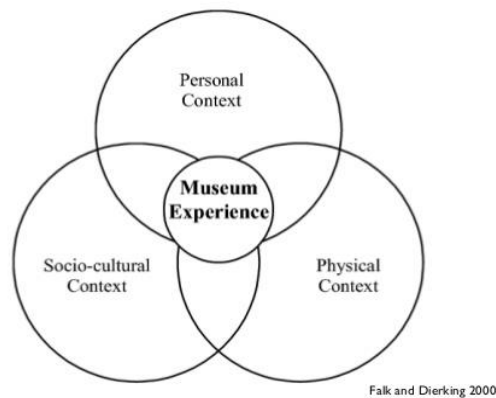


Figure 1. Contextual Model of Learning (Falk and Dierking, 2000)

The physical context, the personal context and the socio-cultural context each represent one characteristic of the Contextual Model of Learning.

The physical context refers to the layout of the museum and its exhibits. In terms of architectural configuration, space is a fundamental part of the learning process (Hense, 1985), because it may favour or restrain the facilitation of free communication, mobility (Nikonanou, 2009), and a sense of safety (Hein, 1997).

Objects are educational tools because the principles of “learning by acting and doing” (Ansbacher, 1998) encourage knowledge-making through exploration and discovery (Hein 1998). Experiential learning enhances the development of the theory and practice of museum education (Hooper-Greenhill, 1999).

The educational use of museum objects, according to Bounia, Nikonanou and Economou (2008), stems from their materiality, authenticity, breadth and aesthetics. These properties contribute toward objects becoming educational tools with diverse functions, depending on the learning aims set by an educator (Durbin et al., 1990).

The personal context reflects the processes involving the individual during learning. This encompasses the ways in which the visitor processes information and perceives objects and ideas. Personal attributes interwoven into this process are: sense of self, personal needs, interests, abilities and motivation fundamental to learning. Each visitor has his or her own characteristics in terms of age, social and cultural existence, as well as interest, knowledge, experience, values and expectations creating a human mosaic, the needs of which formulate a primary research field in museum education (Hooper-Greenhill, 1999).

The socio-cultural context refers to people and the role they fulfil by their involvement in learners' museum experience (i.e. the museum educator, other learners, schoolteachers) (Falk and Dierking, 2000). The socio-cultural context may also refer to the learners' cultural and historic context.

In conclusion, considering socio-cultural theory, museums constitute spaces that carry the potential for considerable learning (Hooper-Greenhill, 2002; Moussouri, 2002). The museum educator's role is to assist learners to understand and interpret new experiences (Dickinson et al., 1978) through personal discourse and group cooperation. After all, "who we are, what we are, and how we behave are products of the sociocultural context in which we are immersed" (Falk and Dierking, 2000, p.38).

2.3.3.3 Experiential learning theory

The influential 18th / 19th century pedagogue, Friedrich Froebel, was the first to recognise that museums are excellent educational environments because they allow interpersonal engagement with displays, a basic tenet of experiential learning (Sadler-Smith, 1997, Tovey 2012). Experiential knowledge is defined as “the knowledge gained through direct encounter with a didactic object, person or thing” (Burnard, 1989, p.306). Tiballi (2015) stresses, in line with Ross and Kurtz’s (1993) argument, that “this hands-on approach often takes the form of manipulatives: physical objects that are meant to be handled by young students to help them develop motor, muscular, perceptual skills, as well as giving intangible concepts and ideas concrete form” (p.60). Many major educational theorists connect museum education and object learning to experiential learning e.g. Dewey (1959) and Montessori (1936). Dewey, a proponent of progressive education, places at the core of museum education the notion that learning should be sought through meaningful action: a hands-on and minds-on system of learning by doing (Hein, 2004).

Hooper-Greenhill, elaborating on the experiential aspect of learning in museums, writes that “learning can occur through different encounters. Arguably the most important is a real encounter in a real space with real things” (2007b, p.36). This view, that tacit knowledge gained through objects may be one of the best forms of knowing, is widely accepted in museum education (Sotto, 1994). However, experiential learning in museums does not come without its challenges. Black (2005) cautions that learning from an experience “will only happen if the visitor perceives the relevance of the displays to his or her own life and can see opportunities for the application of what has been learned” (p.133). Hein (2004) and Black (2005) argue

for experiential learning to take place, interactive museum galleries should be careful not to engender a ‘press-button’ mentality, where exhibits are manipulated but learners are intellectually passive.

2.3.3.4 Transmission model of learning

The “transmission”, didactic or traditional model of learning (Hein, 1998) is based on a “traditional lecture and text pedagogy” in museums (Hein, 1999a, p.75). Learners are viewed as passive recipients of knowledge akin to “little vessels ...ready to have ... gallons of facts poured into them until they [are] full to the brim” (Dickens, [1854] 1995, p.2). In this model, educators are perceived as experts with a responsibility to present and transmit facts and ideas that are independent from learners. Teaching practice emphasises knowledge transmission and focuses on a logical order of teaching dependant on the structure of the subject e.g. chronologically, from simple to complex structures, or from basic to advanced concepts (Hein, 1998).

This model of learning is criticised in museum education literature as undemocratic (Worts, 1995). It is perceived as an out-dated understanding of learning that ignores the needs and characteristics of learners (Hooper-Greenhill, 1999). However, many researchers have found that aspects of this model of learning exist in museum education practice (Black, 2005; Hein, 1998; Hooper-Greenhill, 2007b).

2.3.3.5 Enquiry and discovery learning

Enquiry and discovery learning is characterised by active, participatory learning based on practical examples, discovery and enquiry. These approaches to learning have gained popularity in contemporary museum pedagogy due to the

recognition of constructivism in museums (Hooper-Greenhill, 1999; Hutchings, 2007).

Enquiry learning is based on learning through the provision of information leading to questions and new information (Hutchings, 2007). There are many types of enquiry that can be implemented including confirmation enquiry, structured enquiry, guided enquiry, and open enquiry (Banchi and Bell, 2008). Educational practices following this learning theory can range from pure exploration with open and flexible learning outcomes, to enquiry leading to a pre-determined answer or solution (Banchi and Bell, 2008).

Discovery learning is often used in museums (Hein, 1995). It is most frequently associated with “the Children’s Museums Movement, with Discovery Galleries in natural history museums, and with interactive science and technology centres” (Black, 2005, p.139). Despite the numerous discovery learning practices described by scholars, the term lacks an inclusive definition (Klahr and Nigam, 2004). One can argue that discovery learning encompasses processes which allow the learner to explore, interact and manipulate ideas or objects to arrive at a learning outcome (Elkind, 1976).

An overview of the literature about discovery learning suggests that practices vary dependant on the guidance given (Rosenshine, 2009). A requirement for discovery learning is that “target information must be discovered by the learner within the confines of the task and its material” (Alfieri et al., 2011, p.2). This principle has stirred some controversy and attracted criticism over discovery learning practices that do not advocate the guidance of learners, as learners might find it difficult to reach an outcome on their own. In relation to museums, Black (2005) argues “for discovery

learning approach to work effectively in a museum gallery requires enablers to be present and workshop sessions to be provided” (p.140).

Several studies support the claim that there are limitations to discovery learning practices without the educators’ guidance (Alfieri et al., 2011; Kirschner et al., 2006; Mayer, 2004; Tobias and Duffy, 2009). This research stresses that educators need to possess knowledge of the processes of discovery learning to (Bielaczyc and Collins, 1999; Bruer, 1993; Chi, 2009; Mayer, 2004) ensure the learner knows how to move on to authentic, independent discovery procedures. Black (2005) also suggests that in museums, discovery learning works best “with students who are already interested in, and possess a basic knowledge of, a subject or problem and also an understanding of how to apply problem-solving strategies” (p.140).

2.3.3.6 Learning through play

Research suggests that museums encourage play and provide experiences from which learning may occur (Diamond, 1986). The educational power of play can be traced back to the work of Montessori, Isaacs, Piaget, Vygotsky, and Steiner amongst others (Anning, 1997). Hughes (1991) points out that there is no single theory so far that has been able to completely explain the significance of play in children’s development and the pedagogical implications are yet to be explored in depth.

Rennie and McClafferty, (2002) suggested that the benefits of play are “fun, cognitive and language development, imagination and creativity, and social competence” (p.194). There is some disagreement as to whether play provides contexts for new learning or consolidating existing behaviour, skills and knowledge (Bennett et al., 1997). Fromberg (1987) and Sylva et al. (1980) suggest that the outcomes achieved by play, depend on the interaction between adults and children

(e.g. planning, feedback, correction etc.) as well as the type of play (e.g. free play or structured play). According to Hutt's taxonomy (1981), it is suggested that there are different outcomes of play; varying from acquiring information to engaging in personal enjoyment and ritualised games.

Play is characterised by pleasure, motivation, involves free choice, active engagement, freedom to explore and is stress-free (Garvey, 1991; Bruner et al., 1976). Practices often associated with the approach of play in museums range from drama and role-play to discovery based activities (Hooper-Greenhill, 1999).

2.3.3.7 Learning from objects: nuanced reflections on the power of touch

Understanding the value of object handling and object-based learning is critical to understand the character of pedagogy in museums (Pye, 2007). Objects are the essence of museum education (Pye, 2007) and "various schools of thought have all been active in questioning, reframing and rethinking the object and questions of materiality" (Candlin and Guins, 2009, p.3). Chatterjee (2008) wrote that, "objects are used in museums and galleries for a range of purposes: enjoyment, to stimulate subject specific interest, knowledge acquisition, and inspiration" (p.37). This section explores the benefits of the "power of touch" when handling museum objects as "a core facet of object-based learning is its multisensory nature" (Chatterjee et al., 2016, p.1).

Touch is the primary tool for learning used by humans (Pye, 2007; Candlin, 2007). The historical approach by museums was to store collections and put relatively few items on display and often in cases (Keene, 2005). Embodiment theorists "have convincingly argued that knowledge is not detached from the body, suggesting instead that the body is the ground of culture and thought" (Candlin, 2007, p.89).

Despite "the right to touch freely [remaining] restricted" (Macdonald, 2007, p.108) learning through touch is "becoming more widely accepted" (Pye, 2007, p.135) by museums. More museums have educational handling collections (Keene, 2005), selected objects that can be handled and there are dedicated "touch" exhibitions in museums such as the Victorian and Albert "Touch Me" exhibition and "Raised Awareness" at Tate Modern in 2005 (Pye, 2007).

"The integration of museum collections in learning has been the focus of a significant body of works, and it is clear that museum objects can inspire, inform, engage and motivate learners at all stages of their education" (Chatterjee et al., 2016, p.1). This section discusses how object handling can: i) facilitate memory retention and recall; ii) enhance perception and experience; iii) facilitate knowledge acquisition and meaning making; iv) have an emotional and motivational impact as well as; v) create a healing effect among other experiences.

i) Object handling and memory

Object-based experience is associated with memory retention and recall (Gallace and Spence, 2008). Handling objects activates physical memory systems that "help us to process, store and retrieve information regarding ...those objects that we choose to explore haptically (i.e., by means of our hands)" (Gallace and Spence, 2008, p.163). Touch is especially important for young people or the visually impaired (Gallace and Spence, 2008).

"Objects...can provide a focus for the recollection of deeply embedded memories" (Jacques, 2007). Objects have been used with older adults to aid them to construct their past (Rowlands, 2007) or to tease out memories among those with dementia (Jacques, 2007).

ii) Object-Handling Enhances Perception and Experience

Experimental psychology tells us that our perception of an object is influenced as much by touch as vision (Spence, 2007). A multi-sensory experience with an object leads to the creation of deep memories (Spence, 2002).

Experimental work in neurophysiology also indicates that the way we use our hands affects how we perceive an object. "Touch provides us with knowledge about the location, geometry, and weight of an object by integrating information from the cutaneous receptors in the skin and proprioceptive receptors in the muscles" (Wing et al., 2007, p.31).

Research on the process by which experts and connoisseurs assess objects suggests that touch is a central skill for the evaluation of objects (Macdonald, 2007). For them holding objects, "was almost a part of seeing it, and was essential for proper viewing" (Macdonald, 2007, p.112).

Touch enhances the appreciation of two-dimensional art, especially when the audience is visually impaired (Cassim, 2007). Methods used can include tactile images such as thermoforms, microcapsule images and the "muse" print (Cassim, 2007). Surveys on the experience of art during the exhibition "Sense and Sensuality," in London suggested that touching artwork allowed visitors to experience feelings of exhilaration and a deeper understanding of the art (Khayami, 2007).

iii) Object-handling as a tool for knowledge acquisition and meaning making

Hooper-Greenhill (1999, p.21) explains that objects help learning because they "act to ground abstract experiences" and ideas (Hooper-Greenhill, 2000). Rowe

(2002) said "that the processes of meaning-making are actively co-constructed by group members where objects function as tools for helping individuals to construct, mediate and understand knowledge" (Chatterjee et al., 2016, p.3). Merely touching objects without actively engaging with them might not bring any educational benefits (Candlin, 2007).

Sharp et al. 2016, explain how research on object-based learning with University College of London students from a broad disciplinary background showed that improved subject-specific knowledge and understanding were frequent outcomes students experienced. Based on research from Gallace and Spence (2008), Sharp et al. (2016) argue that "The tactile experience also contextualises and consolidates past knowledge acquisition at the same as it extends it" (p.113).

These findings echo those almost two decades before of Books and Gardner (1993) who argued that somatic or embodied learning may enhance a learner's experience (Durrance, 1998; Simon, 1998). "By introducing sensory and interactive components into exhibitions and events programmes, museums hope to encourage learning and those visitors who would be repelled by scholarly approaches" (Candlin, 2007, p.90).

iv) The Emotional and Motivational Impacts of Object-handling

Research suggests that there are physiological aspects of touch linked to emotional and motivation systems in the brain (Chatterjee, 2008). "The process of object handling...can imbue the object with character, significance and emotional colour in a manner perhaps independent of functionality" (Critchley, 2008, p.69).

Several authors concur that object-handling in museums evokes enthusiasm, motivation and emotional connection (Kavanagh, 2000; Shue, 2004) "in ways that other information-bearing materials do not" (Chatterjee et al., 2016, p.4). Meecham (2016) quoting Borun et al. 1983, notes that, "there is little difference between cognitive learning in the object museum and book-based classroom, but that there is a great difference in affective outcomes" (p.65).

Tactile sensations also elicit emotional responses (Brang and Ramachandran, 2007). "Objects...can arouse curiosity when handled and studied closely" (Hooper-Greenhill, 1999, p.21).

Touch can evoke experiences of mood and feelings "best described as embodied perception" (McGlone, 2008, p.56) - a type of proximal knowledge that "[blurs] the boundaries between the body and the object being handled" (Hetherington, 2003, p.105).

v) Object-handling and healing

Sacred objects are often believed to be imbued with healing qualities (Geller, 2007). Touch "opens up opportunities for experiencing objects via mysticism, enchantment, spirituality and the beautiful" (Meecham, 2016, p.69).

Research suggests powerful links between, "the visual arts and patient recovery time, stress, the need for medication and pain intensity" (Chatterjee, 2008, p.3). Research conducted by the University College London Hospitals NHS Foundation Trust Arts project shows that museum loan boxes had a therapeutic and enrichment impact on patients including overall well-being and better relationships with staff. A

partnership between the British Museum and Pentonville prison showed that object handling had a positive impact on prisoner morale (Samuels, 2008).

This section has explored key museum theories and practices prevalent in museum education literature on taught school programmes in science and humanities museums, which may influence this study's museum educators' personal theories and practices. In particular the significance of educational entertainment in the context of museums education was discussed, as learning in the context of museums is often based on Free-Time Pedagogy. The variety of learning environments that can be found in museums was examined, and Roger's (2004) typology was put forward as a means to understand the spectrum of educational environments that can be found in museums. It was argued that these can range from formal to informal environments based upon differentiations such as the type of visit, programme, museum and professional, as well as the academic background of museum educators. Lastly, the learning theories and practices that are linked in museum literature and research on museum educators' thinking and practice with the teaching of young learners during taught school programmes in science and humanities museums were discussed (e.g. constructivist learning theory, socio-cultural and experiential learning theory, the transmission model of learning, enquiry and discovery learning, learning through play as well as learning from objects). The following section discusses research about museum educators' thinking and practices to contextualise the present study.

2.4 Research about museum educator practice and thinking

This section provides an overview of research about museum educators' practices and thinking to contextualise the present study and illustrate a need to explore the personal theories and practices of museum educators in university

museums. Previous research suggests that museum educators' practices are teacher-centred and inflexible (Cox-Petersen et al., 2003; Tal and Morag, 2007), while others argue that they are visitor-centred and flexible (Castle, 2001; Swartz and Crowley, 2004; Tran, 2004) or they contain both approaches (King, 2009; Piscitelli and Weier, 2002; Taylor and Neill, 2008). However, few studies connect the museum educator's practice with his or her thinking (Allen and Crowley, 2014; Ash et al., 2012; King, 2009; Taylor and Neill 2008; Tran, 2004). To the best of this author's knowledge coupled with research, no previous studies examine museum educators' personal theory or relationship to practice who work in university museums in Britain.

2.4.1 Overview of research of museum educator practices and thinking

Besides some opinion pieces documenting the practical wisdom of museum educators published in professional journals such as the *Journal for Education in Museums* (Burnham and Kai-Kee, 2005; Rice and Yenawine, 2002), there are few systematic empirical research studies on museum educator teaching (Zeidler and Surber, 1999).

Some studies characterise today's museum educators as didactic and unresponsive to visiting groups of children (Cox-Petersen et al., 2003; Tal and Morag, 2007) while others characterise them as visitor-centred and flexible (Castle, 2001; Tran, 2004). Three studies (King, 2009; Piscitelli and Weier, 2002; Taylor and Neill, 2008) suggest that museum educators' practices may contain both dynamics.

Cox-Petersen et al. (2003) provided a detailed critique of educational tours conducted by volunteer museum educators at a natural history museum in California. Tal and Morag (2007) were critical of museum educators' practices and provided detailed descriptions and assessments of museum educators' guided visits to four

different natural history museums in Israel. In both studies the researchers concluded that the tours were generally filled with lecture-style segments; the natural history content was presented in a didactic or narrative style and lacked interactive segments and free-discovery time (Cox-Petersen et.al, 2003). The educators frequently used scientific jargon with limited explanations and posed lower-order questions only (Tal and Morag, 2007). The authors concluded that the educators, in planning and leading the tour, were following a knowledge-transmission model of teaching.

Castle (2001) found that museum educators during guided tours attended to children's needs by addressing their anxieties, interest and attention levels. Likewise, Tran (2004) found that museum educators in science museums adapted the lesson to maintain children's interest in the subject, encouraged independent discovery, and placed importance on creating a positive learning experience.

Piscitelli and Weier (2002) showed that museum educators combined a mix of pedagogical approaches, which ranged across three categories: non-directive (e.g. listening, acknowledging), scaffolding (e.g. reinforcing, focusing attention), and directive (e.g. demonstrating, instructing). Piscitelli and Weier (2002) reported that museum guides engaged visiting school children in casual conversation to establish rapport and to assess their interests and background. Similarly, King (2009) noted that despite museum educators' being highly responsive to children's interests and capabilities, there were instances where the museum educators were didactic. Taylor and Neill (2008) reported that museum educators transmitted knowledge and created interaction with the visitors, encouraging questions.

The studies which describe museum educators' practices as teacher-centred and inflexible were based only on observation of museum educators' practices and

did not consider the museum educators' viewpoints, or connect their practices with their teaching theories.

Of the small number of studies on museum educators' teaching, only five explored museum educators' thinking about aspects of their practices through interviews (Castle, 2001; King, 2009; Pringle, 2008; Taylor and Neill, 2008; Tran, 2004). A key difference between those studies and the present one, is the sample of educators and/or museums used. Castle's (2001) sample was of volunteer docents, interpreters and gallery educators. Taylor and Neill's (2008) study included educators from other non-formal institutions – namely parks or historical sites – and the audience were adults, while Tran (2004) and King's (2009) sample was limited to science museum educators in non-university museums. Pringle's (2008) sample consisted of artist educators. This study explores museum educators who teach school children in humanities and science-related university museums.

Castle's (2001) study uses observations and interviews to provide volunteer docent's, interpreters and art educator's Pedagogical Content Knowledge (PCK). Unlike the present study, Castle (2001) does not compare the museum educators' rationale with their practices but focuses on how they learn and experience teaching. Her study differs from this in terms of the type of programmes and museum educator's she examines. Her findings suggest that knowledge of the collection and the nature of the museums as well as the skill to transform subject matter through pedagogical reasoning are necessary for teaching in museums. She suggests that museum educators conceptualise learning as a lifelong process.

In Taylor and Neill (2008), the interviews based on observations were limited to asking educators how they conceptualised their role considering the non-formal

environments they taught in. Taylor and Neill's findings are relevant to this study. The findings related to the educator's rationale underlying their practices as: i) the emphasis on informally appraising visitors' interests, background and reasons for attending museums to establish a relationship and rapport; ii) transmitting knowledge; iii) encouraging questions were used to create interaction and limited meaning making with the visitor; and iv) providing a pleasurable educational experience was a key aspect of their role.

Tran's (2004) findings resulting from observations and interviews, revealed that museum educators use their professional experience with questioning techniques to facilitate student's learning and asked the teachers accompanying children to help address challenges with their charges. Museum educators explained that the rationale behind adaptations detected during the lessons observed in Tran's study, was: i) to maintain children's interest in the subject matter; ii) to encourage them to pursue science on their own; iii) to provide a positive experience; and iv) to encourage them to retain content.

King (2009) used interviews to enquire about science museum educator beliefs, but these were not based on practices observed. She had a theoretical interest in the beliefs underlying teaching of enquiry in science museums. Like Taylor and Neill (2008) and Tran (2004), her interviews focused only on an aspect of museum educator's practice (i.e. enquiry teaching practices). Her findings show that museum educator beliefs were congruent with practices observed. However, museum educators could not always justify their practices and often misused notions of educational theory.

Unlike Taylor and Neill (2008) and King's (2009) research, the present study uses a combination of pre- and post-interviews to explore museum educators' personal theories of their teaching. This conveys in rich detail the relationship between personal theory and practice. In this study, observations are not used to examine aspects of practice predetermined by categories selected by the author to describe practice, as Tran (2004) and King (2009) did (i.e. how museum educators adapt practices or how they use enquiry practices). They help the author understand how practices are related to museum educators' personal theories.

Also, Tran (2004) and King's (2009) studies, have no theoretical framework to make sense of the data emerging from interviews; instead, the researchers refer to interview data as museums educator "rationale" or "beliefs." This study uses personal theory to understand the thinking that guides museum educator practice and examines the influence of the teaching context on the museum educator's personal theories and practice.

Pringle's (2008) study focuses on the perceptions and practices of artist educators in art galleries. Pringle uses interviews and observations to examine the participants' understanding of themselves as artists, their role as gallery educators and the influence of gallery context on their pedagogic practice. Interviews were also conducted with education curators. Pringle's (2008) findings reveal that artist educators take on the role of facilitators, co-learners and instructors. She emphasises that they do not identify themselves as teachers and draw on their experiences and skills as artists to enable learners to connect with artworks. The present study differs from Pringle's in terms of the museum and museum educator sample examined.

Some research on museum educators' professional development tells how educators use new practices or improve their practice in line with a pre-determined educational direction (Allen and Crowley, 2014; Ash et al., 2012). Allen and Crowley's (2014) study does not systematically explore museum educators' personal theories nor does it explore how the latter relates to everyday practice. Allen and Crowley (2014) ask museum educators to comment on the practices they were trained to use in the context of piloting a new enquiry-based programme. The study by Ash et al. is like the present study in that the researchers asked museum educators to reflect on their practices. However, Ash et al. used design-based scaffolding to change museum educators' practices toward becoming more learner-centred. They did not explore the museum educators' personal theories or belief systems or examine the relationship with practice, as this study does.

After having illustrated the gap in literature about museum educator's teaching in university museums, in response to Rasmussen and Winterrowd's (2012), call for additional research about museum educator teaching because "for the purpose of future discourse... [we must] understand and document our [museum educators'] teaching in the present" (p.8), the following section discusses why and how the theoretical notion of personal theory is used in this study to help illuminate the thinking and practice of museum educators in university museums. In doing so, it also provides an overview of relevant literature on this topic from mainstream education literature.

2.5 Usefulness of exploring personal theories of museum educators and practice with overview of mainstream education literature

Even though the topic of museum educators' personal theory and practice in the context of university museums is not widely researched in museum education literature, it is argued in subsection 2.5.1, that it has been widely researched in general education literature because of its value to help understand teaching. Commentary on the usefulness of exploring personal theory, to illuminate the participating museum educators' pedagogical thinking, and the way it relates to practice in the context of university museums is provided (2.5.2). Subsection (2.5.3) defines the term personal theory. Subsection (2.5.4) provides an overview of research based on the notion of personal theory and subsection (2.5.5) provides an overview of research on the relationship between teachers' personal theories and practice. The reviews are not exhaustive, but draw on general education research.

2.5.1 The usefulness of research into teacher thinking and practice

Educational literature that seeks to research teaching either examines the educator's observable actions or inquires after a teacher's thought processes (Clark and Peterson, 1986). Research into teacher thinking shifts the focus from how teachers behave, to finding out what teachers think, and what the personal theories or beliefs are that influence the "how" and "why" of their conduct in the classroom (Clark and Peterson, 1986).

Several reviews of this work have been undertaken (Calderhead, 1996; Carter, 1990; Clark and Peterson, 1986; Fang, 1996; Fenstermacher, 1994; Pajares, 1992; Richardson, 1996; Verloop et al., 2001) and concur that to understand teaching it is important to capture the voices of teachers, their belief systems or personal theories,

and to look at the world from their perspective and to link these factors to teaching practices (Fenstermacher, 1994). Numerous studies in mainstream education have been conducted on teacher beliefs and personal theories (Bryan, 2003; Lew, 2001; Luft et al., 2003; Van Driel et al., 2001).

Research in mainstream education has demonstrated that, under the umbrella of research into teacher thinking, studying personal theory and the way it is related to practice is central to understanding teaching practice. Research exploring this topic has received growing attention in mainstream educational research (Borg, 2003; Drageset, 2010; Forrester, 2008; Hudson et.al., 2012; Leatham, 2002, Stemhagen, 2011). The importance of this research exploring the relationship between personal theory and practice can be summarised in Clark and Peterson's (1986) statement: "we contend that the process of teaching will be fully understood only when these two domains are brought together and examined in relation to one another" (p.258). Although such research has been pursued in mainstream education, little research of a similar nature has been done in museum education. This study addresses that shortfall in relation to museum educators' teaching in university museums of natural science and humanities.

2.5.2 The usefulness of the term "personal theory" in examining museum educator thinking and practice

The field of study into teacher thinking has been characterised by a multiplicity of labels to describe the psychological context of teaching (for discussion of these see Fang, 1996; Pajares, 1992; Verloop et al., 2001). This has led to "definitional confusion" (Eisenhart et al., 1988). There are different definitions across research, for example "belief" and "personal theory" often define similar concepts

(Clandinin and Connelly, 1987). It is often agreed that exploring teacher thinking to understand practice includes what teachers know, believe, value and think (Borg, 2003; Stern and Shavelson, 1983).

Personal theory is defined as the entire “underlying system of constructs” (Sendan, 1995, p.60) of beliefs, values, attitudes and practical knowledge that teachers draw upon in thinking about teaching and to guide their practice (Sendan, 1995; Tann, 1993). This coincides with Leatham’s (2006) definition whereby teachers’ thinking that guides practice is viewed as “the fundamental elements that make up our personal philosophies and ideologies” (p.12). A full elaboration on the definition of personal theory is provided in section 2.5.3 below.

This study argues that “personal theory” is the most useful concept to understand museum educators’ teaching because it provides an incisive understanding of the interconnected elements underlying practice (Kelly, 1955).

It has been argued that teachers’ personal theories influence their teaching, learning and shape their pedagogy (Isenberg, 1990; Munby, 1982; Vartuli, 1999). As Beattie (1995) stressed, studies based on narrative enquiry can “provide new ways for thinking about pre-service and in-service education for teachers and for school improvement and educational reform” (p.65). Cooney and Shealy (1997), Marland (1998) and Tann (1993) and argued that to improve teaching performance or adopt new approaches, researchers and teacher educators must first understand the personal theories that give rise to teachers’ action.

Research on personal theory has been used in developing teacher education courses – in-service and pre-service – based on a model of the “reflective teacher” or

“reflective practitioner” (McCutcheon and Jung, 1990, p.144). Museum educator training programmes can be aided in the same way.

Calls have been made from within the profession to codify the “wisdom of practice” of museum educators to better understand and improve the profession (Yellis, 2000; Zeidler and Surber, 1999). For these reasons, this study uses the concept of personal theory to gain insight into how four museum educators conceptualise their teaching and how their personal theories relate to practice to inform our understanding of teaching in the context of two university museums.

2.5.3 Definition of personal theory

The concept of personal theory owes much to Dewey, Kelly and the tradition of critical theory, as well as Aristotle’s work on practical reasoning (Ashcroft and Griffiths, 1989; Carr and Kemmis, 1986). These philosophers and thinkers aver that people hold personal theories based on their experience of how the world works. This influences actions. According to Moran (2012), the definition of a personal theory is a description of practice and a rationale for it: “a personal theory of teaching practice is a teacher’s union of theory and practice, both a way of conceptualizing and enacting teaching. It is an answer to the question: How do I do my work as a teacher and why do I do it in this way?” (p.2). Personal theories are conceptualised as “an underlying system of constructs” (Sendan, 1995, p.60) that teachers “draw upon in thinking about, evaluating, classifying, and guiding pedagogic practice” (Sendan, 1995, p.60).

Matsagouras (2011), Tann (1993) and Handal and Lauvas (1987) identify personal theory as the beliefs that consist of a repertoire of values, attitudes, and practical knowledge an educator holds to make judgements. In this study, personal

theory is accepted as “the fundamental elements that make up our personal philosophies and ideologies” (Leatham, 2002, p.12)

However, trying to distinguish teachers’ knowledge from their beliefs, values or attitudes is difficult (Abdullah-Sani, 2000; Abelson, 1979; Eraut, 1985; Pajares, 1992) Research has not yet established how these constructs interact to inform practice. To understand how this has been conceptualised in literature each of these constructs – beliefs, values, attitudes and practical knowledge – are defined and an attempt is made to explain how they interact within a personal theory system.

First, the construct of “beliefs” is among the most popular in teacher-thinking research (Pajares, 1992) but has been dubbed a “messy construct” (Pajares, 1992, p.307) due to poor conceptualisations and many definitions (Clandinin and Connelly, 1987; Elbaz et al., 1987; Fenstermacher, 1994). It is generally accepted that beliefs are acquired through a process of cultural transmission (Brown and Cooney, 1982; Nisbett and Ross, 1980), past and present life, and educational and professional experiences (Raths, 2001; Van Fleet, 1979).

Beliefs are defined in this study as “any simple proposition, conscious or unconscious, inferred from what a person says or does” (Rokeach, 1968, p.113). They are usually distinguished from other concepts because of their evaluative and affective components (Nespor, 1987). Beliefs are whatever the individual considers to be true and do not necessarily need to be evidenced as they are based on personal judgment (Luft et al., 2003).

“Teachers’ beliefs” relate to what teachers believe and do in relation to the classroom, students and materials (Eisenhart et al., 1988). Often teachers’ beliefs about teaching and learning are closely aligned in terms of the theoretical orientations

that underpins them (Tsai, 2002). They are viewed as highly personal and context specific (Pajares, 1992). Educational beliefs in this study are understood to be interconnected and inclusive of attitudes, values and professional knowledge (Bryan, 2003; Kitchener, 1986; Peterman, 1991; Pomeroy, 1993; Rokeach, 1968) all of which inform a teacher's personal theory (Rokeach, 1968).

Martin (2008) states that, "beliefs along with values and attitudes make up an individual's beliefs system. An attitude is defined as a set of beliefs about a specific belief object or situation... A value, on the other hand, has an imperative to act and contains the three subcomponents of evaluative, comparative, and a judgemental capacity" (p.39). The dynamic between different substructures in this system of beliefs is explained by Fenstermacher (1994). He states that "clusters of beliefs are organised around an object or situation and predisposed to action, the holistic organisation [becomes] an attitude" (Fenstermacher, 1994, p.3) and that "beliefs could also become values when they are more evaluative, comparative and /or judgemental" (Fenstermacher, 1994, p.3).

The personal theory system of a teacher is also influenced by his or her practical knowledge. Attempts to distinguish knowledge and beliefs have resulted in either considering beliefs as a subset of knowledge (Nisbett and Ross, 1980), knowledge as a subset of beliefs (Rokeach, 1968), or viewing beliefs and knowledge as synonymous (Kagan, 1992; Lewis, 1990). Research has shown that knowledge and beliefs are intertwined (Nespor, 1987; Nisbett and Ross, 1980). Knowledge is often distinguished from beliefs in that it describes the propositional dimensions of thinking (Fenstermacher, 1994). This study takes the position that knowledge can be defined as "a justified and true belief" about the world (Hospers, 1997). It is considered a subset

of the entire belief system and is distinguished from beliefs with regards to the objectivity and strength of the justification knowledge claims rely on. Matsagouras (2011) and Clandinin (1985) state that the kind of knowledge that guides a teacher's action is neither wholly theoretical nor merely practical in the sense of knowing children, but it is expertise arising from "experience, intimate, social, and traditional...both professional and personal" (p.362) that, when blended with the personal background and characteristics (beliefs, values and attitudes) of the teacher, inform his or her action. This practical knowledge is described by Schon (1983) as a "practical rationality," that entails a process of complicated decision-making based on insights from memories and experiences as opposed to technical rationality, where purely objective ways of knowing guide action.

Pajares (1992) discusses findings that suggest educational beliefs play an important role in the interpretation of knowledge and that beliefs cover what one accepts as true, because the simple, most empirical thing one knows will, on reflection, reveal itself as a judgement or a belief (Lewis, 1990; Nespor, 1987; Rokeach, 1968, Schommer, 1990).

Verloop et al. (2001) explain: "in the mind of the teacher, components of knowledge, beliefs, conceptions, and intuitions are inextricably intertwined" (p.446). The way in which they interact has been described as a process of "personal theorizing" (Cornett et al., 1990). Using the notion of personal theory to understand teacher thinking is preferred over other terms, because it views museum teacher thinking in terms of the totality of the web of beliefs that contain values, attitudes and practical knowledge that guide action. Personal theory recognises the aesthetic, moral, emotional, and cognitive dimensions that as an interconnected system, mould a

teacher's thinking and inform his or her practice in a way that is personal (Clandinin and Connelly, 1987).

Personal theories “come from prior life experiences (personal) and classroom experiences (practical)” (Cornett et. al., 1990, p.520) and are “the personal foundations on which an individual's professional practice is built” (Cole, 1990, p.203). In other words, they are used by individuals to make sense of things. They could have predictive value, but may not always be coherent (Calderhead, 1987; Kelly, 1955). It has also been found that a teacher's personal theory relative to teaching can change in different learning venues (Samuelowicz and Bain, 1992) and when teaching different disciplines (Cobb, 2002; Kagan, 1992; Leatham, 2006; Tsai, 2002).

This study takes a holistic approach to eliciting museum educators' “collective way of thinking” (Matsagouras, 2011, p. 1194), in relation to practice – that is, exploring not just elements but the entire “underlying system of constructs” (Sendan, 1995, p.60) of beliefs, values, attitudes and practical knowledge (i.e. personal theory) that the museum educators in this study draw upon in thinking about teaching and to guide their practice (Leatham, 2002; Matsagouras, 2011; Sendan, 1995; Tann, 1993). This is done through pre-interviews and several post-interviews and underlined by observed practices; such an approach has not been used before in research on museum educators in university museums who were former school teachers with a PGCE background. The present study fills this gap.

2.5.4 Studies of personal theory

This subsection examines the studies that use, or overlap with, the conceptualisation of personal theory. Qualitative methods of data collection such as

interviews, observation or document review provide descriptions of the practitioners' personal theories (Cornett et al., 1990; Radwin, 1995). Other researchers used questionnaires (Murray and Macdonald, 1997) or Kelly's repertory grid technique (Hillier, 1998; Salmon, 1993).

In many studies of teachers' personal theories, researchers list core propositions about the teachers' role, learning, learners and the teachers' relationship with them. For example, Cole (1990) said the following are elements of teacher theories:

- to facilitate positive and successful learning experiences
- foster learning
- prepare students to be worthwhile members of society
- establish and maintain mutual trust and respect.

Cornett et al. (1990) described teachers' personal theories in terms of the following themes: i) offer visual learning; ii) talk in children's terms; iii) make science learning fun; and iv) help students save face.

Levin and He (2008) found that teachers' personal theories were: i) as a teacher you are forever a student; ii) children should have a choice; iii) expectation shapes achievement; and iv) assessments are authentic and varied.

Pinnegar and Carter (1990) noted how personal theories could be described as "dynamics underlying student learning in the classroom." In studies with more participants, researchers clustered participants' personal theories under pedagogical typologies. For example, Berman-Rossi (1988) created the typologies of

rational/empiricist (content) or pragmatist (process). Chan (2001) searched for teachers' personal theories around six predetermined themes:

- the meaning of teaching and learning;
- the role of teacher and students; the role of peers;
- individual versus group learning;
- student abilities and needs;
- practices and class management.

He classified them into traditional and constructivist. Other researchers, following the tradition of Clandinin (1985) and Elbaz (1981), to explore teachers' personal theories through metaphors. This study discusses museum educators' personal theories and how they relate to practice by analysing findings in a framework (Leatham, 2006) to provide a relevant theoretical expression for the relationship between personal theory and practice emerging from the analysis of data in this study.

2.5.5 Research linking teacher thinking and practice

Exploring how personal theories relate to practice is critical to understanding the teaching of museum educators in university museums. Due to the absence of studies using the term "personal theory" to examine the relationship between teacher thinking and practice in museum education, studies from mainstream education using the term "belief" provide an overview of the relationship between practice and what is defined in this study as "personal theory." This decision is justified on theoretical grounds. On the one hand, the term "belief" is integral to this study's definition of "personal theory," which is viewed in this study as beliefs including values, attitudes and practical knowledge (Handal and Lauvas, 1987; Matsagouras, 2011; Tann, 1993). On the other hand, like Leatham (2006), the term "belief" is explicitly or implicitly

used by many prominent researchers (e.g. Clandinin and Connelly, 1987; Fang, 1996) to refer to what is defined in this study as “personal theory”.

The body of literature examining the relationship between beliefs and practice is inconclusive (Woods, 1996). Studies focusing on the relationship between belief and practice are generally categorised as studies that either show “consistency” or “inconsistency.”

Numerous studies in mainstream educational research show that teachers’ beliefs, and classroom practice exist in “symbiotic relationships” (Foss and Kleinsasser, 1996, p.441). Most research suggests that beliefs are consistent with practice (Beswick, 2005; Bryan, 2003; Fang, 1996; Mitchell and Hegde, 2007; Ng and Farrell, 2003; Pajares, 1992; Tobin, 2012). Some researchers argue that this is due to the influence that teacher practices exert on beliefs (Cobb and Yackel, 1996), while others argue for the bi-directional relationship of beliefs and practice (Cobb et al., 1990; Thompson, 1992).

In some studies, varying degrees of consistency have been found between self-reported beliefs and the actual classroom behaviour of teachers (Bryant et al., 1991; Charlesworth et al., 1991; Hyson, 1991; Kemple, 1996). In studies that report inconsistencies, it was found that teacher practice reflected more traditional beliefs than the ones espoused (Davis et al., 1993). To promote research between beliefs and practice, it is argued that rather than reporting consistencies or inconsistencies without explanations, it would be more fruitful to consider why these might occur and take into consideration the context that teaching takes place in (Fives and Buehl, 2012, Leatham, 2006). This argument resonates with recent research in the field of

mathematics teaching (Stemhagen, 2011; Drageset, 2010; Forrester, 2008) and language teaching (Borg, 2003; Martin, 2008.).

Questions have arisen whether, in some studies, a false inconsistency was created between the beliefs or personal theory of the teachers studied and their practices (Leatham, 2006; Li, 2013). Two factors seem to play a role in research that has these findings: i) the theoretical perspective taken on beliefs as fixed constructs; and ii) the types of methodology used in the research study.

At a theoretical level, as Ng and Farrell (2003) and Pajares (1992) highlighted, “much of this work has been conducted from a cognitive perspective, viewing beliefs as fixed assumptions, representing teachers’ mental lives” (Li, 2013, p.176). Viewing beliefs from a single theoretical stance might not be appropriate because “a cognitive-based perspective ignores the contexts ...of teachers’ daily work” (Li, 2013, p.176). This perspective does not recognise alternative outlooks; for example, an interactionist or context-dependent perspective. “A context-dependent view of beliefs would argue that teachers’ beliefs change based on the specific situation presented, including the content to be taught, the physical resources in the environment” (Fives and Buehl, 2012, p.475). In line with these calls, the author of this study remained open to the influence of context and the idea that museum educators might espouse different views on teaching, depending on the museum discipline they taught in.

Methodological issues might also be responsible for apparent incongruence between beliefs and practice (Fang, 1996; Skott, 2001). For example, quantitative investigations based on questionnaires, “tend to look for correlations between self-reported beliefs and observations...which may obfuscate the complexity in the belief-practice relationship” (Fives and Buehl, 2012, p.481). There remains a question about

the wording of items in questionnaires, and whether they are understood by teachers in the same way the author intended, and whether teachers selected items that may not accurately portray their beliefs (Martin, 2008). Other studies have been criticised because they did not use direct observation in the classroom and post-interviews, but rely only on pre-interviews (Martin, 2008). When decisions about practice are not studied through the lens of classroom interaction, teachers are often unable to articulate their beliefs (Li and Walsh, 2011; Speer, 2008). To that end the current study paid equal attention to pre- and post-interviews and observations of museum educators' practices.

Arguments of congruence and incongruence that do not take into consideration the context of teaching, or account for the reasons underlying patterns of congruence or incongruence, have not helped advance knowledge of the relationship between beliefs and practice. "We know little about the content of teacher's beliefs and the nature of the relationship between beliefs and practice" (Bryan, 2003, p.840). The author addresses those concerns by employing relevant parts from Leatham's theoretical framework, thereby contributing to the advancement of knowledge around museum educator teaching in university museums.

2.6 Theoretical framework

Subsection 2.6.1 delineates how relevant parts from Leatham's (2006) framework were used in this study and presents arguments for its use, versus other frameworks, to understand the relationship between the participating museum educator's personal theory and practice. Leatham's framework was used in the writing of the Discussion and Conclusion chapters to give theoretical expression to the findings of this study after the data was analysed. Leatham's framework was

chosen because the findings of this study resonated with key parts of his theory. A description of Leatham's framework is provided in subsection 2.6.2.

2.6.1 Choosing Leatham's framework

This subsection delineates how Leatham's framework was used in this study and presents arguments for the use of relevant parts from Leatham's (2006) work, to understand the relationship between the participating museum educator's personal theory and practice in the context of teaching in **university museums**.

During the initial stages of data analysis, the author of this study searched for instances of congruence and incongruence between personal theory and practice, in line with the way this topic is researched in wider education literature. However, later stages of analysis revealed the dichotomy between rigid "congruence" or "incongruence" in describing the relationship between personal theory and practice is a less fruitful and binary way, to understand the relationship between personal theory and practice. In some cases, post-interviews showed that there were varying degrees of divergence between the two, due to parameters that museum educators could identify (e.g. the degree museum educators differentiated their practices to suit learners' characteristics was limited by the time and familiarity with the learners). During the analysis of post-interview data in other cases, the practices that initially appeared as incongruent were found to be related to the museum educators' personal theories (e.g. in the context of the natural science and humanities museums, the museum educators used different practices which during later stages of analyses were found to be in line with their personal theories, because it emerged they held different views on knowledge and learning per the museum discipline they taught in). A detailed description of the analysis process is provided in Chapter Three. A key

finding relative to the participant's relationship between personal theory and practice was that their personal theory influences practice, however contextual factors, that museum educators identified, may see the two diverge.

The findings of this study resonated with Leatham's (2006) view on the relationship between personal theory and practice, which is in line with investigations suggesting that teacher personal theories are dynamic systems that influence practice in a context-related way, resulting in different degrees of congruence and incongruence between the two (Borg, 2006). Leatham (2006) suggests that diversions may occur due to contextual influences (see 2.6.2 point (i) below). Also, the findings of this study aligned with Leatham's framework in the respect that he argues opposing elements in a personal theory system can co-exist, because they are clustered in isolation from each other in the individual's perception. A person might, in other words, appear to be holding contradictory beliefs about learning (e.g. both as construction and transmission) due to different views held on learning, according to the discipline taught (see 2.6.2 (ii) below). Leatham also considers methodological aspects of exploring an educator's personal theory and examining its relationship with practice in a way that avoids a researcher's claims of false incongruence between the two (see 2.6.2 (iii)). This view reinforces the choice of methodology used in this study to uncover museum educator's personal theories and explore the relationship they bear with practice in a more fruitful way. For example, Leatham (2006) suggests that an educator's personal theory can be best uncovered when participants are asked to reflect on episodes of observed practice. This in turn he suggests gives researchers the opportunity to better understand the relationship between personal theory and practice.

As Leatham's framework resonated with the findings of this study, relevant notions from his framework were used in the writing of the Discussion and Conclusion chapters to give a theoretical expression to the findings of this study e.g. the finding of this study that museum educators held different views on knowledge when teaching in the natural science and humanities museums, can be explained according to Leatham's notion that opposing elements in a personal theory system can exist, because they are stored in separate clusters according to the discipline they teach. So, in this case practices are aligned with personal theories.

Other frameworks that were considered include Matsagouras (2011) and Pratt's (2005) frameworks. Matsagouras' (2011) framework was rejected because it only provides a compilation of potential pedagogical theories specific to school teacher's personal theories. It does not describe or analyse the nature of personal theory or the relationship it might have with practice and is not based on empirical research. Pratt's (2005) framework was not selected because it is limited to the beliefs of teachers in adult education.

The following subsection describes Leatham's framework in further detail.

2.6.2 Leatham's framework of personal theory

Leatham (2002) defines a belief system as "the fundamental elements that make up our personal philosophies and ideologies" (p.12) which "are predispositions to action" (Rokeach, 1968, p.113). Leatham's view of beliefs coincides with the definition of personal theory in this study; namely, that it is a system of beliefs that influence practice. These two terms are used interchangeably in this study. Both definitions are close to Argyris and Schon's (1974) understanding of personal theory as "the theory of action to which he [an educator] gives allegiance" (p.6).

Leatham's framework (2002) makes three key points relevant to the findings of this study: i) personal theory influences practice, however contextual factors may see divergence between the two; ii) opposing elements in a personal theory system may co-exist, because they are clustered in isolation in the individual's perception and; iii) a methodological point, which highlights the importance of interviews based on observation of practice.

i) Varying degree of alignment between personal theory of teaching, practice and the influence of context

Leatham (2002) seems to endorse the idea that personal theory influences practice. He argues that individuals develop elements of a belief system, or personal theory, that make sense to them and influences what one does in practice. Leatham (2002) stresses that there are instances where practices may diverge from personal theory. He suggests that diversions may occur due to contextual influences or clashing beliefs relative to teaching and an educator's broader personal theory.

Leatham (2002) suggests that an individual's personal theory is a rational system, "I assume individuals develop beliefs into organized systems that make sense to them" (Leatham, 2002, p.13). For this reason, Leatham (2002) suggests that personal theories often influence practice. However, he argues, that this does not mean that there might not be divergence between an educator's personal theory of teaching and practice. Rather, Leatham (2002) emphasises that there is always a rationale behind an educator's divergence from an element of his/her personal theory of teaching, which can be identified and justified by the educator upon reflection on practice. In Leatham's (2006) view, instances of diversion should be treated by researchers as opportunities to learn and look deeper into reasons that might cause this

to happen if we are to make better sense of educator's practice (Skott, 2011). Leatham (2002) suggests, with Argyris and Schon (1996) and Mansour (2013), that the divergence or tension between personal theory of teaching and practice might be attributed to limitations imposed by the teaching context (e.g. institutional characteristics, classroom characteristics etcetera.). Leatham (2002) also argues that in some cases clashing elements in an educator's personal theory relative to teaching and an educator's broader personal theory can create a diversion between an educator's personal theory of teaching and practice.

This contributes to an understanding of the intricacy between personal theory and practice that goes beyond a description of rigid congruence or incongruence. This argument is resonant with research among mathematics teachers (Drageset, 2010; Forrester, 2008; Hudson et.al., 2012; Leatham 2006; Stemhagen, 2011) and language educators (Borg, 2003; Martin, 2008).

ii) Opposing personal theory elements in separate clusters

Leatham (2002) suggests that teachers can hold beliefs or elements in their personal theory about teaching that are in opposition to each other. Context determines which beliefs get enacted in practice. This might explain why “to an outside observer, it could appear that the belief holder retains contradictory beliefs, but they are retained and called upon, by the belief holder, for distinct purposes and contexts” (Martin, 2008, p.56).

Empirical and theoretical work recognises that teachers' personal theories consist of sets of beliefs, or clusters, where, at times, individual beliefs or elements in a personal theory from different clusters might appear as contrasting (Richardson, 2003). This can be the case between competing beliefs that are subject-specific

(Munby, 1982). For example, Bryan (2003) found that the teacher in his case study had different clusters of beliefs about learning and teaching: one was teacher-centred and didactic and another was where the teacher's role was of a manager and learning was hands-on. Bryan (2003) suggests that the situation the teacher found himself in (e.g. discipline he taught or learning outcomes of the lesson) determined which belief he used. This is in line with Fives and Buehl's (2012) view that "depending on which nest or set of beliefs a teacher is operating under at the time, and which beliefs are expressed in the belief assessment, beliefs and practice may appear more or less congruent" (p.482). These examples show how beliefs and practices "have a strong relationship, but the relationship may be contextually or situationally specific" (Martin, 2008, p.55).

These studies highlight the importance of context as a "key component [of] the teachers' personal belief system rather than the background to the systems" (Zheng, 2013b, p.201) and supports the view that the relationship between the two is dynamic (Li, 2013; Skott, 2011).

iii) Methodological aspects of Leatham's framework

Leatham (2002) argues that to establish the relationship between personal theory and practice (which includes identifying the factors causing a divergence between personal theory and practice), and to avoid superficial inferences of incongruence when relevant or labelling educator's behaviour as irrational, "the researcher must be willing to look deeper into the belief that supported an action" (Martin, 2008, p.55).

Leatham (2002) explains that to be able to "uncover," "discover," and "explore" (p.12) an educator's personal theory and the way it relates to practice,

observations and interviews based on episodes of practice must be used. This approach concurs with Argyris and Schon's, (1996) methodological approach. Leatham (2002) states, in accordance to Pajares (1992) "One infers the structure of beliefs about a given topic through analysis of what a person says...and does with respect to that topic; the context is crucial. It is not simply a matter of asking someone what they believe. The person must be observed in situations where they (and the researcher) can uncover and infer the person's beliefs" (p.307).

It has been widely reported in literature that a researcher cannot always determine the meaning intended by the teachers if the researcher is not privy to the meaning teachers ascribe to practices (Brown and McIntyre, 1995). In contrast to questionnaires or single interviews used in many studies in this field, conducting observations of practice and conducting interviews about actual classroom practices might help elicit elements in a personal theory rooted in teaching realities to allow an understanding of how they are related to practice (Phipps and Borg, 2009). The author of this study paid special attention to the museum educator's own meaning-making of the practices observed during post-interviews, to better understand museum educator's personal theories and avoid misinterpreting the relationship between those and practice. Also, the museum educator's meaning making of their observed practice, helped explain the factors that influence practice in a more profound way.

Other parts of Leatham's (2002, 2006) framework which describe the internal structure of a personal theory system that have not been relevant to this study are the following: i) that the internal structure of personal theory systems consists of core and peripheral elements and; ii) that there is a quasi-logical relationship between these elements. Leatham, similarly to other researchers (Borg, 2006; Brownlee et.al., 2002;

Green, 1971; Thompson, 1992), suggests that a personal theory system consists of core and peripheral beliefs. He does not clearly define the differences or how these are defined. The way in which beliefs function as a system is not well understood (Borg, 2006; Zheng, 2013a). Also, Leatham suggests that there is a quasi-logical relationship between beliefs (Green, 1971). For individuals, sometimes one belief implies another belief, so practice is influenced by the individual's associations. An example, is provided by Leatham: "Some teachers maintain that there is a logical relationship between these statements [A: Students need to learn their time tables and B: Students should not use calculators]. That is for some A implies B" (Leatham, 2006, p.94) and, accordingly, their practices are influenced by the connection they have created between two beliefs. The data of this study did not allow the author of this study to identify which were core or peripheral elements in a personal theory and whether the relationship between elements in a personal theory was quasi-logical.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This research study encapsulates the findings of interviews and observations in two university museum settings with four museum educators who designed and delivered three programmes for primary school children.

This chapter presents a summary of the pilot phase of this study and delineates the methodological considerations for the design and execution of the main study. It reiterates the research question and focus of this study. A discussion about the chosen research design and the rationale behind choices concerning access, sample selection, data collection methods, and credibility are presented. Ethical issues addressed by this research are outlined. This chapter concludes with a description of the data analysis approach employed in this study.

3.2 Research Question

The research question explored is: ***How, in a university museum setting, do museum educators' personal theories of teaching relate to their educational practices?***

This study was designed to interrogate the “how” of museum educator personal theories with an exploration into the ways museum educators' personal theories are (or are not) related to their practice. This direction was taken because this type of research question (exploring concepts and relationships between concepts) is appropriate for exploring multi-case studies as in the present study (Denzin and Lincoln, 2011; Yin, 2003). To explore the relationship between personal theories and practices, the personal theories of museum educators had to, initially, be mapped out.

3.3 Timeline of the fieldwork

Table 1, displays the two phases of the fieldwork. The first phase helped the author check the feasibility of the topic, refine interview questions, and ensure the appropriate collection methods. The second phase included primary data and the first two rounds of analysis.

Table 1. Chronology of fieldwork

Phase	Activity	Time
1	Pilot study	June 2011 – July 2011
2	Main period of data collection and rounds one and two of data analysis	September 2011 – February 2012

3.4 Pilot study

To examine the feasibility of the topic under study, a three-week pilot study was carried out from mid-June to mid-July 2011 in the museum of a British university city (Museum A). The aim of the pilot study was to explore the proposed data collection methods (Janghorban, et al., 2014; Kim, 2011) and to ensure that these would provide relevant data to answer the research question.

Procedural findings from the pilot study assisted the author in refining the interview questions, data collection techniques, and observation-recording mediums. Content-specific findings validated the feasibility of exploring this topic and the appropriateness of interview and observation techniques in yielding relevant data for the research question posed in this study.

The pilot study was conducted with two museum educators at Museum A. This phase of the study included two sets of observations and pre- and post-interviews for two programmes. There were two main procedural findings from the pilot study. These included revisions to the interview questions and interview techniques, as well as the type of media used throughout observations.

The author took care not to use leading questions. For example, when an interviewee expressed his or her personal theory about their role as a museum educator, instead of asking, “In what ways is teaching in a museum different to teaching elsewhere?” the author phrased that question in a neutral way: “What is the nature of museum teaching?”

The author used silence or reflecting back part of what the interviewee said to help the subject expand a response. Often subjects had interesting additional comments to make if given enough time to think (Ritchie, et.al, 2013). The author ensured flexibility to allow the adaptation of the interview protocol to accommodate queries from the interviewee, to build rapport and allow rich responses during the interviews (Rowley, 2012). For example, in one instance, the author was asked personal questions regarding her background and her view of museum education in her homeland, which she happily answered. This prompted her to include this information as part of her introduction to the museum educators during the main study and to be open to questions. It was clear that, as past studies have shown, the flexibility of the researcher during interviews was important, especially as the interviews were semi-structured (Doody and Noonan, 2013; Randall, et al., 2013).

The pilot study gave the author insights regarding the type of media needed to capture museum educators’ practices in an efficient, unobtrusive, and ethical way.

Field notes were taken and Dictaphones were given to museum educators. The most efficient way of keeping field notes proved to be semi-structured notations (Paine, 2015; Peters and Halcomb, 2015). A table was constructed by the author to concentrate the scope of observation to activities and details relevant to each museum educator's personal theories. Dictaphones were used to accurately record responses. These media were acceptable to the museum educators because they were discreet and ethically acceptable, as previous research has cited (Dahm et al., 2015). The use of a video camera was considered by the author, but rejected by the museums as inappropriate and obtrusive due to the participation of children in the sessions. Videos have the advantage of allowing an author to replay episodes observed during the post-interviews to stimulate the museum educator's recall of an event and to provide a basis for reflection (Roth, 2009). However, this did not prove a disadvantage as post-interviews were conducted after the observation of sessions with learners, to ensure museum educators did not falter in their recall.

Overall, the content of the pilot study validated the research question and proposed methodology of the study, and indicated that the research was feasible given the available time and resources.

3.5 Research design

Qualitative research was the most appropriate methodological approach for this study because it is used when a "problem or issue needs to be explored...study a group...[or] identify variables that cannot be easily measured" (Creswell, 2013, p.47-48). "Predetermined information from the literature" (p. 48) cannot be used because there is limited knowledge of the phenomenon (Yin, 2003). Qualitative research designs are used when what is needed is a detailed understanding of the issue from the

individual's perspective (Punch, 2009; Yin, 2014). These preconditions existed for this study and guided the choice of the qualitative design. As this study is framed by a "how" question, the exploratory nature of the qualitative "case study" strategy is appropriate (Denzin, 2006; Grosseohme, 2014; Yin, 2003) for the following reasons:

- i) The relationship between the personal theory of each museum educator and the educational practice of each in university museums needed to be explored with case studies, because there is a paucity in the literature about the focus of this topic in these types of museums. A detailed understanding of multiple cases could have profound importance to the understanding of teaching and its rationale in university museum programmes directed at primary school age children.
- ii) A case-study research design is also fitting because it is a robust method for relatively intense investigations of issues that are infrequently investigated (Merriam, 2009; Pathak, et al., 2013; Stake, 1995; Houghton, et al., 2013). In-depth understanding was achieved through detailed contextual analysis of a limited number of events (namely, observed teaching practices and personal theories explored during interviews) and then an analysis of the relationships between those events (Stake, 1995).
- iii) Yin (2003) identified two additional criteria for the case-study method, namely, the researcher has no control over the events and behaviours to be studied, and phenomena are current rather than historical. Both criteria are satisfied here. The type of case study selected was a "multi-case" design. The unit of analysis (Yin, 2003) was each museum educator who was a separate case (Yin, 2011). The phenomenon of the study is highly individual, that is, "personal" theories in relation to individual practice.

The boundaries of each case were the museum and the programme. The museums are in a university city; each has a different orientation determined by the discipline the collection belongs to.

Under investigation were three programmes delivered to primary school children on class visits: Programme 1 administered by the humanities museum (Museum A), and Programmes 2 and Programme 3 administered by the natural science museum (Museum B).

A multi-case design allowed the author to select several studies to illustrate the relationship between under-researched personal theories and the practice of museum educators in university museums (Zikmund, et al., 2012). In qualitative research, it is difficult to generalise from one case to another because the context of cases differs (Glesne and Peshkin, 1992), especially when the context is personal and potentially variable. A multi-case design allows an in-depth understanding of each case, as well as the exploration of common themes that may arise across the four cases (Yin, 2003). In addition to a detailed description of each case and the themes within, it permits a range of meanings (on patterns of personal theories and patterns in the relationship between personal theories with practices) that amplify common concepts across case studies (Creswell, 2013). This is done not to generalise beyond these cases, but to understand complexity and the interpretations that may arise (Merriam, 1988).

Stake (1988) distinguishes between scientific generalisation – derived by experimentation and induction – and naturalistic generalisation where understandings emerge from case studies and experience in individual events (Punch, 2009). This

allows museum educators insight from these case studies by reflecting on the details and descriptions presented (Stake, 1995).

3.6 Navigating access and sample selection

To gain access to museum educators, the author contacted five museum directors of university museums to ask for permission to conduct her research (Jupp, 2006). Most directors either did not contact the author back or would not agree to participate in the study. Therefore, the author decided to participate in a conference where the museum directors of the university museums she targeted and which were in close geographical proximity to her would be present.

The museum director from Museum A positively responded to the author. This helped facilitate access to the head of the education department of that museum (Museum A) as well as another university museum (Museum B), that the author had previously unsuccessfully contacted. Both directors agreed that the museum educators in their museum could participate in this study.

The sample criteria for the selection of the case studies took place at two levels: the museum and programme. Both were based on purposive sampling (Haas, 2012) to ensure that the case selection illustrated features of optimal practice for **university museums** and programmes. This was deemed necessary for a study exploring an under-researched topic. Selecting cases based on university museum educational excellence would, it was hoped, provide rich information.

On an institutional level, the selection of these two museums, which are connected to a well-established and highly regarded university was because they are internationally renowned for educational excellence as exemplified by numerous

awards for their work. The humanities museum (Museum A) has received numerous awards including the “Guardian Family Friendly Museum Award,” “Contemporary Art Society Annual Award,” and “Clore Award.” Awards to the natural science museum (Museum B) include being shortlisted for the “Art Fund Prize for Museum of the Year,” and receiving the “Family Friendly Museum Award.” This museum was also awarded a partnership with the Arts Council based on excellence in regional educational programmes.

It was desirable that the study examine more than one museum to ensure that the research findings were not institution-specific (Houghton et al., 2013; Yin, 2014). The author selected two museums of different types or genres; one oriented in humanities and the other in natural science. While both are broadly scientific, the different disciplines present diverse pedagogical challenges. It was expected that the exploration of the museum educators’ personal theories and practices might be related to disciplinary pedagogical parameters (Zikmund et al., 2012) to allow insights into the particularities of teaching in different contexts.

This study focused on three taught museum programmes, the selection of which was based on educational excellence and museum educator recommendations. Programme 1 was the recipient of the “Clore Award.” Programme 2 had a sizeable number of participants over a long period and good recommendations, and Programme 3 was created in partnership with a high profile Non-Governmental Organisation.

These three programmes were recommended by museum educators because they offered the author a spectrum of styles.

- Programme 1, administered by Museum A and run jointly by both museums is pioneering in terms of structure, style, and length of delivery in the museum (four hours) in comparison to other programmes in Museum A.
- Programme 2, is one hour, it is designed and run by Museum B, is typical of the programmes provided in Museum B in terms of mode, style, and period of delivery.
- Programme 3 sessions were one hour and tailored to fit the needs of a partnership with a high profile Non-Governmental Organisation.

The selection of programmes examined was for primary school children, as this audience segment visits museums in significant numbers (Tran, 2004).

All the museum educators delivering primary school programmes in these museums agreed to participate in this study. The only criterion set was long-term experience in museum education (from three to ten years) (Creswell, 2013). It was believed that this would better allow museum educators to articulate their personal theories of teaching more readily than novice museum educators (Brown and McIntyre, 1995). After checking that they fulfilled the criterion set by the author, it was agreed that they would participate in this study. The fact that all participating museum educators had a PGCE teaching qualification was coincidental.

Generally, there is no set sample size for qualitative research studies (Yin, 2014); however, it was necessary to ensure that an appropriate sample size was achieved. For the purposes of this study, which included in-depth analysis of each case and considering the limited resources and time available, four museum educators meeting the criterion were recruited. There were no other museum educators teaching

primary school programmes in those two museums. Data was collected from 28 interviews and 24 taught sessions of three programmes delivered by the four recruited museum educators.

Since the research objective was to develop an in-depth understanding of the relationship between the personal theories of museum educators and the practices used in their teaching of primary school programmes in museums, it was necessary to observe and interview museum educators after monitoring several sessions. During Programme 1, the author observed 16 sessions delivered by all four participating museum educators (four sessions per museum educator).

In Programmes 2 and 3 she observed the same number of sessions, four in total for each participant museum educator. This is illustrated in Appendix D.

3.7 Data collection methods

Tapping multiple data collection sources is crucial for in-depth information to answer the research question of this study (Denzin and Lincoln, 2011). Interviews and observations were used to address the research question posed. The exploration of the relationship between personal theory and practice meant data pertaining to personal theories had to first be obtained through pre-interviews. This allowed the author to collect data on the relationship between observed practices and stated personal theory (collected from the pre-interviews) during observations.

Post-interviews were used to collect further data on the museum educators' personal theories and build interpretations on the relationship they bear with the museum educators' practice. This created a nuanced understanding of the nature of the relationship between personal theories and practice within the teaching context of

university museums. Table 2 summarises the key methods of data collection to address the research question.

Table 2. Data collection methods to address the research question

Research Question	Data Collection Method
How, in a university museum setting, do museum educators' personal theories of teaching relate to their educational practices?	Interviews and Observations
Preliminary mapping of personal theory	Pre-interviews
Relationship between personal theory and practice (author's perspective)	Observations
Nature of relationship between personal theory and practice (interviewee's perspective) and Enriched mapping of personal theory	Post-interviews

3.7.1 Interviews

Frey and Oishi (1995) define an interview as "a purposeful conversation in which one person asks prepared questions (interviewer) and another answer them (respondent)" (p.25) to gain information (King, et al., 1994). Interviews with museum educators helped establish their personal theories of teaching - that is, their personal theory elements, the way they are translated into practice, the conditions that influence the way personal theory elements are translated (or not) into practice, etcetera. Interviews before and after classes are widely used in research to elicit

teachers' personal theories (Grotjahn, 1991; Cooper and McIntyre, 1996; Husbands, et al., 2003; Pendry, 1994). This study holds the assumption of "man-as-scientist" developed by Kelly (1955), Bannister and Fransella (1971), where the research subject is recognised as an agent who has

- intentionality,
- self-reflectivity,
- potential rationality, and
- communicative ability.

Interviews were conducted on the assumption that museum educator actions are intentional and based on potential rationality. They can, in turn, be reflected upon and communicated by a museum educator to the best of his or her ability during interviews (Mitchell and Marland, 1989; Grotjahn, 1991).

All interviews were semi-structured because of the flexibility afforded by this structure (Punch, 2005). Flexibility was deemed essential by the author to encourage a profound understanding of the museum educators' personal theories (Strauss and Corbin, 1990.) Semi-structured interviews allowed museum educators to freely express their thoughts in a manner that supported the exploratory aim of this study (King, et al., 1994).

Interviews were face-to-face because this allowed for intimacy in recording the personal theories of museum educators about teaching (Hiller and DiLuzio, 2004). Face-to-face interviews in qualitative research have disadvantages and advantages (Rubin and Rubin, 1995). The disadvantages include limited time to collect data due to the museum educators' workload and availability. Advantages include direct contact by the author with the research participants; a commonly accepted protocol for valid qualitative research (Creswell, 2002). It allows the modification of the line of enquiry, follow-up of interesting responses, and the observation of non-verbal cues (for example, hand gestures) complementing the verbal responses given by the interviewees (Robson, 2007). Developing rapport was key to facilitating a relationship of trust to allow the collection of useful information and this was engendered by face-to-face interviews. All interviews were audio-recorded enabling the author to give her full attention to the interviewee.

There were two types of interviews conducted for the study: the pre-interview and the post-interview. The pre-interview was conducted approximately three weeks before the delivery of Programme 1, while the post-interview was conducted immediately after each observed session across all three programmes. All four museum educators went through one pre-interview and four post-interviews in the context of the programme in Museum A. Two museum educators participated in a second round of four post-interviews in the context of two programmes at Museum B (Appendix D)

3.7.2 Pre-interviews

The objective of the pre-interview was to provide insight into the personal theory of teaching used by each museum educator to guide his or her teaching of

primary school children in a museum setting. This provided insights into one of the two concepts embedded in the research question.

All pre-interviews were approximately one-and-a-half hours. The first half-hour consisted of general questions that focused on the professional background of the museum educator (for example, what did you study? Why did you choose to become a museum educator?) and warm-up questions about teaching in that museum (for example, what is the range of programmes you teach in this museum? What is the educational aim of this museum? Are your aims influenced by the objectives of the programmes?). The questions then proceeded to the main body of the interview. The pre-interview questions are provided in Appendix B.

The author provided a definition of the “personal theory” of teaching to the museum educators and asked them about the personal theory that guided their teaching, which practices they selected, and why. If the museum educators needed prompting, the interviewer referred to general topics such as the role of museum educator and learning, to help them elaborate their personal theory in relation to those general topics.

Rather than relying on general concepts and questions defined *a priori*, the author allowed for the exploration of themes and ideas that emerged during the interview. This allowed for the identification of themes not considered by the interviewer, but important to participants. For example, in one case, a museum educator emphasised that having no prior contact with the children and having scant time to deliver a session, which is the norm in museums, influenced his personal theory with regards to his practices and role as a museum educator.

The second half of the interview capitalised on the responses given during the first half of the interview (Kvale, 1996). The author persistently prompted the interviewee to reflect further and asked “why” they held certain elements in their personal theories, or used practices. The interviewer frequently formulated impromptu questions to follow up leads that emerged during the interview (examples include: ‘you mentioned motivation is an important aim when you teach. Why is it important? Is there a relationship between motivation and learning? What practices do you use to motivate learners? Why? You mentioned children are a special kind of visitor... Is it important when you are teaching children to use motivation? Can you please explain how you view your role as a motivator? You mentioned knowledge is a process of meaning-making: can you please elaborate on that?’).

This information was necessary for the author to orient her observations and select what aspects of each teaching episode would be discussed in each post-interview. Teaching episodes were logged into the fieldwork notepads and analysed as instances that seemed to “confirm” or “contradict” elements of the personal theory as expressed in pre-interviews. For that reason, the pre-interviews were transcribed, read several times and analysed during the three weeks prior to the observations.

3.7.3 Observations

Observations were used as a primary method of data collection. Observations provided information for the research question that could not have been captured by interviews (Silverman, 2011). This is because “interview responses are notorious for discrepancies between what people say they have done, or will do, and what they actually did, or will do” (Robson, 2007, p. 310).

Observations provide first-hand evidence of museum educator practices and insights into one of the two concepts embedded in the research question. The objective of the observations was to understand the practices of the museum educators to help answer the research question of this study by accounting for the extent of “congruence” or “incongruence” between the museum educators’ observed practices and initial accounts of their personal theory expressed in pre-interviews.

As it was central to this study to obtain the museum educators’ conceptualisation of events to fully answer the research question, because “belief [personal theory] systems cannot be observed, the researcher can only observe a specific action, and try to understand the motives and personal theory elements [theory] involved in this action” (Grotjahn, 1991, p. 193), data collected from observations was used to prompt recollections in the post-interview to allow museum educators to reflect on elements of their personal theories underlying specific episodes (Punch, 2005). Observations provided the basis for the post-interviews, which explored the ways in which the practices of museum educators were related to their personal theory and the reasons behind that.

All four museum educators were observed delivering four sessions in the context of the programme in Museum A. Two museum educators went through a second round of four observations in the context of two programmes at Museum B delivered by each (Appendix D).

During direct non-participant observation, the author recorded what was taking place. Non-participant observation was chosen to ensure unobtrusive observation in an environment where pedagogical practices were employed (Cobb et al., 2003). It is better for the author not to participate to avoid influencing the events

being observed and to increase the validity of the data collected (Yin, 2003).

Observations were captured in field notes with detailed description of settings, activities, museum educator body language, and spatial movement. This allowed analysis on the spot and the use of those findings in the post-interviews conducted soon after the observation sessions.

Field notes were semi-structured and based on a table created during the pilot study. Robson (2007), explains that semi-structured observational methods help achieve reliability and validity in data collection “at the cost of a loss of complexity and completeness by comparison with the informal route [unstructured notes]” (p.313). However, in this study the advantages of this observational method outweighed any potential limitations. This methodological decision was dictated by the research question of this study. Observations had to be filtered through the categories that emerged from the pre-interviews (regarding museum educators’ personal theories) to ascertain whether instances of observed practice appeared to be congruent or incongruent with museum educator personal theories. This was a pragmatic decision as post-interviews about museum educators’ rationale underlying observed practice followed immediately after the observations were conducted. There was no time to analyse the observation data in any other way than using semi-structured notations. An observation table sample is provided in Appendix E.

To orient observations, transcriptions of pre-interviews were read and analysed. Salient points (personal theories expressed) were noted. Observations were checked against elements of personal theories that emerged from the final stage of analysis of pre-interviews. If the episode observed appeared “congruent” with a personal theory from the pre-interview analysis it was marked with a “+” (for

example when peer learning practices to hone analysis skills were observed, the description of that episode in the field notes was marked against that personal theory element with a “+”). If it appeared “incongruent” it was marked with a “-” (for example, if a museum educator used practices underlined by a fixed epistemology apparently conflicting with a professed personal fluid epistemology, it was marked as incongruent with a “-”). The author also noted the nature of the “incongruence” when describing the observed episode.

3.7.4 Post-interviews

There were four half-hour post-interviews with two museum educators and eight with another two museum educators (two of the museum educators who participated in Programme 1 also delivered Programmes 2 and Programme 3) (Appendix D).

The objective of the post-interview was to answer the research question of this study, *How, in a university museum setting, do museum educators’ personal theories of teaching relate to their education practices?* This was accomplished by taking practices from the observations that appeared “congruent” or “incongruent” with the personal theory expressed during pre-interviews. The museum educator was asked to talk about his or her practices and the personal theory element that underlined them to establish the relationship between personal theory and practices. It is important, for the purposes of this study, to understand the extent to which practices were congruent or not with the personal theories expressed in pre-interviews, and the reasons behind each instance, to advance beyond a simple description of congruence and incongruence. In some cases, this allowed for further elaboration and the accumulation of rich detail in understanding the personal theory elements articulated

in the pre-interviews, as well as the influence of teaching context on the museum educator's practice.

A sample of post-interview questions is provided in Appendix C. Museum educators were asked to explain their thinking behind observed episodes that either appeared "congruent" or "incongruent" with personal theories expressed in pre-interviews. This was an attempt to elicit the museum educator's perception of the relationship between their personal theories and practice. Some examples are provided below.

Instances of "congruence" with elements of personal theories mentioned in pre-interviews:

- During the post-interview, the author summarised an episode where a museum educator was observed helping with peer learning. This was congruent with an element of his personal theory mentioned during the pre-interview, namely, that learning is analytical thinking honed by peer-learning practices. The author asked the museum educator to name the practice he used in the described episode. Peer learning came up in his answer. The author then asked him to explain why he used it.
- In other instances, where practices observed were not mentioned in the pre-interviews, if the author hypothesised that it was an example of a practice used by a museum educator to translate an element of his personal theory (for example, creating a positive learning environment), the author tentatively marked that event as congruent.

Instances of “incongruence” with elements of personal theories mentioned in pre-interviews:

- During the post-interview, the author noted an episode where the museum educator told off a child who was misbehaving. This appeared incongruent with an element of his personal theory mentioned in the pre-interview, namely that the museum educator does not like disrupting a positive learning environment. The post-interview helped create a better understanding of the museum educator’s personal theory with an element not mentioned in his pre-interview (for example, the use of firm practices to establish a controlled and positive environment). This enabled a re-interpretation of what appeared as an “incongruence” between personal theory and practice. It became clear that the museum educator saw telling off a child as a means of safeguarding an overall positive learning environment when the accompanying school teacher failed to discipline a disruptive child.

The decision to conduct interviews that relied on questions about underlying personal theories, based on observed practices (Creswell, 2013) was driven by research that shows educators reflect better on their teaching rationale, when specific episodes that are “real and shared events rather than imagined reconstructions” (Brown and McIntyre, 1995, p.36) are used as prompts (Calderhead, 1981; Yin, 2014). The literature has highlighted that educators may omit or not express fulsome personal theories when asked. They may not find it easy to recall their actions out of the context of specific teaching episodes (Eisner, 1991), or they may wish to present themselves in a favourable light (the social desirability response bias) (Robson, 2007).

Grounding post-interviews around shared classroom events created opportunities to collect additional data for the research question that could have been missed, if museum educators were not asked to explain how they dealt with the contingencies of each episode (Brown and McIntyre, 1995).

To increase the validity of responses, Cooper and McIntyre (1996) suggested interviewing a teacher as soon as possible after lessons: this author interviewed museum educators after each observed delivery. Post-interviews explored the relationship between personal theories and practice and provided the museum educator's viewpoint on the relationship between personal theory and practice. This enabled nuanced articulation of personal theories and the parameters that enable or limit the translation of personal theory into practice.

3.8 Credibility

To safeguard “credibility” (Eisner, 1991) in the context of a qualitative study, the author took certain steps throughout the data collection and analysis of this study. These are described in this section.

During data collection, it was important to encourage “authentic responses to requests for information” (Cooper and McIntyre, 1996, p. 30). To encourage authenticity, the author took several steps to build trust with the participants. This included giving detailed information about the study, the author sharing her own professional background and interest in the topic, and spending time informally with the museum educators. During the interviews the author was non-judgmental; she did not agree or disagree with the responses given, did not phrase questions pertaining to “incongruence” in a critical manner but stressed she was interested in a better understanding of personal theory and practice. She did not press for answers if the

interviewee was reluctant to respond, as on one occasion where a respondent said they had “nothing intelligent” to say or “did not know” why they did certain things (Cooper and McIntyre, 1996). Lastly, the focus on shared events during the post-interviews helped the museum educators focus on specific instances rather than making general statements about their personal theories.

The participants were asked to introduce the author to the children being taught in each session. However, during observations of museum educator practices, the author was aware of the so-called “Hawthorne Effect,” when people usually perform better, or differently, under observation because of the attention of an outsider (Eisner, 1991). For that reason, the author adopted the role of a passive participant by being out of the educator’s line of vision and not interrupting the programme in any way.

At the end of each programme the author asked the museum educator whether his or her behaviour was typical and whether she was intrusive in any way. They confirmed that their conduct was typical, because they were accustomed to others monitoring their teaching. If there was any remark on the author’s discretion, she complied to avoid confounding the natural characteristics of the observed delivery. Lastly, to minimise the bias of selective attention (Robson, 2007), the author recorded all events that were related in some form (for example through a relationship of “congruency” or “incongruence”) with the personal theories of each museum educator.

During the process of analysis there were several steps that the author took to safeguard credibility. Creswell (2009), Stake (1995) and Denzin (1978) suggest

triangulation to corroborate evidence from individuals. Triangulation in this study involved using multiple methods of data collection.

Multiple sources of information in this case were the pre-interviews, observations, and post-interviews, used to collect data to answer the research question in this study. On the one hand, observations were used as an alternative method, which “seeks through a surrogate observer” (Stake, 1995) to catch what the author might have otherwise missed. Observations were used to examine whether the respondents accurately described the elements of their personal theories that guide their practice in the pre-interviews.

On the other hand, the museum educators’ post-interviews helped triangulate the results from the observations pertaining to the nature of the relationship between personal theory and practice. For example, in cases where there appeared to be an “incongruence” between practices observed and elements of personal theory as expressed in the pre-interview, post-interviews provided an “additional interpretation” (Stake, 1995) of what appeared as “incongruences” in the eyes of the author. In these instances, the participants were asked to voice their rationale behind practices. The museum educators’ post-interviews also triangulated the results of the pre-interviews, by allowing the participant to elaborate on and complement their personal theories. For example, the teaching context of each episode (e.g. discipline of collection) was found to be a critical factor affecting which element in a personal theory guided a museum educator’s action. It often emerged that such elements were not in pre-interviews. This enabled the author to reconsider the relationship between personal theory and practice as one that cannot be adequately described by notions of rigid “congruence” or “incongruence” without considering the teaching context.

To reinforce credibility, a fellow D.Phil. student was asked to blind-code a percentage of the data. He was given one pre-interview, a post-interview and transcripts of the episodes observed prior to the post-interviews and was asked to code that material. A conversation ensued on codes that were different until consensus was reached.

3.9 Ethical considerations

To conduct this study in an ethical manner, the author complied with the ethical guidelines for educational research issued by the British Educational Research Association (BERA, 2011).

Prior to the study, the author received approval from the Ethical Committee at the University of Oxford and so, before data collection, and in accordance with BERA guidelines, the author explained to participants:

a) the purpose of the study:

- was an exploration of museum educators' personal theories and the relation between those and their practice. It was clarified that this was not an evaluation;

b) the reason they had been chosen:

- was because of their experience as museum educators in university museums;

c) their responsibilities throughout the study:

- an agreement to an audio-recorded interview prior to observations of their practice
- four observations of their deliveries in each programme they participated in and where they would wear a dictaphone

- an audio-recorded interview at the end of each observation;
- d) their rights as participants:
- they could withdraw at any time
 - their identities would be kept confidential and pseudonyms would be assigned to them and the institutions they worked for
 - data would be stored in password protected files for five years and would only be accessible to the author, her supervisors, and whoever did the blind coding
 - their right to review their data at any time
 - their right to request copies of any reports or publications related to the study, and;
- e) the results of the research would form the basis of an Oxford doctoral dissertation. Copies would be available if they wished to obtain them.

The author received in writing a voluntary informed consent form from each participant. The author, throughout the study, complied with the confidentiality and anonymity ethical requirements of BERA guidelines, in line with the *Data Protection Act 1998*.

During the interviews the author attempted to put the participants at ease by maintaining a non-judgmental stance. In addition to the techniques described previously to create rapport, the interviewer displayed attentive listening by smiling, nodding, leaning forward, showing genuine interest, and praising the museum educators for their skills (Cooper and McIntyre, 1996.) The author was also flexible

with the time participants were available for pre-interviews to ensure no disruption to their work schedule.

Throughout the analysis of data and the write-up of the study the author was careful to not distort findings. After the study, the participants were provided with copies of the research.

3.10 Approach to analysis of data

This study followed an iterative thematic approach for the analysis of the data set, consisting of 28 interviews and 24 observations. Thematic analysis identifies important ideas or themes in a data set to answer the research question (Boyatzis, 1998). This thematic approach, described in detail below, was selected because it was compatible with the exploratory aim of this study (Boyatzis, 1998). According to Creswell (2013), thematic analysis is useful with explorative multi-case studies because it allows an in-depth picture of each case and helps depict the patterns that emerge. Thematic analysis provides “rich detail” and is useful if the topic under investigation is under-researched and participants’ views are not known (Braun and Clarke, 2006, p.79). As there is a dearth of literature about how these museum educators’ personal theories are related to their practice in university museums this approach was deemed appropriate.

3.11 Data handling

There were two phases of inductive data analysis for each case study. The first was during the data collection phase of the study and the second was after data collection was complete. The first phase included two rounds of analysis: the analysis of pre-interviews after they were conducted and observations (concurrent to data collection during observations).

The second round consisted of the analysis and synthesis of data: the analysis of post-interviews per case study and synthesis of all data both per case study and across case studies. The following section details the steps of analysis and principles for each pre-interview, observations, and post-interview data. A synthesis of the findings that emerged from all data was used to answer the research question in this study.

3.11.1 Analysis during data collection

3.11.1.1 First round of analysis: pre-interviews

Analysis started during the data collection process with the pre-interviews. Three weeks prior to the observation of each programme, a pre-interview was conducted with each of the four museum educators. During the three weeks between the pre-interview and the observations of each museum educator, the pre-interviews were analysed by the author. Methodologically, this was necessary, because the personal theories from the analysis of each pre-interview were used throughout observations to allow the author to filter observations through the lens of the museum educator's personal theory. This was dictated by the research question, which focuses on exploring the relationship between personal theories and practices.

The criteria throughout the observations was the “congruence” or “incongruence” of practices observed with the museum educators' personal theories as expressed in their pre-interviews. The following section describes the three steps of analysis that the author followed after each pre-interview, with a few major themes representative of each museum educator's personal theory.

i) Preparatory stage

The author transcribed the four pre-interviews: one for each case study. This allowed the author to become familiar with the data, as a preparatory stage to later analysis of all the data (Yin, 2014). The author read each pre-interview while listening to the audio recording of the pre-interview. This allowed the author to correct any mistakes made during the transcription and to immerse herself in the data to ensure familiarity with the depth and breadth of the content (Braun and Clarke, 2006). The author then did a preliminary coding of the text on printed copies of the interviews to capture the author's thoughts about key themes in the data.

She created memos to generate an initial list of ideas based on the data. The author uploaded the pre-interview transcripts to NVivo 9. This was a useful organisational tool because it allowed the author to index segments of the text with codes, carry out retrieval operations quickly, and link research notes to coded segments (Cassell, 2005).

a) Step One: Assigning codes

In step one of the analysis, the author coded the pre-interview in its entirety while referencing handwritten codes. Codes are defined in this study as “tags, names, or labels on pieces of data for assigning units of meaning to the descriptive or inferential information compiled during a study” (Miles and Huberman, 1994, p.56). Units of meaning can be phrases, sentences or whole paragraphs (Punch, 2009). A unit of meaning was any sentence or paragraph that described an idea expressed by the museum educator regarding an element of his or her personal theory about his or her teaching (Patton, 1990). For example, the code “cultivate stress-free environment” was given to this segment of data, “Behavioural research shows that human beings

feel very uncertain if they don't know what's going to happen. People like to have a structure and they like to know what that structure is. Not knowing what is happening can be a stressful experience... That is especially the case with museums because they can be intimidating huge spaces due to their architecture. You need to familiarise children with the space if you want them to feel good and learn.” A principle used was to keep surrounding data in every code to preserve its context (Bryman, 2001).

At the initial stage of analysis, the author wanted to ensure that all the data was captured in a descriptive and detailed way to ground the analysis. Another principle used during the assigning of codes was that all data should be coded. Despite the time limit of three weeks to conduct this round of analysis, the author found time to do this. Every passage of each pre-interview was studied to determine the precise words used and to label each unit of meaning with a code. This process followed the principle that codes should be descriptive. Punch (2009) and Miles and Huberman (1994) refer to this kind of descriptive coding as first-level coding or codes that require little or no inference beyond the data itself (Punch, 2009).

The origin of the code names was either a few words that the author composed that seemed to best describe the information or they were in vivo codes, where exact words used by participants were used to label the code (Creswell, 2013). For example, the excerpt, “I want to help children get a deeper experience of science and nature. Nowadays, they are detached from it and it's detrimental to them,” was coded as “aim to facilitate deeper experience of museum experience.” The excerpt, “I want to extend their understanding in a way that they would not be able to do on their own. I want them to understand what science is about,” was coded as “aim to extend understanding.”

There were many instances where the author coded the same data excerpt with two different codes if the author felt that two different ideas were described in an excerpt. This was because the author was not initially able to determine what code was more meaningful for the data, in relation to elements in that museum educator's personal theory. For example, the excerpt,

During the 'what is it activity' I usually ask children to elaborate on the rationale behind their answers. So, I ask them to show me how an object is used, for example. I try to use that sort of question with each group at least once so that I can see whether anybody needs a bit more intervention and needs some more help with using their observations for evidence for a theory,

was coded as "use questions to gauge children's observation skills" and "gauging as tool for differentiation." The first code emphasises the importance of the personal theory element on gauging as a tool for observational skills, while the second code highlighted the importance of the personal theory element on gauging as a tool for differentiating practices.

This first step of analysis resulted in 152 codes. These codes had to be reduced to a manageable number to enable the collection of data during observations. A snapshot from NVivo provides an example in Appendix F. This led the author to step two of her analysis, which engineered a process of "abstraction" of codes to ensure the data was intelligible (Miles and Huberman, 1994, p.10).

b) Step Two: Assigning themes

Step Two of analysis was aimed at classifying codes into themes. The author re-focused analysis at the broader level of themes in the data and reduced the number of codes to a manageable number by clustering codes together under a new theme. This mirrored Braun and Clarke's (2006) guide to thematic analysis, whereby at this step as a researcher "essentially, you are starting to analyse your codes and consider how different codes may combine to form an overarching theme" (p.89). Themes are defined in this study as a group of codes that share the same concept (Boyatzis, 1998; Gibbs, 2008) which "captures something important about the data in relation to the research question" (Braun and Clarke, 2006, p.82). For example, codes "hone questioning skills" and "hone object handling skills" were collated under the theme "hone analytical thinking and construction of meaning." Miles and Huberman (1994) refer to this as second-level coding or pattern coding, because each theme represents a pattern amongst codes (Braun and Clarke, 2006).

Themes described a more abstract concept, which brought together less abstract and more descriptive codes (Punch, 2009) to help delineate the elements of a museum educator's personal theory. This was necessary to answer the research question of this study.

The author used the codes developed in Step One, reread the data and searched for statements that might fit under one theme. This combined pieces of information into themes as a form of reduction (Kolb, 2012). This was achieved by constantly comparing codes applicable to each theme (Glaser and Strauss, 1967). The standard for putting codes in the same theme was a loose resemblance based on a "look-alikeness" or "feel-alikeness" (Creswell, 2013, p.184). This was since no *a priori* set of concepts or themes related to this type of museum educators' personal

theories was found in the literature. Themes had to be generated to capture the museum educators' personal theories through a process of code comparison to find out what they have in common and how they differ.

At the end of this process the author went through the raw data assigned to a theme to ensure that the data abstracts described the same idea and that each theme had identifiable distinctions (Braun and Clarke, 2006). This brought another round of analysis, whereby codes previously collated were split, put into different themes and renamed because they merited further refinement (Saldana, 2012), (for example codes "observational questions" and "questions for motivation," which were initially assigned under the theme "practices" were re-assigned under newly formed themes of "enquiry based questions" and "motivational questions").

Codes that were not relevant to answering the research question were discarded. General information on the programmes taught or biographical information was disregarded. These codes were concentrated under a new theme called "unrelated miscellaneous." If one excerpt was coded in two different ways, the author chose only one code per excerpt. This refined the codes by deciding on the central idea they described. The codes were reduced into 14 themes:

- Knowledge as something fluid
- Learning as honing analytical thinking and construction of meaning
- Positive learning environment
- Cultivate rapport
- Stress-free experience
- Foster interest and enthusiasm
- Object-handling

- Observation of objects
- Questioning (enquiry-based)
- Discussion
- Interpretation
- Peer learning
- Motivational questions
- Role as teacher

c) Step Three: Connection between themes

In Step Three, after themes had emerged throughout the previous analysis, the author looked for relationships between themes to provide a refined analysis of the data and to reread all the raw data in each theme. The principle was that all relationships between themes must be supported by evidence from the original data and that abstraction of data, notwithstanding the museum educator's actual language, was preserved as far into the process as possible. After several rounds of reading the raw data in each theme, it emerged that the rationale behind each practice (listed in the previous step as an individual theme, for example "Questioning" and "Peer learning"), was closely connected to an element in a personal theory about "Knowledge," "Learning," or "Creating a Positive Learning Environment" (each element in a personal theory constituting a separate theme). For example, a museum educator drew a link between the themes "object-handling," "observation of objects," "questioning," "discussion," and "interpretation" as describing practices and the theme "learning as honing of analytical thinking and construction of meaning." The former themes described practices used to hone analytical thinking and construction of meaning.

In some cases, the interviewee stated a connection between themes. For example, a museum educator provided the link between an element in his personal theory about learning and elements in his personal theory about practices:

We [museum educators in the X Museum] are interested in the process of creating a complex analytical answer that makes sense and is based on historical enquiry [which entails] object handling, observation of objects, questioning, discussion, interpretation, that is what learning is about in a history museum.

Spotting these connections was usually facilitated by identifying key words to make sense of data and to detect relationships between themes; for example, relate themes that describe practices with the themes that described elements of a personal theory on learning, knowledge, and educational environment, etcetera. (Frankfort-Nachmias and Nachmias, 1996). This helped the author create a “cumulative set of conceptualisations” (Miles and Huberman, 1994, p.14).

In other cases, the connections were implicit. For example, a museum educator spoke about his personal theory element of cultivating rapport and his personal theory of fostering enthusiasm. It became apparent to the author that these personal theory elements were part of this museum educator’s conceptualisation of a positive learning environment, as both these themes referred to cultivating a positive pedagogical environment. In this case, the theme: “positive learning environment,” became an overarching theme and “Cultivate rapport,” “Create stress-free experience,” and “Foster interest and enthusiasm,” became sub-themes within “positive learning environment,” signalling the nature of the relationship between different themes (Braun and Clarke, 2006).

In this case, this process yielded three main themes: “Knowledge as something fluid,” “Learning as the honing of analytical thinking and construction of meaning,” and “Positive learning environment.” The theme relative to learning was connected to another theme describing practices to cultivate analytical thinking and construction of meaning. Even though most museum educators during the pre-interviews could not explain what practices they used to attain each overarching element of their personal theory, some relationships were established. A diagram was created to depict the relationship among themes (see Appendix G). The theme relative to a positive learning environment contained three sub-themes: “Rapport,” “Stress-free,” “Interest.”

The compilation of the main themes within a museum educator’s personal theory was used in observations of his or her practice. This attempted to establish whether the observed practices reflected the main elements in that museum educator’s personal theory. The way the main themes were used throughout observations is explained in the following section.

3.11.1.2 Second round of analysis: Analysis of observations

Observation data was analysed during the data collection phase. These amounted to four observations for Case Study 1 and 2, and eight for Case Study 3 and 4. Analysis was engineered concurrently with collecting data during observations.

The table used for the analysis contained three columns (see Appendix E). On the left-hand side was a column to describe each episode. In the middle was a list with the major elements of each museum educator’s personal theory originating from the analysis of each pre-interview. For example, in Case 1, themes concerned personal theory elements relative to the nature of knowledge, learning, positive learning

environment, and practices used to hone children's learning. These themes were found to be part of the museum educator's personal theory during the analysis of pre-interviews. While observing each session, the author took notes from each episode in the first column and checked against the element of the personal theory she thought the episode was related to in the second column.

The third column was titled "congruence/incongruence" and categorised the episodes observed with data on the personal theory of the museum educator that emerged during the pre-interview. If the episode observed appeared congruent with an element of a personal theory from the pre-interviews, it was marked with a "+" sign. If it appeared as incongruent it was marked with a "-" sign. An example is provided in Appendix E.

Sometimes the practices observed were explicitly mentioned during the pre-interview, in which case the author assigned a positive sign between that element of the personal theory and the episode. In cases where the practice observed was not mentioned in the pre-interview, the author had to evaluate which overarching personal theory element it was connected to. This pairing was tentative because as reported in literature the same museum educator may use identical practices for different reasons each time (Breen, et al., 2001). During the post-interviews the author confirmed that the practice observed was representative of an element of the museum educator's personal theory (for example on learning).

Between observations and post-interviews, there was a period of approximately 30 minutes, while museum educators took a break, and the author went over her notes and reflected on observed episodes and how they may have matched or not elements of a personal theory.

Methodologically, analysing observation data in this manner was necessary because post-interviews consisted of questions about observed episodes. They occurred soon after the observations concluded. It was important to harness the perspective of the museum educator close to the events. This study had no intention of using observation data to criticise or assess museum educator practices: its purpose was to answer the research question.

3.11.2 Analysis after the data collection phase

3.11.2.1 Third round of analysis: Analysis of post-interviews

The post-interviews were analysed after the data collection phase. To answer the research question, findings arising from the analysis of the post-interviews were used to discern the relationship between the practices observed and the museum educator's personal theory. This also allowed for a rich account of the personal theory of each museum educator.

Post-interviews of each case study were analysed using the same iterative process conducted for pre-interviews. There were four post-interviews for Case Studies 1 and 2 and eight for Case Studies 3 and 4. The codes that emerged from the analysis of each museum educator's pre-interview were used to analyse all the post-interview data of each case study. After uploading all the transcripts of the post-interviews on NVivo9, the author went through each episode discussed in the post-interviews. Using the personal theory given by the museum educator, the author coded the episode under the personal theory element theme that existed from the pre-interviews. For example, when the practice discussed in the post-interview was that of "modelling enthusiasm for the activities" because the respondent explained that he used this practice to "foster interest and enthusiasm" it was coded under a category

from pre-interviews called “practices to foster interest and enthusiasm.” This was linked in the pre-interview with the overarching theme “positive learning environment.” It usually shed light on other practices the museum educator used to fulfil his personal theory about a positive learning environment.

The author remained open to the development of new codes if any emerged from a post-interview. One example was the personal theory on “control over classroom,” a subtheme of Case Study 1 called “positive learning environment.” Another example was Case Study 3, about teaching in museums with different disciplines.

When coding the post-interview data in Nvivo9, the author assigned red to codes and themes that showed the personal theories from post-interviews were congruent with those in pre-interviews and guided the observed practices. The codes/themes from post-interviews that seemed to indicate “incongruence” or a degree of diversion between the stated personal theory in the pre-interviews and the practices observed were blue. For example, episodes where a museum educator did not use higher analytical questions as mentioned in his pre-interview were noted as incongruent to his personal theory of a fluid epistemology.

After the author ensured the post-interview data was matched correctly with existing codes, she re-examined the “incongruences” between blue codes/themes by going through another round of analysis. The author examined all blue codes/themes to assess whether the rationale underpinning “incongruent” practices were in opposition to the museum educator’s personal theories of teaching and the reasons for that. The author found that in some cases the practices which initially appeared as incongruent were in line with the museum educator’s personal theory. The author

found that one of the reasons this happened was because an element of a museum educator's personal theory was not mentioned in the pre-interview. For example, during a pre-interview, the theme describing "knowledge as fluid" was changed to "knowledge as fixed and fluid" - depending on the stage of historical enquiry the educator was teaching. This gave a richer picture of how knowledge was conceptualised by that museum educator in relation to the discipline and teaching context, revealing that practice was often congruent with his/her personal theory.

In most cases, as post-interviews shed light into new personal theory elements and conceptual additions, they provided an elaborate description of the personal theory given in pre-interviews. There were other cases where the museum educator's practices diverted from their personal theories (for example, the level of differentiation of questions per learner's abilities).

Post-interviews helped the author understand under what circumstance some practices were enabled or limited, this provided insight into the museum educator's thinking. A diagram to describe the relationship between personal theory and practice is provided in Appendix H.

After post-interviews were analysed, each theme that emerged was matched with the description of the episode it related to, to ensure comprehensive reporting and analysis.

3.11.2.2 Synthesis of data

Three rounds of analysis were carried out for each case study. A new set of codes was developed for each. This was consistent with the unit of analysis – museum educator – in the case study, because the nature of "personal theories" vary from one

individual to another. The author wanted to avoid imposing categories to case studies. A cross-case comparison was conducted during the writing of the Discussion Chapter after all case studies were separately analysed.

In preparation of the cross-case analysis and to answer the research question as it applied to each case study, the author created a table to seek evidence for each theme from the pre- and post-interview databases. This was to establish patterns in the personal theories of each case study. The author used a visual format that presented information systematically to draw valid conclusions (Miles and Huberman, 1994).

The table has five columns. The first and second column lists the themes and subthemes that emerged from the interviews. The third column, based on a careful review of all the data, has a tick (□) if that personal theory element is mentioned in pre-interview material. An “o” is used if it was not mentioned and an “x” if any data is in direct opposition, per pre-interviews and observations, to a personal theory element. The same logic was followed in the fourth column for post-interview data. During this process, the author kept notes pertaining to the pre- and post-interview data to map a detailed picture of each personal theory and to reveal potential tensions. The comments included in the fifth column encapsulate the author’s conclusions based on the following questions: Which elements of a personal theory appear in interviews? Do the post-interviews reveal a new aspect of personal theory? If so, does it contradict any personal theory element expressed in the pre-interview or does it reveal a new aspect of an old personal theory element? Does any personal theory element account for variations in practice? Was equal emphasis given to every aspect of an expressed personal theory? Did context influence the way personal theory was expressed in practice? See Appendix I.

The author created a diagram to map the personal theory and its relation to practice for each museum educator. This was done to identify the “story” that each theme tells and how it fits into the broader overall narrative about the data in relation to the research question (Braun and Clarke, 2006, p.87). In blue was the personal theory stated in the pre-interview, and in green the personal theory aspects added in the post-interviews and congruent with the pre-interview. A hash (#) was applied between new personal theory elements from the post-interviews, which appeared to create tension with personal theory elements expressed in pre-interviews.

A red line was applied between personal theory connection, for example “learning as analytical thinking”, and practices, for example “practices based on honing historical enquiry thinking.” See Appendix H.

To answer the research question as it applies across the case studies, the author created a table with seven columns for each case study. This final stage was to integrate the data for each individual case study and to make connections between the findings (Punch, 2009.) The first and second column, had a list of all the themes and subthemes that emerged from the interviews. The third column, based on a careful review of all the data that matched themes and subthemes from the interviews, consisted of a tick (☐) if that personal theory element was mentioned in the pre-interview material. It was blank if it was not mentioned. The fourth column, consisted of observation data associated with an element of personal theory. As these were long pieces of text, the author concentrated the description of each episode in a separate document. She used the number assigned to each episode as it is referenced in the table. In cases where there was congruency between the personal theory element

expressed in the pre-interview and the episode observed, a circle (o) was noted in the next column, and in cases where incongruence was noted, a square (□) was applied.

Incongruence saw the creation of a sixth column to enter the rationale provided by the museum educator behind an episode during post-interviews. This enables the inference, based on that rationale, of whether there was true incongruence between personal theory and practice, the degree of incongruence and the reasoning that supports that interpretation.

The last column was reserved for comments arising from scrutinising the data and included the following questions: Does this practice divert from the museum educator's personal theory? Why is that the case? See Appendix J.

This synthesis of data was performed separately in each case study. To establish patterns, the author looked at all the tables to establish commonality among museum educators' personal theories with patterns of congruence and incongruence and possible reasons. The author created an extended version of the same tables based on shared personal theories and the reasons provided for congruence's and incongruences.

CHAPTER FOUR: CASE STUDY ONE

ALEX

4.1 Introduction

This chapter presents the case study of Alex, a museum educator and head of the education department of Museum A, a university humanities museum. Alex's background is examined with a short commentary on his career, the educational character of the museum he works for and how this impacts his teaching. The context of the programme studied and the details of the museum are in Appendix A.

Three key points emerge from this case study. The first is that Alex's personal theory of teaching is based on three elements: a) one relative to knowledge (i.e. that the nature of knowledge is fluid and fixed); b) one relative to learning, according to which learning is a process that encourages learners to cultivate analytical thinking skills and construction of meaning, as well as, a perception of learners as individuals with varying abilities; and c) one relative to cultivating a positive learning environment that: i) creates rapport; ii) is stress-free; iii) encourages interest and enthusiasm; and iv) maintains order.

The second point, is that in the case of Alex the relationship between personal theory and practice is characterised by degrees of alignment. Findings suggest that Alex is not always able to translate his personal theory of teaching into practice due to factors such as, time constraints and lack of familiarity with learners.

Thirdly, the findings suggest that Alex's personal theory of teaching is influenced by his experience as a museum educator in a university museum coupled

with his background as a history school teacher and, in some cases, the discipline of the museum he teaches in, all of which align with, and are reinforced by, the pedagogical approach that characterise the university museum he works for. The latter seems to enable the translation of his personal theory into practice.

4.2 Profile of a museum educator and the museum he works in

4.2.1 Alex's background

Alex studied Modern History for his undergraduate degree. He also holds a Postgraduate Certificate in Education (PGCE) for secondary history teaching. Alex's original goal was to work as a museum educator. During his teacher-training programme he taught at a museum. He was then employed as a history teacher in secondary schools for eight years. Alex's ongoing interest in museum education saw him study for a Master's degree in Museum Studies. After graduating, Alex was employed by a humanities museum as an educator and head of department. His post requires him to manage a team that delivers a host of family, school, and adult-focused programmes. All the primary school programmes in this museum are taught by Alex and another museum educator (Bridget) who also participated in this study.

4.2.2 Alex's view on the nature of his profession and the museum he works in

Alex said in his pre-interview that education is a central mission at the humanities museum he works for, "with some museums, education is very peripheral and with other museums it's central, in this museum, education is a central mission" (Pre-interview, Alex). He suggested this might be tied to the museum's small size and its university affiliation. This perception of university museum collections as "teaching tools" with a central mission to educate echoes the historical antecedents of

university museums (Verschelde and Adriaens, 2016, p.13). Alex said this ensured a focus on engaging visitors, “nowadays the public face of a museum is very important” (Pre-interview, Alex). Alex linked this institutional priority with his personal mission of developing more visitor-centred educational programmes for the museum. He affirmed that his supervisors and colleagues enable this educational vision by creating a creative and flexible working environment. He also asserted that there was a common pedagogical approach in this museum and this was sought during the hiring of new members. Alex said,

If new museum educators do not believe in the way we do things maybe they are not the right people for this team, but we’d hopefully find that out by talking to them in interviews...that doesn’t [mean] that we are not open to new ideas and suggestions for improvement from new members (Pre-interview, Alex).

Alex revealed that during his 13 years as head of this education department,

There has been a huge shift in priorities. Before, the focus of the museum was research, and visitors, not so much. Not many programmes were provided and the programmes reminded me more of school pen and paper activities...now we are incorporating other pedagogical features in our programmes. There are still certain elements of a formal learning environment but also others, that are sort of more informal (Pre-interview, Alex).

Alex said that the outcome of this shift was that activities were transformed from strictly didactic activities, toward education programmes that include

constructivist elements and a more visitor-centred approach. This is in line with recent views whereby university museums in the humanities are seen to move away from a more formal and didactic pedagogical model towards a more informal and visitor-centred model (Curtis, 2014).

Alex said, “This approach is encouraged by the museum management and me as head of the education department, so the practices you see me use in this programme are based on our common philosophy of museum education”. (Pre-interview, Alex). This resonates well with research by Leatham (2002) who argues that alignment between an educator’s personal theory and the pedagogical approach of the teaching context he works in enables his ability to translate his personal theory into practice.

Institutional shifts and a flexible working environment allow Alex and his staff to fulfil their personal educational vision of museum education programmes. In the sections that follow, the themes that emerged from the analysis of the interviews with, and observations of, Alex are discussed to respond to the research question posed by this study, *How, in a university museum, do museum educators’ personal theories of learning relate to their educational practices?*

4.3 Introduction to Alex’s personal theory of teaching and practice

This section presents Alex’s personal theory and practices. Information on factors that appear to influence his personal theory of teaching are provided (e.g. his background as a history school teacher and museum educator in the humanities university museum sampled in this study). This finding is line with research that argues a major factor influencing museum educators’ personal theory and teaching is prior experience in teaching (Castle, 2006). It illustrates the relationship between

elements of Alex's personal theory and practices considering the teaching context of the humanities university museum he works for. The influence of the teaching context on the educator's ability to translate their personal theories into practice is supported by researchers such as Borg (2003), Drageset, 2010 and Leatham (2002). Each section focuses on a single element of his personal theory. Each element of his personal theory is reconstructed from Alex's pre- and post-interviews. Observed practices are used to discuss the relationship between his personal theory and practice. Analysis showed that Alex's personal theory was based on his informed views about: a) the nature of knowledge; b) learning as the construction of meaning and analytical thinking; c) practices used to facilitate the process of analytical thinking and view on learners; and d) cultivating a positive learning environment. These are discussed below.

4.3.1 The nature of knowledge in museum education and practices

In the subsection that follows, Alex's element of his personal theory concerning the nature of knowledge in a humanities university museum is presented. Findings suggest that Alex's conceptualisation of knowledge is influenced by his understanding of the nature of knowledge in the discipline of history, which coincides with the museum collection he teaches. This is in line with Castle's (2002) findings on museum educator's epistemological views, according to which "the knowledge of different disciplines offers different ways of knowing our world" (p.1). For Alex, knowledge is produced through a process of personal meaning-making and evidence-based interpretation. Alex said in his pre-interview that the nature and production of knowledge in history is fluid. He recognised in his post-interviews, that in activities where learners had to identify an object he would only accept responses that were "factually correct," because when it came to an object's identity he sees the nature of

historical knowledge as fixed. Such an approach to knowledge seems to mirror a criterialist approach to knowledge. “Criterialism” is “an understanding that historical knowledge is based on evidence, and developed through the use of criteria and arguments” to construct multiple personal interpretations (Voet and De Wever, 2014, poster). Alex traced his viewpoint back to his understanding of history research principles and history teaching in schools, where historical knowledge consists of fixed information and fluid interpretations based upon evidence. The influence of a museum educator’s professional and academic background on his personal theory has previously been highlighted in museum education literature by a number of researchers (Bevan and Xanthoudaki, 2008; Ebitz, 2005; Tran and King, 2007).

This element of his personal theory – expressed in pre-and post-interviews – was reflected in his practices.

In his pre-interview, Alex explained that knowledge is something that:

We create...it is not something external to us...finite or unchangeable... it is fluid... It [interpretations in history museums] must make personal sense, or acquire meaning through a process of construction, of meaning based on our experiences. [In history museums] it is important that learners construct their knowledge through a process of analysis (Pre-interview, Alex).

Data from observations confirmed that Alex supported the development of learner interpretations in activities dealing with later stages of object analysis. Typically, Alex facilitated the construction of personal meaning. This practice is revealed in the dialogue below, which is taken from the last activity of Programme 1. During that activity, Alex asked students to share the evidence they had collected to

interpret the significance of the objects and what those objects show about the person who used them.

Alex: How might they have lost this arm? What do you reckon?

Child1: Maybe a battle.

Alex: Maybe a battle, because they've got a sword.
Absolutely.

Child1: When they were going through the forest then they might have come across some warriors and fought.

Alex: That's possible. Okay. We've got one more thing to do before we go back. Where do you think, this person comes from? What is the evidence? Where does it suggest? What do you reckon?

Child1: Ireland.

Alex: Okay, is there anything Irish in there?

Child 1: Not really...

Child 2: Asia.

Child 3: Is it Africa?

Alex: Is it?

Child 3: Most of the things are from Africa and there's only one thing from India. So, he might have travelled to [India] (Observation 3, Alex).

Alex said in the post-interview that his goal was to prioritise reflection, the use of evidence and analysis rather than directing learners to a definite answer or reaching a pre-determined outcome. Creative thinking and cultural interpretation of objects was

prioritised, because in humanity museums, “the process is what matters...I want them to use the evidence to make sense of it [objects] in a personally relevant way. We don’t have a set story we want them to discover. There is no story...we were very definite when we buried items” (Post-interview 3, Alex). This view reflects a move away from the simple transmission of knowledge from museum staff, which historically was characteristic of university museums, towards the delivery of narratives developed by museum educators in collaboration with students, which is more characteristic of a non-formal learning environment and seems in line with the direction in which humanities university museums are moving towards (Roberts, 1997).

Despite most observations reflecting Alex’s view to not direct learners to a definite answer, some episodes in earlier activities dealing with identification of objects were observed where Alex intervened to correct the way children identified objects or he guided them towards an answer. Such an episode is provided below, where Alex, after correcting the learner’s evidence, provides the correct answer. This is taken from the “exploration” activity, where learners were asked to compare their objects to designated museum objects to help their enquiry.

Alex: Where is this object from?

Child: The biggest whale in the world.

Alex: What kind of whale was this?

Child: Killer whale.

Alex: No.

Child: Orca?

Alex: It was a sperm whale and the sperm whale jaw that's in the X Museum is the only sperm whale jaw that's ever been found. A sperm whale is a big whale, but it's not the biggest whale in the world. The biggest whale in the world is the – does anyone know?

Child: Killer whale.

Alex: Blue whale. Blue whale is way bigger than the killer whale. The killer whale is a great whale, but not the biggest.
(Observation 4, Alex)

When Alex was asked about this in his post-interview, he said that there are certain limits to the type of responses acceptable during the earlier stages of enquiry where learners must identify an object. This view seems less in line with the extent of experimentation and intellectual challenge that museum educators in other museum disciplines, such as art, aim for (King and Marstine, 2006) and which researchers such as Curtis (2004) champion for all university museums. Alex suggested that this does not clash with the element of his personal theory, relative to valuing the process of learning or accepting the fluidity of knowledge when it came to cultural interpretation of objects. He said it would harm a student's learning if he accepted incorrect factual answers. Alex explained,

During the process of analysis in historical enquiry, if kids get things wrong, such as with historical or scientific facts, we should tell them it's wrong. I'm not going to say, 'Oh yes, that's right, but you can look at it in another way.' Their interpretation and answers should be based on logical evidence and reflect correct facts (Post-interview 4, Alex).

Alex spoke of his experience as a history school teacher and used the following metaphor to explain his view on the nature of knowledge in a university history

museum: “Objects have to be ‘read’ – like how written historical documents are read by students in school and used to extract information, which will then be used to create multiple theories and interpretations” (Pre-interview, Alex). Despite controversy in museum education literature as to whether it is appropriate to treat textbooks and objects as pieces of information that can be “read” in similar ways (Chatterjee and Hannan, 2016), Alex’s view reflects Kraayenoord and Paris’s (2002) position that there are “similarities between reading text and understanding objects by considering the analogous process of constructing meaning” (p.216). Alex confirmed that this view of knowledge was shared by this museum due to its institutional identity as a university museum. His response reflected how his perception of the principles underlying historical enquiry also influence his view on the nature of knowledge. He said,

One of the things we’re interested in, in this museum is how you interpret the collections, because we are a research museum. I think it’s important to expose learners to the way historical research works... We encourage a range of different interpretations and multiple viewpoints from visitors because that is what a university research museum should be doing, not just go down one line of interpretation offered by us (Post-Interview 4, Alex).

This subsection shows that this element of Alex’s personal theory is grounded in an understanding of knowledge in a humanities museum, as a product of analytical thinking, and a process by which learners make sense of objects. For Alex, this entails encouraging learners to focus on analytical thinking, while reflecting on accurate information to construct evidence-based personal interpretations. Findings suggest that Alex’s personal theory was influenced by his experience as a history school

teacher coupled with his views on historical research. This is in line with the epistemological approach taken in this museum.

The next subsection presents Alex's personal theory relative to learning and shows that the practices he used to facilitate this type of learning, were peer learning and a pattern of questions.

4.3.2 The nature of learning in museum education and practices

This subsection presents Alex's element of his personal theory that learning in university museums, regarding humanities collections, entails a focus on honing analytical thinking skills and construction of meaning. Alex argued that learning to think analytically and construct meaning in a humanities museum involves exposing learners to activities that develop object handling, observation, questioning, discussion and interpretation. This finding resonates with Castle's (2001) research on museum educators' personal theories relative to learning in humanities museums, as well as the learning aims of university humanities museums (Hartz, 2017). It suggests that a museum educator's personal theory relative to learning is discipline specific and corresponds to the discipline of the museum collection they teach in. This finding is endorsed by researchers who support that the relationship between personal theory and practice is mediated through the sociocultural contexts that museum educators work in (Ash, 2004; Briscoe, 1991; Rogoff, 2003). Observations indicated that this element of his personal theory was implemented in practice. Post-interviews confirmed that the design of activities and Alex's choice of practices observed in Programme 1 were informed by this element of his personal theory.

Alex explained that analytical thinking and construction of meaning required building a learner's ability around "object handling, observation of objects,

questioning, discussion and interpretation.” This understanding of learning as honing of analytical thinking skills and construction of personal understanding mirrors a constructivist orientation to learning (Hein, 2002; Tsai, 2002; Voet and De Wever, 2014). Alex said with reference to learning with a history collection,

I personally believe in these principles and want to build our programmes based on what is best practice in museum education, which I personally think goes along the line of constructivist learning theory... Turning towards this approach... is increasingly recognised by the management as good practice for a [university] museum with a history collection... I always try to help learners while building up their analysis skills to construct their knowledge and personal meaning (Pre-interview, Alex).

This shows that Alex’s perception of learning in museums is reinforced by what he considers as “best practice” in museum education and in the context of a university history museum. Indeed as other researchers have shown (Black, 2005; Hein 1999a; Hooper Greenhill, 2007b; Nakou, 2001) a constructivist orientation to learning based on honing analytical thinking skills has been argued to be part of what is considered as “best practice” both in museum education in general and in the context of history university museums in particular. Alex also referred to his experience as a history teacher to assert his view that “teaching students to do history as a discipline, in other words teaching students to think like historians... entails learning about the process of historical enquiry and thinking. I want students to experience this in the museum” (Pre-interview, Alex). According to Alex, this view echoed his museum’s aim to help students “[learn] how history and archaeology

museum professionals work...because making research and research practices accessible to students is an important mission of university museums” (Pre-interview, Alex). The latter echoes Hartz’s (2017) view on the mission of university museums. Both findings suggest that the professional background and museum context a museum educator works in influence his personal theory and practice (Cobb, 2002; Grossman et al., 1989; Hofer, 2000; Kagan, 1992; Leatham, 2006).

Data from observations showed that the analytical thinking skills and principles mentioned by Alex in his pre-interview, were at the epicentre of every activity in Programme 1, which was co-designed by Alex. Alex involved students in activities that were centred around developing five skills – object handling, observation, questioning, discussion, and interpretation – which are at the heart, in his view, of developing analytical thinking skills.

The first activity was called, “What is it?” Students were asked to move from one table to another in groups of three. They had to determine the identity of one object per table, based on options on a museum worksheet. Alex told them to look at an object, use their senses to reflect on it, and discuss their views in a group. Alex encouraged students by asking questions such as:

- i) “What is it made of?”
- ii) “What does this smell remind me of?”
- iii) “What does it remind me of?” (Observation 1, Alex)

Alex evaluated students’ answers in a group session. Consistent with Alex’s element of his personal theory relative to learning, learners were asked to use their observation skills to interact with the objects using their senses and to read the objects in the context of discussions among peers and the museum educator.

During the second activity, students were asked to document a dig and choose an object to research in their group (Observation 1, Alex).

In the third activity, groups of students documented, on worksheets, the properties of the object they chose to examine. Alex also asked students to hypothesise as to the use of the object based on the evidence they were collecting (Observation 1, Alex).

Students were asked, in the fourth activity, to use a map that directed them to objects in the museum. They were asked to choose an object and to identify it. This involved discussion among the students (Observation 1, Alex).

During the fifth activity, Alex coordinated a discussion where children were urged to use the evidence they collected and to interpret what each object told them about the identity of the plastic human skeleton in the mock dig. This culminated in a story and multiple interpretations about the skeleton's identity (Observation 1, Alex).

These activities used by Alex seem to be underlined by the principle of gaining knowledge and skills through meaningful direct encounter with objects. This hands-on and mind-on system of learning by doing reflects a basic tenet of experiential learning (Hein, 2004; Sadler-Smith, 1997).

When Alex was asked in a post-interview about the aim of those activities and his rationale, his answer echoed the element of his personal theory on learning. Alex said:

I designed these activities based on what I considered to be best practice for developing analytical thinking skills in museum education...especially a history and anthropology museum that belongs to a university...and based on what

skills learners must hone to become analytical thinkers and make sense of things with a history collection like little history researchers...that's based on my experience of teaching history in schools... To hone children's analytical skills in this programme [Programme 1], you give kids an object or you get them to learn how to look at an object, interact with it and then you get them to 'read' that object in the same way that books are read to collect information, discuss it with their classmates, document it, research similar displays in the museum and say what that object says about the people that made it. Museum education is mostly about analytical thinking... [developing] students' critical thinking and construction of meaning (Post-interview 1, Alex).

This subsection discussed Alex's element of his personal theory of learning as analytical thinking, collection of evidence and construction of meaning in learners. He mapped out his understanding of the five skills of observation, handling, questioning, discussion, and interpretation. The explanation Alex provided behind observed episodes in his post-interviews reflected faithfully this element of his personal theory provided from the pre-interview. This suggests that he remains true to his personal theory in his practice. Lastly, this section indicates that Alex's personal theory was supported by references made to what he considers as museum education best practice in a university museum.

4.3.2.1 Practices used to facilitate analytical thinking

In the following two parts of this subsection it is argued that Alex's element of his personal theory of learning is translated into practice by employing i) peer learning; and ii) questioning with objects to hone learners' analytical thinking skills and construction of meaning, as well as a view on learners as individuals with varying

characteristics. The first practice reflects the importance that Alex places on the social context of learning. This is in line with Falk and Dierking's (2000) Contextual Model of Learning which relies on socio-cultural learning theory to explain the nature of learning in museums. Each practice is separately discussed in the following subsections.

The first part of this subsection, argues that, per Alex, peer learning supports analytical thinking and meaning-making, because learners extend their understanding in ways that would have not been possible on their own. Analysis is facilitated when learners are compelled to articulate their ideas and discuss them with their peers. Indeed as other researchers (see for example Falk and Dierking (2000), Flem et al., 2000; Riddle and Dabbagh, 1999; Rueda et al., 1992; Rueda et.al., 2001; Shambaugh and Magliaro, 2001; Tharp and Gallimore, 1988) have shown individual interpretations can be enriched by the viewpoints of more advanced learners, resulting in a build-up of ideas in a way that otherwise would have not been possible.

The second part of this subsection, observes that Alex uses a pattern of questions to support analytical thinking with objects. This view of learning through the provision of information and questions that lead to further questions and discovery of new information, is in line with enquiry learning (Hutchings, 2007). This approach to learning has gained popularity in contemporary museum pedagogy due to the recognition of constructivism in museums (Hooper-Greenhill, 1999; Hutchings, 2007). Even though most observations reflected these two practices, there were episodes when Alex varied his questions with different learner groups. When Alex was asked about these episodes in post-interviews, it became clear that the element of his personal theory about analytical thinking consisted of differentiating questions to

suit learner abilities. Analysis showed that this could be traced to his personal theory relative to learners as individuals with varying characteristics. Observations showed that in his practice Alex categorised learners into three ability groups and tweaked his questions per the learners' ability as a group. Alex used his experience as a school teacher to explain why he used this practice, but also reported that the extent and nature of differentiation he used was limited by the visiting class teaching environment i.e. time and familiarity with children. This finding has previously been discussed in literature on teachers' thinking (Bennett et al., 1997, Leatham, 2006; Mansour, 2013), arguing that the nature of the visiting class teaching environment provides constraints and opportunities for museum educators to enact elements of their personal theories.

4.3.2.2 Peer-learning to facilitate analytical thinking

In this part of the subsection relevant to learning it is argued that Alex's personal theory highlights the importance of promoting students' analytical thinking and construction of meaning through peer learning. Data from pre-interviews, revealed that Alex's knowledge of the theoretical notion of the zone of proximal development (ZPD), informed his personal theory on the significance of peer learning in analytical thinking. Observations mirrored this element of Alex's personal theory.

During his pre-interview, Alex linked the importance of peer-learning to his view about the conditions under which learning occurs. He explained that he saw "a buffer zone between the learning a person does on his own and learning that a person cannot do without help from others" (Pre-interview, Alex). He explained that a student's ZPD can be extended by a variety of cultural mediators and pointed out in his pre-interview that these mediators are referred to by Vygotsky (1978) as "More

Knowledgeable Others” (MKO). Alex concluded that learners develop their analytical thinking and construction of ideas by engaging in discussion among themselves.

Individual interpretations are enriched by the viewpoints of more advanced learners, resulting in a build-up of ideas in a way that otherwise would have not been possible.

Alex’s position reflects Vygotsky’s view that community is central to the creation of meaning (Von Glasersfeld, 1974). In particular, the importance he places on the student’s ZPD – that is, “the area between the things that a learner can do on his own and the things that he cannot yet do, even with assistance” (Orey and Branch, 2010, p.49) – is in line with the socio-cultural understanding of learning, as something that occurs when learners engage in social behaviours with others who are slightly ahead of them developmentally (Aschermann, 2001). In Alex’s words,

By having to verbalise an idea, not only is the analysis of that individual child clarified in his head but it prompts another child to take that idea further, ending up collectively with a better analysis and interpretation (Pre-interview, Alex).

Data from observations confirmed that Alex encouraged students to work together to complete activities, an example is provided below. It is taken from the introduction of the “What is it?” activity and shows Alex highlighting the importance of collaboration throughout the course of the day. Alex was observed always commencing the activity with these words,

I want you to discuss with each other, that’s the most important part of the day. If you’re talking to each other by the end of this game, then we will have succeeded. I want you to challenge each other and work together. We don’t care if you have the right or wrong answer. We just want you to have

good conversations with each other about what the answer might be (Observation 1, Alex).

During the post-interview, Alex was asked about these episodes. He said that he reminded learners to work together. He drew on this element of his personal theory in his pre-interview to explain why that was essential. He stressed,

During conversations children understand things by doing it together in a way that they wouldn't be able to on their own... As you saw Jane built on Jack's idea about the smell and that helped them all find the answer. That's why it's important for them to work in groups, to support each other's analytical thinking... I always remind them they should do that at the beginning of an activity and throughout (Post-interview 1, Alex).

Data analysis displays the congruence between Alex's practices and the element of his personal theory on the significance of peer learning in terms of developing analytical thinking. The next part of this subsection on learning concludes the discussion about Alex's personal theory, regarding what practices are most appropriate in developing learners' analytical thinking and meaning making. The following section demonstrates that questioning through objects is paramount to the facilitation of analytical thinking.

4.3.2.3 Questioning through objects to facilitate analytical thinking

Alex's personal theory highlighted the importance of using a build-up of questions with objects to encourage learners' analytical thinking and meaning making. Alex usually commenced the enquiry process with questions based on observation and progressively posed more analytical questions. However, some observations indicated variations in the questions he used with certain groups of

learners. It became apparent, and was confirmed during post-interviews, that this was due to Alex's nuanced view about questioning and construction of meaning; that he should differentiate the way he implements this element of his personal theory to suit learners' abilities. However, even though part of Alex's personal theory on learners, was that they are individuals with varying abilities and should be accommodated on an individual level, due to contextual limitations (i.e. time and familiarity with learners) he was not able to translate this element of his personal theory.

During the pre-interview Alex admitted he found it hard to expand on the way that he facilitated this build-up of analytical thinking skills. He said that he used a sequence of questions "from more observational to more analytical questions," to cultivate the learners' ability to interrogate the object. This finding mirrors extensive research on enquiry learning, according to which the learner- through different types of enquiry- is encouraged to explore, manipulate ideas or objects and ask questions to arrive at a learning outcome or make personal meaning (Banchi and Bell, 2008; Elkind, 1976). Alex explained that he relied on his experience as a museum educator to implement this practice. In his own words,

Whether children are holding objects from a handling collection, or looking at an object in a case, well-structured questions and a progressive build-up [to confirmation of their inquiry process] helps their analytical thinking... It's hard to explain... It's a build up from observational to more analytical questions that will help to make sense of what they are looking at. This skill is to museum educators who are specialised teachers (Pre-interview, Alex).

Data from observations reflected that Alex often, in the episodes observed, used a pattern of a progressive build-up from questions based on observation to more

analytical questions with learners. However, observations also yielded that the episodes where Alex concluded with high analytical questions were limited. What follows is an example of the questions Alex modelled whenever he engineered a full build-up, as well as an episode to demonstrate how that was put into practice. Alex tended to start with closed questions: How does this smell? What does it remind you of? What colour is this? Is it smooth? Is it heavy? (Observation 2, Alex).

He occasionally proceeded with higher-level abstracted questions such as:

Why?

In how many ways can you prove or disprove your answer?

Compare and contrast question: 'Why is it x? Why isn't it y?'

Tell me something which is not x? (gave familiar examples)

In what ways? (Observation 2, Alex)

The following episode from the "What is it?" activity demonstrates this:

Alex: Why do you think this is a fish, Jamie? You sound very certain. What does it remind you of?

Child 1: I have seen one like it at a fish store.

Alex: Did you feel it? Do you think if you'd felt that fish in that fish store it would have felt like that one? Do you think it smelled like that?

Child 1: Hmmm.

Alex: Why is it a fish and not a slug? What is the difference between the two? What does a fish have that a slug has not? How are they different?

Child 2: They have gills.

Alex: Gills and fins. Does this one have gills and fins?

Child 2: No.

Alex: So, tell me, in what other ways can you prove this is a fish?

Child 1: I don't know.

Alex: Remember what I told you before? You can find out what something is by proving it is not something else (Observation 2, Alex).

During post-interviews when Alex was asked about these episodes, he explained in detail his thinking behind his personal theory on the practice of questioning. Alex recognised that his practices were based on a pattern he followed, namely, i) starting off with concrete questions based on observation; ii) then using questions that encouraged comparisons or even contrasts; and iii) occasionally, when able to do so, concluding with higher analytical questions. He admitted that the latter was difficult to master in practice. He said,

I have a general pattern in mind. So, you start with the concrete questions, all the observational stuff, 'How does it smell?' 'What colour is it?' So, after those questions a child has looked at the object. Then you use that evidence to help them look out and in, so, 'How is it the same?' 'How is it different?' The compare-contrast thing tends to be in the middle.

Then you might have judgmental questions: 'How could it be designed better?' or 'Why is this animal different to that one?' That kind of thing, the higher-end analytical questions are hard to think of. My role is one of stepping in to extend the students' zone of proximal development, through a process of scaffolding (Post-interview 2, Alex).

During some teaching episodes, it was observed that Alex occasionally skipped the “compare-contrast” questions or did not progress to any higher analytical questions in his build up. That was usually the case with learners’ who had difficulties completing the activity.

When Alex was asked about one such episode, he confirmed in his post-interview that he had not challenged that group of children with anything more than **basic questions grounded on observation of objects**. He attributed this to his reading of this group of students as “slow learners.” His overall response showed that differentiating his questions was an intuitive practice to accommodate learner abilities. This provided some evidence to suggest that the element of his personal theory about questioning contained an understanding that a museum educator should differentiate practices to suit the varying abilities of his learners. Alex said,

I was trying to get them back to the line of enquiry and not moving them to a higher analytical level because they were having difficulties with simple questions. It was beyond their level and abilities. It’s hard to know why I tell children what to do, it’s unconscious. I also have very limited time...I do not know these children well either. I’m trying to take shortcuts through the questioning if children cannot keep up.... perhaps use prompts a bit more...even if that is not ideally what I would like to do, I think it is a practical way to address the situation and help learners in what I think is the best way possible...I am just a human being and I don’t get it right all the time (Post-interview 3, Alex).

The emerging hypothesis – that there is a nuance in Alex’s personal theory to differentiate questions to accommodate learner abilities – was strengthened throughout the course of observations. While the previous episode demonstrated that

Alex downplayed the build-up of questions with less-skilled learners, other episodes made the case that Alex insisted on higher analytical levels of questioning with learners that he considered high achievers. Even though the notion of “ability” is disputed in education literature (Hart et al., 2004), Tran (2004) reported similar findings in his study of museum educators.

In the post-interview following one such episode Alex was asked to explain his rationale behind his questioning practice. He confirmed that he differentiated the level of questions per what he perceived to be the ability of this group of learners. He explained that he asked more analytical questions and gave fewer prompts because he gauged that this group consisted of “very able” students. He said,

I started asking questions aimed at ‘less able’ children, [but] it turns out that they were very able and had good knowledge, but [were] I think, just a little immature. So, I read, for example, [John’s] immaturity as lack of ability and it wasn’t. I very quickly changed, throughout the day, my way of questioning and started trying to work them up very much quicker to a higher level of more analytical questions, providing less prompts. They were quite capable (Post-interview 4, Alex).

This response from Alex was typical of the answers elicited across post-interviews when he was asked to explain his thinking behind similar episodes. Subsequently, Alex was asked in his final post-interview to reflect on the observed episodes and to consider whether there was any overall thinking pattern that informed his practice of differentiation. Alex explained that he based his differentiation practice on a personal categorisation of learners in three groups: very able, medium, and less able. He stressed that he believed in differentiating practices in a way that

accommodates each learner's individual abilities, however he explained that the differentiated practices he ended up using targeted learner's as part of an ability group. He pointed out that this was the case because he was limited by time and familiarity with the learners. This finding mirrors research (Bennett et al., 1997, Leatham, 2006; Mansour, 2013) showing how limited time and a lack of familiarity with students may hinder the educator's ability to follow fully his personal theory and differentiate his practices to each learner's abilities. Alex recognised that this categorisation of learners into different ability groups was intuitive, based on his museum and school teaching experience.

Depending on an individual's knowledge and experience, an object can be analysed on an observational level only or it can stimulate higher levels of analysis. What I did is first cover the middle group of learners, leaving them to work independently. Then I moved to the 'less able' and 'abler' learners. With able learners, I try to ask them high analytical questions. The way I adapted my questioning is based on assumptions I make about the students and [I] adjust the level of questions accordingly... It's about reading a situation...I used this practice when I taught in schools...What helps museum educators accomplish this is the experience they have accumulated from teaching the same programme to many different students over the years. But I do not have much time...[to] get to know them on a personal level and act accordingly...individualise differentiation practices in a finely tuned way (Post-interview 4, Alex).

This part of the subsection relevant to learning discussed Alex's element of personal theory regarding questioning to hone learners' analytical thinking and construction of meaning. Alex's personal theory relative to learners and

differentiation practices was also examined. Alex's ability to translate his personal theory relative to learners in his practice was limited by the time and familiarity with learners.

4.3.3 Creating a positive learning environment in museum education and practices

This subsection discusses the details of Alex's element of his personal theory relative to conceptualisation of a positive environment to support learning and a life-long learning attitude towards museums. Alex said in his pre-interview that a positive learning environment has three characteristics: i) it cultivates rapport; ii) creates a stress-free experience; and iii) fosters the learners' interest and enthusiasm. Alex explained that these are key conditions for learning. This is in line with studies suggesting that museum educators value interest, engagement, emotional support as elements of a positive learning experience (King, 2009; Taylor, 2006; Taylor, Neill and Banz, 2008). His response highlights that his conceptualisation of a positive environment is influenced by the goals set by museums and university museums. Indeed as other researchers and writers have shown, the creation of an engaging and supportive positive learning environment is a core aim of all types of museums (Castle, 2001; Hein, 1999b; Hartz, 2017; Hooper-Greenhill, 2007b; King, 2009; Nikonanou, 2009; Roberts, 1997; Tran, 2004). Alex believes they can cultivate a life-long love towards learning and a positive attitude towards museum visits. In his words,

Nowadays museums have the obligation to open their doors to all visitors and create a positive learning environment for all....
To encourage a positive attitude towards lifelong learning in museums. Ultimately, I want children to have a very positive

experience with their learning. What do I mean by that? Well, I want to create a learning environment where children feel welcomed and emotionally supported. I want them to have a stress-free experience and I want them to feel interested and engaged. That sort of thing. I want to create a positive learning experience for them because I believe that this supports their learning. When visitors have a positive experience, they leave the museum happy and want to come back again and learn more about the collections and history... These are things that this museum stands for... its part of the obligations of a university museum. (Pre-interview, Alex).

Each characteristic that Alex attributed to a positive learning environment and the practices he chose to translate into practice are discussed. This section stresses that per Alex's pre- and post-interviews a positive learning environment consists of:

- i) Cultivating rapport with learners by:
 - a) giving them the option to choose their behaviour;
 - b) calling learners by their names;
 - c) using welcoming body language or attitudes; and
- ii) Creating a stress-free experience throughout the session by:
 - a) familiarising learners with the layout of the museum; and
 - b) signposting the aim and content of each activity; and
- iii) Enhancing the learners' interest and enthusiasm by:
 - a) using real museum objects;
 - b) framing activities as games;
 - c) praise; and
 - d) modelling enthusiasm for the activities.

- iv) Creating order by establishing boundaries, giving children the opportunity to choose their behaviour, using firm language, strategic ignoring, or reverting to their school teacher for help.

Observations reflected the elements of Alex's personal theory in action. This subsection mostly relies on post-interview data to analyse Alex's personal theory in terms of his choice of practices. They suggest that some of the practices used by Alex stem from his experiences as a school teacher while others are from his experience as a museum educator in this museum context.

4.3.3.1 Rapport and order as characteristics of a positive learning environment

This part of the subsection relevant to creating a positive learning environment, focuses on Alex's perception that cultivating rapport with students and maintaining order enables a positive learning environment. Ways of achieving rapport were observed, and confirmed by Alex in the post-interview discussions, and include building trust with learners and providing them with the right to choose their behaviour; addressing learners by their names; using welcoming body language and an embracing attitude; and paying attention to learners' interests. Order was maintained either by recourse to the school teachers accompanying the classes, using choice, or firmer practices such as strategic ignoring. This is in line with practices reported in museum and wider education literature to create an organised learning environment (Babkie, 2006; Grossman et al., 2004; Tran, 2004).

During his pre-interview, Alex mentioned that cultivating a sense of rapport and comfort in learners was key to facilitating a joyful learning experience. Alex said,

A sense of rapport and a feeling of comfort are necessary for learning to take place. Especially when it comes to non-visitors, like these children, it is important to make them feel welcomed, trusted and at ease in this learning environment. I mean, that way we are at least giving them the chance for a happy experience. I like to let their teachers deal with disciplining them (Pre-interview, Alex).

Several observations provided evidence, confirmed in the post-interviews, as to the way Alex translated this element of his personal theory into practice. Firstly, it was observed that Alex used empowering language, which conveyed trust in learners and gave them an element of choice about their behaviour, as in these examples,

“Can you please put your hand up if you promise not to run when exploring the museum?”

“I believe you can be sensible,” and

“Who will commit to doing that? It’s up to you. We now have a contract. I am glad I can trust you.” (Observation 1-3, Alex).

In the post-interview, when Alex was asked about these episodes he confirmed that he used these phrases as a purposeful way of developing rapport with learners. Alex explained that through these phrases he gave children the chance to choose their behaviour. Trust, was for Alex key in creating rapport. Alex said,

When learners are trusted...they usually respect that and feel encouraged. That way I can concentrate on learning and engaging children with the objects. Beforehand, I had to find a way to tell them ‘You must not do this. We need to be able to trust’, but I did it, I think, in a more inclusive way of ‘Do you want to go out into the museum? Can you be sensible? Will you commit to doing that?’ They know they have the choice to follow the trust I show them and enjoy the day and achieve or

misbehave and create a painful and negative experience for everyone (Post-interview 2, Alex).

Secondly, the use of learners' names was another practice used by Alex to facilitate rapport. It was observed that Alex always memorised students' names. When Alex was asked about this observed practice in a post-interview, he confirmed that it was a useful trick to create a sense of closeness with learners. In his own words,

So, this morning, I told Sarah, 'Oh I know your name,' and she said, 'You don't know my name,' and I said, 'Yes I do, it's Sarah,' and she just lit up. She felt at ease. It shows them you care a little bit more. It is a useful gimmick to build a connection with them (Post-interview 4, Alex).

Thirdly, observations showed that Alex's facial expressions and tone of voice typically conveyed warmth towards the learners; for example, a joyful tone in his voice, enthusiastic facial expressions, and smiling. Observations showed that Alex typically welcomed learners and encouraged them to come back at the start and end of every session. The next example is taken from the start of the session. Alex said,

It is so nice to be seeing you all again. Welcome to the museum! This is your museum as well and we are very happy to have you here. When we came to your classroom you were excellent with handling objects and figuring things out about them. I am looking forward to showing you around (Observation 3, Alex).

A typical closing example consisted of thanking the students for attending, praising them for their performance, and stressing that they were welcome to return. "I want to stress that we loved having you here, thank you for doing so well. You can

come back any time you want. You did well. And tell your parents they can come too, we are free and we are also open on Sunday” (Observation 3, Alex).

In the post-interviews, in reference to both cases, Alex explained that important features of his teaching were building closeness with learners to enhance their learning, triggering future visits by stressing that they can come anytime, and by making them feel like part of the museum community. His response indicates that his views are in line with the priorities set in this museum. Alex said,

It’s important to make children feel welcomed in the museum and base our relationship with them on that sense of closeness. These children come from difficult areas [with residents that] typically do not visit the museum. That is also a goal of this programme in this museum. To make them feel that this is also their museum, they can come anytime they want (Post-interview 3, Alex).

There were a few episodes where individual learners misbehaved. He was observed giving them a choice to choose their behaviour. The first episode was when students were ignoring their schoolteacher’s effort to prevent them from bringing food into the museum. The author’s notes recount what happened.

The students came back from their lunch break. Some of them were very rowdy and their schoolteacher was shouting at them, trying to keep them under control. However, he was not successful in doing so and students brought their food into the museum. Alex blocked the entrance and firmly told the students to leave their food in their bags. He tapped his hand on the wall several times to get students’ attention. He [repeatedly] told them it was their choice whether they wanted to calm down and enter the museum or stay in the corridor (Observation 3, Alex).

During the post-interview, Alex explained that to preserve a positive learning environment it was best to leave it to the teachers to deal with discipline as they had more knowledge of the children's backgrounds. Researchers such as Tran (2004) and King (2009) have reported similar findings with regard to museum educators teaching school children. However, he admitted that contextual circumstances, such as the schoolteacher's ability to keep a class under control, forced him on occasion to set limits to individual students to ensure a positive learning environment. He affirmed that this practice mirrored the element of his personal theory about positivity because, despite being firm, he gave learners the choice to decide whether they wanted to comply with behaving correctly. He explained that this was a means to maintain order, which in his opinion was a prerequisite for a positive learning environment. This is in contrast with literature suggesting that artist educators value a less disciplined and more egalitarian learning environment in museums (Pringle, 2008). This could suggest that the professional background of museum educators, and possibly the museum context, might account for differences in the conceptualisation of how a positive learning environment in museums is created. Alex said,

I don't want to be disciplining children and create a negative atmosphere and one of unfairness. That is their teacher's responsibility. With children from difficult backgrounds there are usually underlying emotional reasons that cause them to misbehave. Anything can trigger their behaviour... But if their teacher or teacher assistant cannot handle that, then I need to set some limits... Otherwise this behaviour and absence of order will prevent the whole class from learning and feeling happy... Like today, I'm not sure the teacher today did us many favours... so I had to try and fix the situation. If they were being silly as they came in, I made them stand there. I didn't say, 'You're not going to go around the museum', I just

made them stand there until I felt that they had calmed down a bit. I was firm but I gave them a choice. So, if teachers cannot handle them, then their behaviour is worked out through negotiation (Post-interview 3, Alex).

Other episodes observed suggested that Alex might occasionally be firmer than he initially suggested in his pre-interview. During one episode, a student kept touching museum items on the wall, spoke over Alex, and did not follow instructions to walk quietly up the stairs in an orderly manner. Alex was observed telling-off the learner and saying that if he continuously misbehaved it would have consequences for the whole class. However, he did not act upon it. The following description of the event is taken from the author's field notes.

Ahmet is very active and keeps on misbehaving. He runs his finger over the walls, which have objects and pictures, and jumps on the stairs. When Alex told him that if he touched any real museum object then the whole class would not be allowed to visit the museum experts in the conservation department, Ahmet [defied him and] touched the pictures on the wall. But Alex pretended he did not see that and did not react. Ahmet continued jumping on the stairs but did not touch any museum object again. He just quietly followed the rest of the class up the stairs (Observation 3, Alex).

During post-interviews, Alex was asked to explain the reasons behind reprimanding this learner and using what appeared to be as firm language. Alex referred to his conceptualisation of a positive learning environment as one that is disciplined and ordered. He explained that individual children often want to test limits to gauge what they can and cannot do, therefore it is very important to set limits with difficult children, especially when the schoolteachers are not present and the positive

experience of the whole class is at stake. He explained that his threat was hollow and confessed that he pretended he did not see Ahmet misbehave for a second time because he used a practice called “strategic ignoring”. Using this practice as a means to facilitate a controlled environment echoes research in school pedagogy (Herschell et al., 2002). Analysis showed that ultimately Alex thought this was to the benefit of Ahmet’s learning and did not want one learner’s bad behaviour to ruin a positive and fair learning environment for the whole class. He said,

Children often like to test your limits. So, you need to set expectations and be firm... Sometimes the best thing is to say something but not to react too much, this is called strategic ignoring... So, with Ahmet I pretended I did not see him touching that picture again...this was a way to help him engage with learning again... I didn’t want to make an issue of that to the other kids. That creates a feeling of unfairness amongst the kids and you want to avoid that... You want to maintain a positive vibe for all the children. So, I chose to deal with it in that way, as the teachers were not there (Post-interview 3, Alex).

This part of the subsection relevant to creating a positive learning environment discussed Alex’s element of his personal theory relative to cultivating rapport with learners and maintaining order. Analysis showed there were various observed practices which reflected this element of his personal theory. Analysis of subsequent post-interviews showed that external factors such as a schoolteacher’s ability to manage learner behaviour, or the absence of a schoolteacher, influenced the way Alex translated his personal theory relative to a positive learning environment –either through rapport or setting limits- into practice. Nonetheless both measures were consistent with Alex’s conceptualisation of a positive learning environment.

4.3.3.2 Characteristics of a positive learning environment: Stress-free experience

This subsection focuses on Alex's element of his personal theory about cultivating a stress-free experience to facilitate a positive learning environment. Alex used the practices of: i) familiarising children with the layout of the museum; and ii) signposting the aim and content of each activity to facilitate a stress-free experience. Each one of these practices was either informed by his experience as a school or museum educator. This finding gives weight to Bevan and Xanthoudaki's (2008) assertion that the prior experiences and professional background of museum educator's influences their personal theory and practice. Observations reflected this element of his personal theory and post-interviews confirmed that guiding these practices was reducing any stress that could be provoked in learners by an unfamiliar environment or strange learning situations.

During his pre-interview, Alex explained that facilitating a stress-free experience was key to cultivating a positive learning environment. He said,

Behavioural research shows that human beings feel very uncertain if they don't know what's going to happen. People like to have a structure and they like to know what that structure is. Not knowing what is happening can be a stressful experience... That is especially the case with museums because they can be intimidating, huge spaces due to their architecture. You need to familiarise children with the space if you want them to feel good and learn (Pre-interview, Alex).

Observations confirmed that the element of his personal theory of familiarising learners with the museum noted in Alex's pre-interview was used in his teaching. Alex was observed orienting students in the museum at the start of each

presentation. Typically, he explained the layout of the museum and highlighted key aspects of museum space. He would say,

All the things are from around the world – all the animals, plants and rocks and insects and birds and dinosaurs and rocks and fossils. [This] is a museum about people. Every single object in here has been made by people to be used. So, the top floor is weapons, armour, hunting... This floor that we're on has toys and games... anything from mirrors to changing the state of your skull, body piercing, tattooing, all that kind of thing. The toilets are at the back and the exit is here (points to the front) (Observation 4, Alex).

In the post-interviews, when Alex was asked about this episode he said that students needed to be orientated to the museum space because, although museums are exciting, based on his experience as a museum educator they can also be daunting due to their architecture. Children need to feel familiar with a space if they are going to enjoy their experience. Tran (2004) has reported similar findings with regard to museum educators teaching school children. He said,

It's important to explain the geography of the museum. Museums can be overwhelming spaces. That [orientation] makes them [learners] have a sense of control over the space and feel more comfortable (Post-interview 4, Alex).

Part of Alex's repertoire of practices used to create a stress-free environment was signposting the content and aim of the activity as well as providing the rationale behind it. The following is an example:

We're going to start by getting you collecting objects. We're going to be doing an archaeological dig... Then you're going to document the objects – that means we examine the object,

because that is what real archaeologists do. Then we're going to go behind the scenes and we're going to meet Darren, a very special person. He came to work here when he was a student like you. Then we're going to research objects. You'll be taking real museum objects and you're going to be finding similar things around the museum. You'll be using the analysis skills you just tried out. Then you're going to go back to school and hopefully over the next couple of weeks you're going to make a very simple museum in your classroom about who you are, using all the skills you learn today (Observation 4, Alex).

During the post-interview, Alex explained that signposting was used to help children feel in control of their learning to create a stress-free experience. It became evident that using this practice was influenced by his experience as a schoolteacher and his knowledge of what constitutes best practice. He said,

I always explain the aims and objectives and explain how each was useful. I don't say, 'Lewis, go and do this,' and then when Lewis asks 'Why?' say, 'Because I told you so.' You should explain why you want them to do it and what they will do... because they feel in control... This is widely used in schools and it's considered a good practice (Post-interview 4, Alex).

This part of the subsection relevant to creating a positive learning environment presented Alex's element of his personal theory of cultivating a positive learning environment to support a stress-free experience. Analysis showed that Alex could readily explain in his pre-interview what he did to translate this element of his personal theory into practice. He explained that he familiarised learners with the geography of the museum at the start of his presentations to help them enjoy the experience. Observations suggested that he used signposting to the same end. Post-

interviews provided further insight into Alex's personal theory and revealed that his experience as a schoolteacher influenced what he considered to be best practice in museum education.

The following part of this subsection concludes the discussion on Alex's element of his personal theory about cultivating a positive learning environment to support learning in the museum. It discusses how cultivating interest and enthusiasm serve this purpose and what practices are used to accomplish that in practice.

4.3.3.3 Characteristics of a positive learning environment: Interest and enthusiasm

This section relevant to creating a positive learning environment focuses on Alex's element of his personal theory about cultivating students' interest within a positive learning environment. A few ways of achieving this were observed. These included: i) using real museum objects; ii) modelling enthusiasm; iii) using role-play and framing activities as games; and iv) using praise and positive feedback. These ways of achieving a positive learning environment echo research on teaching and learning (Babkie, 2006; Bucalos and Lingo, 2005; Epstein, 2005; Grossman et al., 2004; Herschell et al., 2002; Kern and Manz, 2004). In particular, using museum objects and "play" as "hooks" to involve children in learning is in line with research in museum education (Csikszentmihalyi and Hermanson, 1999; Hooper-Greenhill, 2007b). Post-interviews confirmed that using these practices to cultivate student interest and enthusiasm was embedded in Alex's personal theory.

During his pre-interview, Alex connected cultivating student interest and enthusiasm with the facilitation of a positive learning environment in the museum. In Alex's words,

Cultivating children's interest is the number one priority of museum education, because it creates a very positive learning experience. The aim of a museum trip is to create the enthusiasm that sow the seeds for future learning (Pre-interview, Alex).

During the pre-interview when Alex was asked to expand on the way in which he manages learners' interest, he noted two practices: the use of real objects and modelling enthusiasm. Regarding the first practice he said,

Museums are exciting and novel places for children. So, objects are jumping-off points for a lot of things. We're using them to get children enthusiastic about the museum, trying to get them interested about learning (Pre-interview, Alex).

Several observations confirmed that Alex used museum objects in every activity and that he stressed the fact that objects used in the activities were real. It was observed that this generated great interest in the children as demonstrated by their questioning, in the example below, from an activity where children were standing in front of a "mock dig" – a box filled with sand that contained a skeleton and many authentic museum objects. They were asked to discover the identity of the artefacts and the story behind this dig.

Alex: It's going to be a real archaeological dig, as in, you're going to be digging up real museum objects. Some of the things you dig up will be hundreds of years old, so that's another reason for being careful with them. What you've got to do as a team of archaeologists is get all this sand out of the dig, or as much of it as you can, without moving anything that's in here. Just have a look, is there anything that you recognise in here? What's this thing up at the top?

Child: Wow, this is a fossil! Is it real?

Alex: Yes, it is. Museums have real objects, that's what is nice about museums.

Child: How old is it?

Alex: A million years old.

Child: Where did you find it? (Observation 3, Alex).

During post-interviews, Alex was asked to explain his thinking behind such episodes. He explained that based on his experience with children in the museum the elements of novelty and authenticity made real museum objects interesting. Despite the authenticity of objects in stimulating learner interest being disputed in museum education (Meecham, 2016), the importance of experiential learning offered by museum objects is highlighted by researchers such as Hooper-Greenhill (2007b) who argues that "learning can occur through different encounters. Arguably the most important is a real encounter in a real space with real things" (p.36). Alex said,

Children are always interested in knowing if an object is real. There is something about the authenticity and novelty of the objects that is very attractive to them. I play on that to grab their attention. In general, our strength is these buildings and the 'stuff' in them. That should always be the starting and finishing point for learning and motivating learners (Post-interview 3, Alex).

Alex explained in his pre-interview that he encouraged learners' interest by modelling a positive and enthusiastic attitude towards learning. This finding mirrors the concept of "motivational teaching" (Xohellis, 1997) and Free-Time pedagogy in museum education literature, which encompass a view of learning through catering to motivation and curiosity (Falk and Dierking, 2002). Alex contended,

I like to lead by example, because I not only help someone understand what the right way of doing something is, but also hopefully inspire them with my enthusiasm to want to do it (Pre-interview, Alex).

Observations showed that Alex typically used energetic body language such as vivid gestures, facial expressions, drama in his voice, and modelling to highlight an activity.

Alex: What is this? (points at object)

Child: Wood.

Alex: It has a smell, so we're going to use smell. What else are we going to use?

Child: Sight.

Alex: Sight, so looking at things, lots of details on this piece of wood. (He looks closely at the object while speaking and points towards the designs on the wood.)

Child: Hearing.

Alex: Hearing, they might make a noise. (He knocks on the object) Smell, hearing, sight.

Child: Feeling.

Alex: Absolutely, touch, feeling, smelling and one more? (Mimics touching the object, feeling it and smelling it while saying these senses out loud) Is that all of them? So, looking, feeling, smelling but not eating. (Dramatic and humorous emphasis).

(Observation 4, Alex)

During post-interviews, Alex was asked about the above episode. He explained it in terms of his personal theory about how students' interest is cultivated when adults modelled enabling sentiments. Children often learn by emulating adults especially if communications are presented in an engaging way. Alex said,

If they see me doing this and that with the objects, showing them how using senses translates into practice, they'll hopefully copy me and do that as well. Children usually copy adults with great interest... I like to convey enthusiasm with body language... A huge amount of communication is non-verbal (Post-interview 4, Alex).

During the pre-interview, when Alex was expanding on the element of his personal theory about gaining learners' interest, he mentioned that embedded in his personal theory was capitalising on the interests typical for an age group. He said,

Children are special interest groups. In this programme, you need to create an interest in something that sometimes children consider boring... To engage them you need to use things that are cool or are valued by that age group (Pre-interview, Alex).

During observations with the participants of Programme 1 – primary school learners – Alex framed activities as games. Analysis showed that this was the third practice he used to cultivate learners' interest and enthusiasm. This is in line with Hooper-Greenhill (1999) who posits that practices encouraging play promote learners' active engagement and interest. Excerpts from the introduction of the “What Is It?” activity and the “Mock Dig” activity are provided to illustrate Alex's practice. During the first episode, Alex framed the enquiry activity as a game. He said,

Over the next half an hour we're going to play a game. Around this space are seven objects. The objects are in boxes and there's a sheet of paper with possible answers, and a pencil. We're going to play a mystery object game. So, it's going to get you thinking about how we learn from objects. So, when you do the dig, you'll do the project in about half an hour, [because] you'll have all the skills necessary to do it. This is the same things [we had] you doing in your classroom last week, but it's a different kind of game (Observation 2, Alex).

During the second episode, in his introduction to the "Mock Dig" activity, Alex referred to the activity as a game and invited learners to participate in archaeologist role-playing. Data from observations reveal his technique:

This is where the real project starts... You will do what real archaeologists do. I will not be Alex anymore but an angry builder who was stopped digging on this site because some artefacts were found in the ground. I will give you 10 minutes to do this. It's hot outside and my men are anxious. I know nothing, you are the expert archaeologists who will dig and solve a mystery (Observation 2, Alex).

During post-interviews, Alex was asked to explain the reasons behind this role-play. His response confirmed that these practices were consistent with his personal theory.

Children have interests; you always must change things to suit them and get them interested in the activity. We know from our experience that children of this age like playing role-plays and solving mysteries. So then, these act as "carrots" to engage them in the analysis process (Post-interview 2, Alex).

It was observed that Alex used praise to encourage and interest learners. One episode is provided to evidence this point. It is taken from the end of the “What is it?” activity and is typical of how Alex praised the whole class for their performance in an activity.

Child: This object could be used as a rolling pin?

Alex: If you used it as a rolling pin...

Child: The food would be all tangy.

Alex: It would, absolutely, yes, that’s right. Well spotted.

Before moving on to check the answers I want to say that I was impressed [by] all of you. You were asking many questions, using your senses, discussing with each other and you were willing to be open to different answers.

(Observation 2, Alex).

During post-interviews when Alex was asked about this episode he explained that praising learners was used to engage them with the activities through positive reinforcement. He stressed that praise motivated learners because it provided them with recognition. He said,

Praising children is a way to provide positive reinforcement. It’s a way of showing that you recognise their effort and that makes them see you in a positive light and [they] want to try to do even better. Telling children, they are doing well goes a long way (Post-interview 2, Alex).

This part of the subsection relevant to creating a positive learning environment argued that cultivating learner’s interest and enthusiasm to support their learning was an element of Alex’s personal theory. This section also provided evidence that there was congruence between Alex’s personal theory and practices observed. Lastly, this

section showed that Alex could explain all his practices in terms of his personal theory and provided additional information about the practices he chose when prompted by during post-interviews.

CHAPTER FIVE: CASE STUDY TWO

BRIDGET

5.1 Introduction

This chapter presents the case study of Bridget, a museum educator for primary school children in the education department of a humanities museum in a university city in the United Kingdom. It presents Bridget's background and a brief commentary on her profession, the museum she works in, and how it impacts on her teaching. The context of the programme studied and the museum it took place in are in Appendix A.

Three key points emerge from this case study. The first is that Bridget's personal theory of teaching is based on three elements: i) the first concerns knowledge; that it is fluid and fixed; ii) the second is about learning; to encourage learners to cultivate analytical thinking skills, meaning making, and a perception of learners as individuals with varying abilities and characteristics; iii) the third concerns the development of a positive learning environment that satisfies learners' needs, encourages order and engages children in a way that provokes enthusiasm.

A second point, is that even though in many cases Bridget's practice mirrors her personal theory, there are episodes where the teaching context and her knowledge of the collection limit the full translation of her personal theory into practice.

A third, is that Bridget's personal theory is influenced by the discipline of the museum she teaches in, her experience as a museum educator in a university museum coupled with her background as a school teacher, both of which align with the

pedagogical approach that characterise this university museum and its management. This seems to enable the translation of her personal theory into practice.

5.2 Profile of a museum educator and the museum she works in

5.2.1. Bridget's background

Bridget has worked as an educational officer at a humanities university museum for ten years. Museum education beckoned during a gap year prior to her Postgraduate Certificate in Education (PGCE) when she worked for a museum in a United Kingdom town. After finishing her PGCE, she continued to volunteer at the same museum while she taught English language and literature at a school for five years. She studied part-time for a Master of Art in Museums and Galleries in Education at the Institute of Education in London. After she graduated, she pursued work in a museum because of the gratification she enjoys when working with visitors and objects. "I like the challenge of enthusing typical non-visitors to use the museum and to encourage them to make a connection with the objects in the museum" (Pre-interview, Bridget).

5.2.2 Bridget's view on the nature of her profession and the museum she works in

Bridget believes the educational nature of museums allow more freedom "to teach in creative ways" that are "less standardised" (Pre-interview, Bridget). Tran (2004) and Castle (2001) reported similar findings in their studies of museum educators. She said,

I like the freedom that museum education offers. There's a lot more freedom than having to teach to a curriculum for exams.

I taught a lot of exam classes before I came into museum education (Pre-interview, Bridget).

Bridget explained that museum education is not a profession regulated by external bodies, nor accountable to governmental inspections. She explained that the pedagogical orientation of this museum was aligned with her views on museum education. Bridget explained that as a result she had the freedom to translate her personal theory into practice. This is in line with Leatham (2002) and Mansour (2013) who argue that alignment between an educator's personal theory and the pedagogical approach of the teaching context he works in enables his ability to translate his personal theory into practice. She said,

In schools, they must tick off objectives every week. They're Hofstede's (Office for Standards in Education), we're not OFSTED'ed. So, they [school teachers] are much more target- or learning-objective driven. In this museum, I am given the freedom to design and deliver programmes the way I choose. However, these must be approved by the education department [of the museum] ...this is rarely, if ever, problematic because this museum's vision of teaching and learning is very close to my philosophy of teaching (Pre-interview, Bridget).

This section presents her professional background, and rationale for choosing this profession as ways to understand Bridget's identity as a professional museum educator. In the section that follows, the themes that emerged from the analysis of the interviews with, and observations of, Bridget are presented to answer the research questions posed by this study, *How, in a university museum, do museum educators' personal theories of learning relate to their educational practices?*

5.3 Introduction to Bridget's personal theory of teaching and practice

This section presents Bridget's personal theory and practices. Information on factors that appear to influence her personal theory of teaching are provided (e.g. her background as a school teacher and museum educator in the humanities university museum sampled in this study). Indeed as other researchers have shown (Borg, 2003; Drageset, 2010; Forrester, 2008; Leatham, 2006; Martin, 2008; Stemhagen, 2011) an educators' professional background and experience influence their personal theory and are key to understanding how their personal theory relates to practice. It illustrates the relationship between elements of Bridget's personal theory and practices considering the teaching context of the museum she works in. Each section focuses on one element of her personal theory voiced throughout her pre- and post-interviews and draws on Bridget's observed practices to discuss the relationship between the two. Analysis reveals that Bridget's personal theory is based on her informed views about: i) the nature of knowledge; ii) learning and teaching of enquiry skills as well as learners; and iii) cultivating a positive learning environment. These are discussed below.

5.3.1 The nature and production of knowledge in museum education and practices

In the subsection that follows, Bridget's element of her personal theory concerning the nature and production of knowledge in museum education, and humanities-oriented museums, is presented. Bridget says, knowledge is something that is not fixed; it is produced through enquiry and personal meaning-making. She argues that this translates to an emphasis on the learning process rather than focusing on the outcome of the enquiry. However, Bridget explains that integral to her understanding of historical enquiry is the view that knowledge can also be fixed.

Bridget's understanding of the nature of knowledge is in line with a criterialist approach to knowledge according to which historical knowledge is based on evidence and developed through arguments used to construct multiple interpretations (Voet and De Wever, 2014). She asserts that this is necessary for the learner's personal evidence-based interpretations of objects during analysis. It is argued that this element of her personal theory is reflected in her practices.

Bridget also recognises in her post-interviews that despite her intention to follow her personal theory and encourage persistence with enquiries, sometimes during activities where learners identify an object, factors such as time available and her knowledge of the collection see her resort to cutting the enquiry process and providing hints or giving the correct answer. This findings mirrors extensive research on teachers (Bennett et al., 1997, Leatham, 2006; Mansour, 2013), where the teaching environment and knowledge of teachers were found to constrain the teachers' ability to enact elements of their personal theories.

Bridget expressed in her pre-interview, the element of her personal theory that knowledge in history, "is not an objective, externally given truth" (Pre-interview, Bridget) that should be transmitted to learners. She said that knowledge in the humanities is, "a quest that has as an aim understanding and personally making sense of the world around us" (Pre-interview, Bridget). She provided an example from the programme:

In history and, in general, the humanities in my experience, that [outcome of historical analysis] is mostly achieved through questioning and accumulation of evidence that can be used to interpret and make sense of information. That's why when discussing who the person might be, at the end of the

session I allow for plurality of interpretation – if it can be supported by evidence (Pre-interview, Bridget).

Data from observations confirm that Bridget supported the development of the learners' personal interpretations based on evidence, while challenging interpretations that were not supported by facts. A typical example of the way Bridget facilitated the learner's "quest" for knowledge is illustrated in the dialogue below. Learners were asked to share with the class information they had on objects and were called to "puzzle" the information together and create "the story" behind the person who used them.

Bridget: Okay, museum experts. You've now done all your work. It's like a jigsaw puzzle. Each person will give information on their objects and we puzzle things together to create the story of the person buried here. What I want to know is the evidence to your reason. Who wants to start first?

Child 1: We found out this is a comb from Sub-Saharan Africa.

Bridget: Well done girls, that was good research. Now, I want to hear, what Suban's group found out. What does this object tell you? (Pointing at the object the next group was carrying in their box).

Child 2: He is from Africa.

Bridget: What made you say that?

Child 2: This is an amulet that can be found in Africa.

Bridget: Well done! I like your thinking. The evidence is building up.

Child 3: This is a lion's tooth from Zaire.

Bridget: Hmm, where is Zaire?

Child 3: Africa.

Bridget: So, we have a comb that is from Sub-Saharan Africa, an amulet that could be from Africa, and a lion's tooth from Africa. Maybe this person is from Africa. What kind of a person has lion's teeth near them?

Child 3: A poacher. Maybe he lives in Africa and hunts wild animals?

Bridget: These are some good ideas. I loved your story of this person being a hunter of wild animals, till you had no evidence. We don't know about him stealing from other people. We don't have any evidence of that. What is this?
(Points at another object.)

Child 4: It is a horse leg.

Bridget: Where do we find horses?

Child 5: England.

Bridget: You are right; horses live in England. But also, horses live around the world. What was a horse doing there?

Child 4: Maybe he had a friend who was a pony, so when he died they buried him with him.

Bridget: Interesting thinking. So maybe he is from Africa, maybe from England. Perhaps he was a poacher or a traveller who rode a horse. I'm impressed you put together the information you gathered.

(Observation 2, Bridget).

When Bridget was asked about this episode her explanation echoed the element of her personal theory voiced in pre-interviews that knowledge is a “quest” based on evidence without a fixed outcome. She reiterated the importance of an “open-ended discussion... to construct meaning,” even though she admitted that elements of didactic teaching are present in her teaching. This element of her personal theory seems to be influenced by her view of learning regardless of the educational context it takes place in, as well as her view of learning in the humanities. This finding mirrors extensive research among teachers, where it was found that subject matter influences a teacher's epistemological conceptions and viewpoints on the nature of student learning (Cobb, 2002; Grossman et al., 1989; Hofer, 2000; Kagan, 1992; Leatham, 2006; Olafson and Schraw, 2006; Tsai 2002). Bridget said,

Museum teaching has the privilege of being less didactic than teaching in schools... elements of that can be found in museum teaching- especially when you teach school programmes in this museum... Even though in general terms, learning is learning regardless from where it takes place... it tends to be more about the process of learning and construction of meaning... That is especially the case with liberal arts and humanities... It favours open-ended discussion

and problem-solving. Finding the right answer hasn't been the key aim, has it? Because as you saw, they come back after their research at the end of a dig and they think that huge bone belongs to a dainty little pony when it's quite clearly not. But it's what they've discovered from their research and if they can argue their case (i.e. use evidence they have collected throughout the day) that is okay (Post-interview, 2).

Despite most observations reflecting Bridget's element of her personal theory relative to facilitating inquiries, there were a few cases – when learners had to identify objects – where Bridget gave the answer after two failed attempts to prompt further thinking:

Bridget: What did you find out about this object? What is it?

Child 1: We don't know.

Bridget: Look if any of the patterns are like objects you see in the displays. The patterns should help you find out what it is.

(After 10 minutes, the same group returns).

Child 1: It's from India!

Bridget: How do you know?

Child 2: From the patterns.

Bridget: I wonder if other objects have this exact pattern (points at the object) that looked more like these. Did you find objects that had these patterns?

(Long pause)

Bridget: Okay guys, we have three minutes left. It's a comb and has African patterns on them. Please pack your things and come back here so we can get a move on.

(Observation 3, Bridget).

This practice of giving the correct answer initially appeared contradictory to Bridget's personal theory, expressed in her pre-interview and some post-interviews that telling children the answer was not her focus. Also, this seemed at odds with the element of her personal theory relative to the nature of knowledge expressed in her pre-interview – that knowledge is not something fixed. When Bridget was asked, she explained that the analysis of information is prioritised in her teaching, but she would not accept answers that were incorrect during activities focusing on the identification of objects. Bridget elaborated on her view on the nature of knowledge during her post-interview and explained that the nature of knowledge in history when it concerns information is fixed, because interpretations of objects, should be based on evidence.

She explained that she tries to encourage learners not to “go off on flights of fantasy,” when the activity pertains factual knowledge during the earlier stages of analysis; however, she explained that there were limits to this. She said she found it challenging to help unresponsive learners further their analytical thinking process about objects from the natural science museum when time was limited. This reflects Fives and Buehl's (2012) arguments that personal factors such as the educator's subject-related knowledge may hinder the enactment of an element in a personal theory, contributing to the lack of relation between teachers' personal theory and practice. Bridget said,

I try to encourage them, but sometimes they come up with answers that are not based on evidence during identification of

objects... Objects have an identity and I consider this type of knowledge as fixed. If I have done all I could to facilitate their enquiry during this activity, asked all the questions and they're still saying the wrong thing, then I might give out the answer or suggest what is right. I leave it up to them to take the hint or not. I also find it hard to argue and concentrate on the process because of time... It's not always just about the kids... I am more comfortable with my objects, so when in this programme we use objects from other collections, that I don't know as well, I find it challenging to think on my feet about the responses children give and how to further help them with their analysis (Post-interview 3, Bridget).

Knowledge in this context of teaching for Bridget is the result of analysis based on evidence. This element of her personal theory was reflected in most of Bridget's practices. She insisted on open-ended discussions and the use of evidence. For Bridget, the nature of knowledge was fluid as well as fixed under some circumstances, depending on the stage of historical analysis the children were at. It became clear in the post-interviews that when the aim of the activity was to identify objects, Bridget viewed facts as fixed. When the aim of the activity was to interpret objects, Bridget's view on knowledge was fluid.

5.3.2 The nature of learning in museum education and practices

In the subsection that follows, Bridget's element of her personal theory concerning learning in humanities museums as a process of honing analytical thinking skills and the construction of meaning is presented. This element of her personal theory is nuanced, the details of which were explained throughout post-interviews. The information accumulated from the post-interviews helped puzzle together aspects of Bridget's personal theory in humanities museums.

Bridget emphasised in her pre-interview that her perception of learning in humanities museums is based on a broader element of her personal theory, that a teacher's obligation is to facilitate learners' "analytical skills" so that learners can better make sense of the world and construct personal meaning. This understanding of learning as "constructing personal understanding" (Tsai, 2002, p.775) mirrors a constructivist orientation to learning. She explained that was particularly the case with teaching humanities subjects. This finding resonates with Castle's (2001) research on museum educators' personal theories relative to learning in humanities museums. Drawing on her teaching experience of teaching in schools and in this museum, she said,

Children need to learn how to be inquisitive, analyse, construct meaning and ask questions... This is a learning aim in the humanities and in this museum...I used to teach in schools and... a teacher, I think, should always try to develop the children's thinking and questioning skills. Taking [children] out of the classroom makes the learning experience different, but it's learning. Learning goes on in both contexts. I don't think that the education that happens in a museum is necessarily different from that in a classroom. Learning is about analytical skills, isn't it? The difference is that we engineer them around a different space, with lots of objects. The way this is applied in museum teaching is helping children learn how to find things about objects – what questions they can ask and get them to think about things. Learning is a process of trying to understand the world, in this case, what objects can reveal about the world ...and how to make sense of them (Pre-interview, Bridget).

The following subsections relevant to learning discuss Bridget's personal theory with regards to the way her view of learning is put into practice.

5.3.2.1 Practices that build the ability to ask the right questions

In this part of the subsection relevant to learning, it is argued that Bridget's personal theory highlights the importance of honing learners' analytical thinking skills by using questions refined by her experience of what works best with children.

This view that meaning making and analytical thinking skills are facilitated through questions is in line with an enquiry orientation to learning (Hein, 2002; Hutchings, 2007; Voet and De Wever, 2014). Bridget said,

When years ago, I first taught this programme, there were some questions passed down to me. Some of these questions were like the ones I used when I taught at school...so it came naturally for me to use them...I am building up an ability to ask the right questions... I have taught this programme so many times that I know which ones get a good response from children and which don't. I have refined the questions and vary them according to what works best...with historical enquiry and analytical thinking (Pre-interview, Bridget).

During her pre-interview Bridget, did not find it easy to be precise about the way she varied questions. It was during the post-interviews, where observed episodes were used to prompt her teaching rationale, that, she could talk about the nuances of her personal theory underlying her practices and on occasion referred to other factors that influenced her practice.

In the following subsection, relevant to learning, Bridget's element of her personal theory, articulated in pre- and post-interviews, of four practices regarding the use of analytical or enquiry skills in museum education are discussed. These practices were: i) modeling questions based on a "hands on" and "minds on" approach; ii) prompting reasoning skills by asking learners to justify their claims; iii) considering learners' knowledge, experience and understanding to develop enquiry skills; and iv)

differentiating practices to suit learners' abilities, developmental stage and learning style.

5.3.2.2 Modelling questions based on an active learner approach

This subsection focuses on Bridget's personal theory that enquiry is facilitated by questions based on a hands-on approach (the use of senses and object handling to facilitate enquiry) and a minds-on approach (analytical thinking based on information derived from the senses). This touches upon the well-established notion in the museum pedagogy and experiential learning literature that activities that involve the mind as well as the senses facilitate learning (Duckworth et al., 1990). Observations showed that her practice was consistent with this element of her personal theory.

Data from the pre-interview showed that Bridget specified that historical enquiry in museums requires asking questions, often modelled by museum educators themselves first, that help incorporate sensory information to identify an object. She said,

The educators will look at an object and they will ask a series of questions to help the children see what they can find out from looking at the object. This is a main drive that we have...taking objects, using senses and asking questions to see what the children can find out from touching and looking at the object... So, that is, what historical enquiry entails in museums. Like in the start of the "What Is It?" game, you're modelling what they can ask, how to use their senses and problem-solving skills, and trying to get them to think about things and how they can find out the identity of objects. So, modelling questioning techniques, is a way to cultivate their analytical thinking skills (Pre-interview, Bridget).

Data from observations showed that there was a broad pattern that Bridget followed when introducing questions about objects in the initial stages of analysis. The principle was asking questions that could be answered by touching and looking at an object. Typically, she first asked children what senses could be used to explore objects, and then asked what each characteristic of an object signifies about the identity and its use. During her post-interview, Bridget emphasised that the questions she used were meant to model what can be asked of objects and how senses can be used. She said,

Sometimes you want to steer children and model the best ways of looking at an object and maybe they will take that and they will apply it to another object. I would probably follow that when modelling this process at the start of the session and sometimes to individual groups. It's getting them to handle objects, getting them to handle them appropriately and beginning to see that if you ask questions of objects, you know, you can find out all this information. Reminding them that you can use your senses to find out things about the world. You would start with what senses can show you about an object. If you asked a question, 'What is this made of?' and they give you a completely wrong answer, you would ask them, 'Well why do you think that?' Then you would look at the properties of it and say, 'Well, do you think wood is that bendy?' Or something like that. Or 'Does it smell like that, or could it be something like that?' You would just encourage them to think of something else, guide them towards it (Post-interview 2, Bridget).

Bridget's element of her personal theory about modelling questions was explored. The element of her personal theory emphasises asking questions to help

learners understand how the senses can uncover information about objects. This leads to questions that facilitate the start of the analytical process from object handling.

5.3.2.3 Justifying claims and how this prompts reasoning skills

This part of the subsection relevant to learning focuses on Bridget's element of her personal theory that enquiry is facilitated by honing learners' reasoning skills with objects. This is in line with Rowe (2002), who said that objects function as tools that can facilitate individuals critical and analysis thinking skills. Bridget explained that she always insisted on asking children to provide evidence to support their claims, whether these were in favour of correctly identifying an object throughout the initial stages of analysis or making sense of the meaning of objects in the later stages of analysis. Most of her practices reflected this element of her personal theory.

During the pre-interview, Bridget emphasised the importance of encouraging children's exploration of evidence by asking them to justify claims they presented, and by reminding them to think about what that evidence could mean in terms of the problem they were trying to solve. Bridget linked this practice to the overall element of her personal theory of helping learners understand the right questions to ask and to provide evidence to better their enquiry skills.

I want to help pupils piece together their research and give shape to their ideas about the mystery in hand. I always ask them to explain why they answered in that way, because it's a way of encouraging children back and keeping into the line of enquiry. If you've got the ability to ask the questions you know how to find the answers. It's about the questions we encourage the children to ask (Pre-interview, Bridget).

Bridget was observed always asking children to justify their answers and prompting them to think about the significance of evidence. The episode provided below is typical of Bridget's persistent asking of learners, "why" they chose something and rejected other choices. Observations showed that regardless of the validity of the children's answers in initial stages of analysis, she elicited their explanations.

Bridget: What we're going to do is to ask you very quickly what you think the object is. We don't care if you're right or wrong. What we want to know is your reason – what's the evidence for your thinking? So, if I go to object number 1, what do you think this is and why? Yes, Bradley?

Child1: We went for prayer stick.

Bridget: Why did you think that?

Child1: Because it has a little paper inside that has a prayer on it.

Bridget: You couldn't have given a better explanation. Why is it not any of the other options though?

Child1: If it were a child's rattle it would be a bit heavy for like a 3-year-old. If it was a weapon you could probably get killed by the time you go to them.

Bridget: Why would you get killed by the time you got to them?

Child1: Because it's not very dangerous for a weapon.

Bridget: It doesn't seem very dangerous, does it? It's got a bell on it. What's the problem with having a bell on a weapon?

Child2: Too obvious to find, because you can be heard [from the] noise.

Bridget: Absolutely. If you were trying to creep up, being an assassin on somebody, and it started jingling, I think they're going to wake up, aren't they? Okay, so you are spot on; this is a prayer stick. It's a prayer wheel, from Tibet. (Observation 1, Bridget).

During the post-interview, Bridget explained that she asked children to justify their answer, because she wanted to ensure the answer was a product of rational thinking and not a random choice. If the children gave the correct answer in terms of an object's identity or characteristics, she explained that she would challenge that question so that the children would learn how to provide evidence to justify their answer. This reflects an enquiry learning approach, according to which learning is based on a continuous cycle of questions and analysis that prioritises the process of learning and critical thinking (Hutchings's, 2007). She said,

I want children to learn to be inquisitive. Asking "why" is an important question to provide evidence towards the right direction. Yes, he got the right answer, but it's interesting thinking about, well why couldn't it be the other one. I want them to think about the elimination process as well, why wouldn't it be a weapon... That is how they learn the process

of enquiry and what questions to ask themselves (Post-interview 1, Bridget).

Bridget was observed asking children to hypothesise on the meaning of objects and provide evidence throughout the whole session, even during activities which had a different primary goal. She said that she wanted to encourage children to treat activities with objects in a mindful way.

I am trying to stop them from just digging for the sake of digging and think about what is in front of them. They are still quite young children and they enjoy digging, can get absorbed by it and not think much. I want them to learn how they can use evidence (Post-interview 3, Bridget).

In this part of the subsection, Bridget's element of her personal theory about prompting learners to provide evidence and uncover their personal rationale was explored. Bridget through the post-interviews explained that prompting learners to be mindful was a necessity due to their youth. Post-interviews provided an opportunity to understand the details behind Bridget's element of her personal theory relative to learning better, especially in respect to this age group.

5.3.2.4 Prompting learners' knowledge base, experience and understanding as a means of improving enquiry skills

In this part of the subsection relevant to learning, it is argued that Bridget's personal theory highlighted the importance of using learners' "knowledge and understanding," to improve analytical thinking among learners. Observations reflected that throughout the enquiry process her questions stimulated learners to use prior knowledge to make sense of the properties observed in an object. Bridget's practices reflected this element of her personal theory.

During her pre-interview when Bridget was prompted to explain how she facilitated learners' analytical thinking, and what kind of questions she used, she explained that part of her personal theory was to use questions to, "elicit [learners'] knowledge and understanding" through an object. This was justified in terms of her personal belief of learning, that it is a "process of personal connections" between old and new experience and not the product of an "epiphanous moment." In her opinion, analytical thinking skills was about finding ways to make personal connections and construct meaning. This echoes Dewey's (1959) and Paris's (1997) argument that people learn best when new information builds on previous knowledge and experience. Bridget said,

If you just ask the kids, "Well tell me about that object? What does it tell us?" They would be a bit stumped. But if you ask them a series of questions, which elicit their knowledge and understanding of the world through that object, this will enable their understanding and help their quest about what objects can reveal about the people who make them and use them. Will you have time for the aha! moment in a museum? I think there are connections. When there is a revelation it is because they have connected something they already knew with an experience at the museum...at least that's my experience with children in this museum (Pre-interview, Bridget).

Data from observations confirm that Bridget used questions which appealed to learners' prior knowledge. This practice touches upon an established concept in museum education that visitors come to museums with "entrance narrative" about the word (Kelly, 2007) and that to learn meaningfully "a person must integrate new knowledge into his or her conceptual structure" (Jeffery-Clay, 1998, p.3). Two examples illustrate how this element of Bridget's personal theory

was put in practice. These episodes are chosen because the same questions were used several times with different groups of children. The first example is taken from the “What is it?” activity. Bridget was observed initially asking questions that children had to answer and as she progressed with the enquiry, the questions she asked elicited the learner’s prior knowledge to advance the enquiry. For example,

Bridget: Okay, difficult question. First, what is it made of?

Children: Plastic.

Child 1: Plastic and metal.

Bridget: How do you know?

Child 1: Because metal and plastic, you can tell. Plastic is hard.

Bridget: You can tell because does that bit sound the same as that bit? (knocks on the object) Yes? Could you test it any other way?

Child 2: Drop it.

Bridget: Drop it? What would happen if I whacked the plastic and the metal with an axe?

Child 3: Plastic would probably crack but the metal would be okay.

Bridget: Yes, the metal would probably dent and the plastic would crack. If we wanted to test it, we could do anything we wanted and be as destructive, what then?

Child 3: Metal does burn at a high level, so you could burn it.

Bridget: Excellent. So, metal, if we had a high temperature, this would probably melt. What would happen to the plastic? Would that need a high temperature?

Child 4: That would just catch fire.

Bridget: That would just catch fire. Do you notice anything else when plastic catches fire?

Child 5: It stinks.

Bridget: Yes, you get horrible toxic fumes from it.
(Observation 3, Bridget).

Data from the post-interviews confirm that eliciting learners' prior knowledge in most episodes observed was an intentional practice, based on Bridget's element of her personal theory expressed in her pre-interview. When asked, Bridget explained that to bring learners to an understanding of "how society works" she had to gauge their knowledge base and use it to help them understand how an object reflects norms of the society it was made in. She said,

During this episode, I was asking lots of things about what it was made of and why it's been made, so that we think about the roughness of it, the fact that its mass produced, that it's plastic, that there might be lots of the same. All these kinds of things and you start talking about how society works when you're talking about mass production. To get them to that point, I need to gauge what they already know and then use the knowledge they have around that object to help them understand the world around them (Post-interview 3, Bridget).

During the same activity, it was observed that the dialogues about a prayer stick contained questions that appealed to the learner's prior knowledge and personal experience.

Bridget: Is this made of clay or is it a fossil?

Child: (Pause).

Bridget: Serena, what do you think? Do you have a younger brother or sister? Would you give this object to a baby?

Child: No, because if my brother used that object it would hurt him.

Bridget: Why would it hurt your brother, what do babies often do with their toys?

Child: It is sharp and babies always put things in their mouths.

Bridget: Yes, you would need to be careful. So, you're using your past knowledge, well done. So, is it a charm then? What do you think? This is a process of elimination. (Observation 3, Bridget).

Hooper-Greenhill (1999, p.21) explains that objects help learners meaning making because they “act to ground abstract experiences” and ideas (Hooper-Greenhill, 2000). Bridget explained that by using their baseline knowledge and using familiar examples, learners gradually build up evidence to decode that which was previously abstract. She said,

When I asked, ‘Is it a clay or is it a fossil?’ and they didn’t answer I then asked, ‘Would it be for a baby?’ to help them use their experiences and knowledge to figure it out. Indeed, it worked. That’s why objects are great, because they allow making connections between abstract or mystery objects and our knowledge baseline through enquiry (Post-interview 3, Bridget).

This part of the subsection relevant to learning presented Bridget’s element of her personal theory about using learners’ prior knowledge and experience to further

their object enquiries and analysis. This element of her personal theory on learning is a product of connections made between old and new knowledge. Her practice confirms the importance of this element of her personal theory.

5.3.3 Different practices to suit learner ability, developmental stage and learning style

This subsection focuses on Bridget's element of her personal theory, namely that a museum educator should try to adapt practices according to the learners' abilities. Tran (2004) reported similar findings in his study of museum educators. Part of Bridget's personal theory is that learners have individual characteristics and abilities and that all students can learn and succeed. During her pre-interview, it emerged that Bridget is aware, that in practice, there are limitations, such as familiarity with her students and time which make it challenging to fully translate this element of her personal theory into practice. She uses differentiated practices according to the abilities learners' exhibit at group level, rather than individually. This provides evidence that her practice is driven by the realities of the context of museum programmes and the visiting class teaching environment. This is in line with research (Bennett et al., 1997, Leatham, 2006; Mansour, 2013) which suggests that the sociocultural context in which educators work (e.g. the museum context and the visiting class teaching environment) may pose limitations, when it comes to translating personal theories into practice.

During the pre-interview Bridget explained,

I view pupils as individuals with unique characteristics,
interests, abilities and learning levels...all equal potential...
but in the short time we see pupils, we cannot adapt to each of
their learning styles and get to know them well in the way that

a classroom teacher can. The class has some shared experiences so you can draw on these...and there are different ability groups within a class, so you can adapt practices according to the groups' abilities...even if that is not ideal it is quite realistic (Pre-interview, Bridget).

Upon reflection of observed episodes, it emerged that differentiated practices used by Bridget, were based on her perception of the abilities shared by a class. On a few occasions practices were adapted to learner's individual abilities, examples are provided below.

Observation 1:

Bridget: What can you see?

Child 1: It's got like teeth as well.

Bridget: Oh, it's got teeth, okay.

Child 2: I reckon it's a fish.

Child 2: It's a bit like rock.

Child 3: It's got; it's got...these (shows the side of the object).

Bridget: Ah, it's got those things. What's it got on the skin?

Child 1: It's like scales.

Bridget: Ah, do slugs have scales?

Child 2: No.

Bridget: I quite like your observation there; it's a good observation. Okay, I'm going to ask you to make up your minds and move to the next object.

(Observation 1, Bridget).

Observation 2: (Questions moving beyond observation)

Bridget: Okay, with this one, turn it around. Look inside it, around it.

Child 1: I can see scales and these are teeth.

Bridget: How does it feel like, what is this?

Child 1: Smooth... It's hollow. What is a pelvis? (One of the options on the worksheet).

Bridget: (Shows her pelvis). You have three choices. (Bridget points at the worksheet).

Child 2: I think it's the skull of an eagle.

Bridget: What does your skull do? (She knocks her head)

Child 2: Protects.

Bridget: You think this would? Why?

Child 1: Not really.

Bridget: So, which job does better do you think?

(Observation 2, Bridget)

When Bridget was asked about these episodes during post-interviews she explained that she would adapt sessions (for example, the number and level of questions and development of arguments) in line with the general ability of a group.

This suggests that the learning environment created was non-formal, as teaching was adapted to the learners' needs albeit to a limited extent (Rogers, 2005). For example, with regards to higher ability groups she said,

On the 'What Is It?' I asked more challenging questions or developed responses more because I could see that they [learners] could follow that. And you might challenge them

more in a higher ability group than with a lower ability group that is struggling (Post-interview 1, Bridget)

Sometimes, Bridget was observed differentiating the number of prompts and time devoted to small groups (classes were divided for some activities into groups of three) and, on rare occasions, individuals within small groups. Bridget explained that to “accommodate” the “characteristics” of learners she tried to “pick stuff up from children... such as literacy or analytical skills.” With regards to helping small groups of children she said,

I gauge whether that group can work it all out themselves, or if they’re going to need heavy prompting. I mean you do get a sense from their initial answers how much support each group is going to need. You know, some of those girls had very good literacy skills, and several of the boys had weak skills. One of them was writing the word, “Cracks” and he started it with a G, which for a year six... So, then I thought, ‘Yes, this group of boys needs a bit of support’ If they can’t manage on their own I shall devote more time to help them (Post-interview 3, Bridget).

She explained that sometimes learners have difficulties with certain activities. She attributed that to their level of skills and learning styles, and saw it as her responsibility to aid these individuals to develop skills.

It is important to notice the children’s developmental stages and their learning style preferences. And you do pick up stuff like that. Like particularly with the documentation sheet, that’s very revealing. Often somebody who’s had very good analytical skills at what is it and can work things out in his group, you suddenly realise they then have very poor literacy. So, that’s quite interesting. So developmentally, in many ways

they're quite far ahead, but the literacy skills aren't supporting it...I used to see that in schools as well and tried to address it... Then some who have very poor analytical skills, who don't sort of think widely or in a problem-solving way, they do the documentation sheet and have beautifully neat handwriting. So, it's about different learning preferences, abilities and trying to support children accordingly, isn't it? Isn't this the role of a teacher in general? (Post-interview 3, Bridget).

In this subsection, Bridget's personal theory, as expressed in her initial interview and repeated afterwards, with regards to learners' characteristics and abilities and adapting practices to suit them were discussed. Post-interviews revealed that despite aiming to differentiate on an individual level, due to limitations, Bridget often adapted her practices according to the abilities of the class or groups within the visiting class

5.3.4 Creating a positive learning environment in museum education and practices

This subsection depicts Bridget's element of her personal theory that facilitating "a positive and exciting experience in the museums" is important because it can lead to learning and a lifelong belief that museums are exciting places for learning. Studies on museum educators have shown that fostering a positive and exciting environment is a top priority for museum educators (King, 2009; Taylor, 2006; Taylor, Neill and Banz, 2008). Bridget aligns these personal views with the aims of the museum. This is in line with literature on museum education, which highlights the creation of a positive learning environment and lifelong learning as core aims of all types of museums (Castle, 2001; Hein, 1999b; Hartz, 2017; Hooper-Greenhill, 2007b; King, 2009; Nikonanou, 2009; Roberts, 1997; Tran, 2004).

Bridget's element of her personal theory relative to creating such an experience was congruent with her practices. Bridget explained in her pre-interview,

My personal goal is that the children have a positive experience and that I see them excited, engaged and curious about objects and learning in museums. For me, it's about children feeling that the museums are a fun, nurturing and exciting place to come to and that they would like to come back again. I guess a word you could use is lifelong learning, a buzzword in museum education these days. A positive learning experience in museums is important so that good attitudes towards museum learning are cultivated and ...so that children's learning is enhanced (Pre-interview, Bridget).

In Bridget's pre-interview, the core of a positive experience that is "engaging and exciting children with learning" was part of her expressed goal of being a "good teacher," regardless of the educational context (museum or school classroom). She specified that many practices are based on her experience as a school teacher. As other researchers have shown (Bevan and Xanthoudaki, 2008, Ebitz, 2005, Tran and King, 2007) this highlights the influence of the professional background of museum educators in shaping the practices and educational environment fostered during museum programmes. She said, "learning is learning," regardless of the "space" it might be engineered in. "For me, a good teacher...engages and excites children with learning by creating a positive experience." (Pre-interview, Bridget).

Bridget said a positive experience entailed "structuring an experience" that consists of "satisfying children's basic needs," so that the foundations for positive attitudes towards museum learning is laid. She said,

I want to create a very positive feeling about coming into a museum and learning, so I structure an experience per that... A positive experience is a nurturing experience that satisfies children's basic needs and an experience that provokes their interest and enthusiasm. For me that is what it's all about (Pre-interview, Bridget).

The following parts of this subsection discuss the details of Bridget's element of her personal theory relative to satisfying children's basic needs and how this was manifested in practice. The first part will argue that per Bridget's pre- and post-interviews, children's basic needs consist of: i) a need to feel emotionally secure, which was put into practice using praise and orientation in the museum; and ii) a desire for rapport with museum educators. This was put into practice by encouraging a reciprocal exchange of personal experiences, calling learners by their names and valuing what learners share.

Introductions and plenaries, frame the day as a game, with lively and animated teaching. Observations show that on occasions Bridget was firm with the learners, which appeared at odds with the element of her personal theory of creating a positive environment. When Bridget was asked, it became clear that part of her personal theory relative to a positive learning environment consisted of maintaining a disciplined environment for the whole class. This included being authoritative with learners when individual students were disruptive. This was justified within her personal theory as a necessary step to avoid individuals disrupting the positive experience of the class.

5.3.4.1 Satisfying learners' basic needs

During her pre-interview, Bridget explained that positive emotions, such as that of emotional security and a feeling of rapport, provide the basis for higher needs, such as that of learning. This is in line with Falk and Dierking's (2000) position that addressing the learners' basic and personal needs is fundamental to the process of learning in museums. Bridget said,

You know they [the learners] have got to feel secure, loved and have a sense of rapport before learning can occur. If you put them in a strange environment it can take longer to get to that point. It must be a positive, warm and nurturing environment. That is why you must create a sense of rapport between yourself and them [the learners]. It's also very important to try and boost their self-confidence for the same reason (Pre-interview, Bridget).

The following sections elaborate on the subsection relevant to creating a positive learning environment by satisfying children's basic needs. Observation data presents the practices that, as Bridget confirmed in the post-interviews, satisfy the learners' basic need for: i) emotional security; and ii) a need for rapport and a warm environment to boost learning. Post-interview data elaborates on Bridget's personal theory behind the choice of each practice to fulfil the basic needs of schoolchildren, as these were not mentioned in the pre-interview.

i) Need for emotional security

Bridget's element of her personal theory relative to satisfying learners' need for emotional security enabled a positive learning environment. This was attained by using "praise" - a practice Bridget mentioned as an example of this element of her

personal theory in her pre-interview. Secondly, she oriented learners in museum space.

During her pre-interview, Bridget explained that “praise” is a tool she uses to help learners feel confident about their learning. This reflects Csikszentmihalyi’s (1997) view that using positive emotions, such as praise, motivates the learner. She said,

It is important to boost learners’ self-confidence if you want them to feel secure about their learning. They need to feel they can accomplish things and feel good about themselves as learners to help their motivation to learn...Whenever they do something well, or they give it a good shot I like to praise them, because it’s good for them to know they can get some things right and to show them that I believe in them (Pre-interview, Bridget).

Observations showed that Bridget would praise learners who were disengaged and learners who were progressing well. One example, is provided below to illustrate her practices with disengaged learners. This episode took place during a “digging activity,” where learners were instructed to unearth objects buried in sand. Typically, if learners stopped digging and wandered off Bridget would urge them to continue by praising their progress and digging skills. Bridget was observed saying, “Claire, that is really good digging. You can see this piece of wood. I wonder if there is anything else underneath the sand. Would you like to remove the rest of the sand? You are doing great; you just need to remove a bit more sand from this side.” Following Bridget’s praise, learners usually resume with their activity with greater verve.

In the post-interviews, Bridget said she wanted to inspire learners and show she believed in them, and the validity of “their process of thinking.” Bridget explained

that she mostly praised learners that she thought needed a “boost” in confidence so that they would feel secure in their abilities. She thought boosting children’s confidence was important because, in her view, it gives them a sense of achievement and safety that motivates learning. She elaborated,

It’s nice for them to know they can get some of them [answers] right and to acknowledge that their process of thinking is correct. I tend to praise more the ones, maybe, who aren’t used to being praised so much and wander off, because I want them to stay on task with me throughout the day by boosting their confidence and help them feel secure about their abilities. So, during the dig, you know, like today if you’ve got some boys, or girls, who might, you know, go off task or be a bit challenging I’ll try to say, ‘Oh yes that’s good, give it another go’ to motivate their learning in a positive way (Post-interview 2, Bridget).

Bridget was also observed at the beginning of a session mapping out the content of each museum floor, explaining what exhibits were hosted in the exhibition halls and showing where the restrooms were. An episode is provided below,

Okay, guys, gather round please. Stay on the steps so you can see me... This museum is all about human beings. On this floor, we have transport, here we have weapons and here we have magical objects... Behind you are the cloakrooms and the bathrooms. (Observation 1, Bridget).

During the post-interview, Bridget explained that orienting learners at the start of each session created a “sense of familiarity” within “the alien environment of museums” to boost the children’s “emotional security.” This is in line with Tran’s (2004) and King’s (2009) findings on museum educators. Bridget said,

Museums are exciting and novel spaces filled with objects, but arguably an alien environment where it is harder for children to learn. It's important to make them feel secure and create a sense of familiarity with the space by explaining where everything is (Post-interview 1, Bridget).

This section discussed Bridget's element of personal theory about creating an emotionally secure environment for children. The next section will present the way Bridget translated children's need for rapport.

ii) Creating rapport between museum educators and children

This focuses on Bridget's personal theory relative to cultivating rapport and a positive learning environment that satisfies learners' basic needs. Embedded in this personal theory is Bridget's awareness of the challenge of meeting learners only briefly. This finding mirrors research on museum teaching, where museum educators are found to use practices that compensate for, or take advantage, of the learning environment of museums (Pringle, 2008; Tran, 2004). Drawing on her experience of teaching in museums, Bridget explains that a museum educator must work harder, and quicker, to establish rapport. She said,

Because we don't get to spend much time with children, it is important that we build a loving and warm relationship with them, if we want to establish a positive experience. It's important to make them feel welcome in the museum (Pre-interview, Bridget).

Bridget did not specify how this element of her personal theory is translated into practice in her pre-interview. Ways of achieving this were observed and confirmed by Bridget throughout post-interviews. Bridget satisfied the learners' need for personal connection by encouraging a reciprocal exchange of personal

experiences. An example where Bridget initiated an exchange of information on family background is provided below.

Bridget: Are these children's shoes?

(No response.)

Bridget: What do you think? Do you have younger siblings?

Child: Yes, Charlie. He is two years younger than me, and his shoes are bigger than that. He is taller and annoying.

Bridget: Ah! I know what you mean. I have two children myself, x and x, and the youngest has little feet that could fit in here (Observation 2, Bridget).

In the post-interview, when Bridget was asked about this episode, she said the element of her personal theory of building a personal relationship through exhibiting interest in learners and sharing personal information was “important for any educator” regardless from the teaching context to create rapport. Bridget stressed that this role was of significance in the museums to compensate for the pedagogical limitations of the museum context. These findings are in line with literature suggesting that museums educator's personal theory and practices are influence by the totality of their professional background and experiences (Bevan and Xanthoudaki, 2008, Ebitz, 2005). Bridget said,

It's one of the things I find difficult about this post, from having been a teacher... The classroom dynamic is different if you put them [children] in a strange environment. It can take longer to get to that point of creating a personal relationship. They don't feel as close to you and they do not listen as much to you, it is difficult to get them to a state where they learn smoothly. You lose the personal relationship with children

and you must make up for that. So, what I was doing there was letting them tell me something about themselves – and brothers and sisters matter. I’m telling something about my family and me...throughout my teaching career in museums find this practice to work well... So, it’s the personal relationship, isn’t it? You are building up a sense of interest. If you have a personal relationship, a personal contact, I think they’re more likely to listen to you that way. So, you’re building up a sense of, ‘I’m interested in you and your family, I care’ (Post-interview 2, Bridget).

During observations, Bridget was seen memorising students’ names and using them. During the post-interview, Bridget explained,

Using names is important. You’re developing more of a rapport with them and that makes a huge difference. They’re chuffed, at the end of the day, when I know their names because it shows that you care enough about them to try and find out their names, to try and find out a little bit about them. It’s about creating a warm relationship in a short amount of time (Post-interview 1, Bridget).

Observations showed Bridget exhibiting interest in what the learners had to say by her body language (the curious tone of her voice whenever she spoke to children, the exaggerated facial expressions and opening of eyes when learners told her something). She always made a positive comment and provided feedback to what the learners wanted to share even if it was unrelated to the activity. During some group activities, where other adults assisted children, Bridget would listen to what children wanted to share with her even if that comment was just an expression of excitement about an object, for example, “This is such an awesome object. It smells like money.” When asked about this in the post-interview Bridget referred to the

element of her personal theory that learners need to feel “you care about them” and if they do they are likely to feel positive about the museum and return.

I think valuing what children say is important for any educator. It’s a way of showing at any opportunity that you care and that they can be part of the museum world as well. It’s a way of sending out a message that this is their place too and that it is lovely having them in the museum (Post-interview 1, Bridget).

This part emphasised Bridget’s personal theory of cultivating a warm learning environment. It noted the practices she used to achieve that and showed the pastoral role of museum educators to build rapport with a class they may get to work with only briefly.

5.3.4.2 Provoking learner interest and enthusiasm to ensure a positive learning experience

This subsection relevant to creating a positive learning environment focuses on Bridget’s element of her personal theory relative to engaging children in a way that makes them feel enthusiastic. This reflects Hooper-Greenhill’s (1999) and Falk and Dierking’s (2002) research in museums that interest and enthusiasm facilitate a positive learning experience and cultivate lifelong learning attitude toward museums (Black, 2005). This ensures a positive learning experience and the creation of long-term interest in museums as places of creative engagement. Several ways of achieving this were observed. Post-interviews suggest in most cases this part of her personal theory was reflected in her practices. These included using introductions and plenaries to create a sense of purpose. She would frame the day as a “game” or create “mystery” around the analysis and interpretation of objects. Her teaching style was

playful and animated (role-play, exaggerated body language and humour). There were episodes where Bridget dealt with children's misbehaviour in a manner that she acknowledged as quite "fierce." These episodes might suggest that Bridget's practices did not reflect the part of her personal theory of creating a positive learning experience based on enthusiasm. However, analysis showed that, inherent in Bridget's overall personal theory relative to cultivating a positive learning environment was maintaining a controlled learning environment and exerting authority if need be. This notion of a positive learning environment, despite being disputed in museum education literature (Pringle, 2008), is consistent with the aims of university museums (Hartz, 2017).

During her pre-interview, Bridget explained that creating an environment that is enthusiastic is essential to learning. She said,

Learning must take place in an interesting environment. It's my opinion that to support children's learning – whatever that is each time – you need to trigger their enthusiasm and interest for doing so (Pre-interview, Bridget).

When Bridget was asked during the pre-interview to elaborate on how she managed to translate this into practice, she explained that it consisted of finding ways to "sell the day" to the children. A practice she mentioned was using introductions and plenaries. She explained that these practices were useful because they allowed her to build up a sense of purpose throughout the day.

Provoking children's interest is accomplished by finding ways to sell the day to them and keep them on board...creating a sense of purpose throughout the day, by introducing the activities and summarising them to wrap up for example, helps keep their interest high (Pre-interview, Bridget).

During observations Bridget introduced learners to an activity and linked it to the general aim of the session, which was about becoming a museum expert. During the introduction of the main activity of the programme, the “digging” activity, Bridget said,

You are going to be researching objects and find the identity of the person buried with these objects. You are going to be a museum expert. We must do all the jobs an archaeologist would, so we are going to start with the digging, and once we have done the digging, there is going to be another job...
(Observation 2, Bridget).

At the end of this activity Bridget explained,

I must say, archaeologists, you have done this section supremely. Now, you have done the digging. You have recorded the position. The next thing you are going to be doing is choosing some objects in your group, and we are going to go back into Charlie’s museum [another museum educator]. We are going to fill in a documentation sheet for your objects. I just want to run through this document with you, so you know what it all means (Observation 2, Bridget).

During the post-interview, Bridget confirmed that she used introductions and plenaries to signpost the day for the learners and to motivate them by providing the purpose of each activity. This practice is widely used by school teachers as a means to cultivate learner’s motivation (Epstein, 2005; Zirbel, 2008). In line with other studies on museum educators (Tran and King, 2007), this provides an example of how Bridget’s background as a school teacher influences her personal theory and practice as a museum educator. Bridget said,

I want children to see how the activities they do connect and help them gradually build up the identity of the person they are inquiring about. Knowing what purpose each activity serves is highly motivating in getting through the day (Post-interview 2, Bridget).

Several other practices were observed, which Bridget explained in her post-interview were all part of the element of her personal theory relative to honing learners' interest and creating an engaging environment. These are discussed below.

Firstly, throughout the observations Bridget was observed referring to the aim of the activities as “a discovery,” a “mystery,” or a “puzzle” to be solved. This echoes research in museums that “play” can provide experiences from which learning and enjoyment may occur (Diamond, 1986; Rennie and McClafferty, 2002). During the post-interview, Bridget explained that presenting the day in those terms triggered learner engagement and motivation. In her words,

Children like games, so presenting the day as a mystery triggers their curiosity, engages them and creates a fun learning environment. Learning is about being curious and this session is about finding clues and puzzling things together throughout the day (Post-interview 3, Bridget).

Secondly, Bridget used an animated teaching style incorporating humour and theatrics to engage learners in conversation with her. This echoes Tran's (2004) findings on museum educator's teaching, where they used theatrics as hooks to engage children. This seemed to reflect what Bridget said in her pre-interview: “I try to find ways to bring things to life to enthuse children.” An example is given below:

Bridget: It is lovely seeing you again. Today you are going to be museum experts... What do you reckon Con, shall we get them cleaning the...?

Child: Toilets.

Bridget: I think the toilets have been cleaned today (laughter).

Charlie: Dusting the Tyrannosaurus Rex?

Child: Yes.

Bridget: I looked at them today, and they looked clean, so we won't get them doing those jobs. (Humorous tone of voice). More important jobs... Well, I think finding out more about objects. That is what museums are all about (Observation 3, Bridget).

On another occasion, she engaged the children when discussing a gourd milk jug,

It is the Kenyan milk bottle made from a gourd. I think it's the Maasai warriors who use it, isn't it, Charlie? They're big, strong chaps, they milk a cow, they put a little bit of blood in the milk from the cow. They just make a little cut on the neck. That's protein for the day. Shake it up and that's their lunch for the day. Good packed lunch. Would you like to try, do you think? (Observation 3, Bridget).

Throughout observations it was noted that Bridget modelled excitement and curiosity by using vivid body language, including exaggerated facial expressions and hand movements and different vocal pitches. During a "What is it?" activity children were initially not responsive to questions and so she became more animated. Bridget said the element of her personal theory underlying her practices was that museum educators should teach in an "exaggerated" way to engage learner attention in a short period.

I think it's an interesting thing as an education officer that you're there to animate, entertain, make jokes, maybe in a slightly more exaggerated way than a teacher might, who's with a class all the time. You have children with you for a limited amount of time and this is a way to quickly engage children, generate interest and engage their attention quite easily (Post-interview 3, Bridget).

She said that being animated was used to grab learners' attention, and a remedial behaviour tool to hook learners who appeared uninterested. Bridget said that using "humour" and "lively body language" were useful practices to gain control over learners in a positive way.

Like with the discussion today – the children weren't going to just want to sit around quietly, so instead of trying to make them calm down I played it animated and that worked; I managed to hook their interest and keep them under control. Using humour and a lively body language are good ways to hook learners' attention and make them listen to you in a way that is positive (Post-interview 3, Bridget).

On two occasions, she gave learners the choice between enjoying the day or sulking and misbehaving.

First episode:

Bridget took Brendon aside, who was being disruptive and said, 'You have so many great ideas. You could be flying. I won't have sulking. You have a choice. Choose to enjoy or go home. What will you choose?' (Observation 1, Bridget).

Second episode:

There are a few things we need to say before you move on. It is important that you stay in your groups and not run around the museum, because you're Year 6s and you've earned our trust; that means you don't need to be with an adult, but adults will be around. People who run we make them stay with us and we are not fun company. What will you choose to do? (Observation 1, Bridget).

During the post-interview, Bridget explained that giving learners who are disruptive a choice sets a "nice tone" for the group.

Keeping children under control and at the same time enthusiastic is about coming up with imaginative ways of saying, 'Don't do something'. Putting them in the situation where they can choose to be engaged or not, to listen or misbehave accomplishes this. You try to set a nice tone for the group (Post-interview 1, Bridget).

Despite Bridget having stated in her pre-interview and post-interviews that she relies on practices that preserve a good tone to cultivate enthusiasm and interest, there were a few episodes where she was observed being firm. Analysis revealed that the contextual circumstance, such as school teacher's abilities to control their students and individual's behaviour, influenced the way she chose to cultivate a positive environment, which occasionally included establishing order. This shows that Bridget's personal theory, as revealed through the post-interviews, contained this additional element regarding control and that putting it into practice was influenced by the context of the visiting class teaching environment.

During observations, Bridget sometimes reprimanded individual learners for talking over her or not paying attention. For example, if children did not give her their complete attention, she would look into their eyes, raise her voice and say, "Excuse me, I'm speaking. This is not polite," or clap her hands and repeat a rule of behaviour, such as to sit down, raise their hands when they want to speak, or sit facing her and pay attention. During post-interviews, Bridget appealed to her role as a group manager to explain that keeping control over the class in her view is part of maintaining a positive learning environment,

I sometimes need to vary my behaviour because I also need to establish my authority. I suppose it depends on the circumstances... how I choose to cultivate a positive learning environment.... The exact way I do something also depends on the group. But you've still got to have the authority over the group...and make sure everyone in the group is having a positive experience. If behaviour is not an issue, you can let it be a bit more relaxed (Post-interview 3, Bridget).

It was observed that the accompanying schoolteacher was often not present because she was with the other half of the class in a lesson delivered by another museum educator. Bridget was observed pausing for long periods when learners were talking over her; gradually she would raise her voice and tell learners it was rude and she would wear an austere face. Studies have shown that museum educators value an ordered learning environment and usually rely on accompanying schoolteachers to control the student's behaviour (King, 2009; Tran, 2004; Piscitelli and Weier, 2002).

Bridget revealed in her post-interview that maintaining an ordered and disciplined environment was key to facilitating a positive learning experience for the whole class. Part of Bridget's conceptualisation of a positive environment is

underlined by control and discipline. It also suggests that her practices were consistent with her overall personal theory relative to a positive learning environment for the whole class. She said,

So, you're quite dependent on the quality of the staff you're given sometimes... If you had the teacher who had authority over the class, you can play a slightly different role yourself. I had to discipline children quite a lot of [the] time and establish order to be able and maintain a positive learning environment for the rest of the class. But that was because the teaching assistant kept on leaving... She left me at key settling moments every single time. I must make sure I've got the authority in the session and that there is no disruptive behaviour otherwise it becomes chaos and many students can become irritated and start feeling anxious (Post-interview 3, Bridget).

This part of the subsection relevant to creating a positive learning environment discussed Bridget's element of her personal theory relative to engaging learners in a positive learning environment. Analysis showed that the practices she used to engage children, were exaggerated in comparison to teaching at a school (for example, use of humour, body language, theatrical behaviour). Other practices, such as framing the day as a mystery and creating a sense of purpose by signposting activities, were viewed as good practice to engage learners. Even though Bridget was observed being authoritarian during some episodes, post-interviews indicated that her practice was consistent with her overall element of cultivating a positive learning environment for the whole class, as maintaining a controlled and disciplined environment proved to be during post-interviews part of her personal theory.

CHAPTER SIX: CASE STUDY THREE

RENEE

6.1 Introduction

This chapter presents the case study of Renee, a museum educator for primary school children employed in the education department of Museum B, a university museum devoted to natural sciences in the United Kingdom. She also taught in a shared programme with a humanities museum. Information about Renee's professional background and a short commentary of the primary museum she works for and how it impacts her teaching practices is included. An examination of the context of the programmes studied, namely Programme 1 and Programme 3, and the museums they took place in, are in Appendix A.

Three key points emerge from this case study. The first is that Renee's personal theory of teaching has three elements:

- i)** Renee's personal theory relative to knowledge is influenced by the museum discipline she teaches. Renee maintains that knowledge in natural sciences is fixed, while knowledge in humanities can be fixed and fluid.
- ii)** Her personal theory relative to learning and learners is nuanced. It is influenced by the museum discipline she teaches. Renee believes that scientific learning entails discovery. In the context of the humanities museum, Renee says that learning is a process of analytical thinking, and meaning making. Renee also believes that learners have individual characteristics.
- iii)** Cultivating a positive learning experience is a key element of Renee's personal theory of teaching and so she strives to: i) maintain order; ii)

create rapport and a sense of safety; and iii) encourage interest and motivation.

The second key point that emerges from this case study is that although on many occasions Renee translated her personal theory into practice, on some occasions, due to factors such as time and familiarity with learners and the management of the museum, she was unable to translate elements of her personal theory into practice.

Renee's personal theory of teaching is influenced by her experiences as a school teacher and as a museum educator in university museums.

6.2 Profile of a museum educator and the museum she works in

6.2.1. Renee's background

Renee was awarded an undergraduate degree in History of Art and Museum Studies, before attaining a PGCE teaching certification with a specialisation in art. She believed that teaching in a school classroom would enhance her skills for a hoped-for future career in museum education. After five years of classroom teaching, Renee started with volunteer work in museums while supply teaching until she gained employment in her present position.

I thought, it's all very well learning the theory, but I wanted to put it into practice in the classroom, and to see what it was like... I needed to have confidence to lead a group of children and to know that I'm in control. I value that. Also, I think having been a teacher I have a good understanding of what teachers expect when they come to a museum (Pre-interview, Renee).

Renee stressed that her teaching experience provided her with insight into the school curriculum. “All our primary sessions in Museum B are science-based and target specific sections of the primary curriculum” (Pre-interview, Renee). This finding provides evidence that Renee’s experience as a school teacher influenced her understanding of learning and teaching in Museum B. The way prior professional experiences are formative to educators’ educational thinking is consistent with the arguments of Knowles and Holt-Reynolds (1991), as well as Pajares (1992). Renee explained that a good understanding of the curriculum strengthened her ability to communicate the relevance of museum programmes to schoolteachers.

6.2.2 Renee’s view on her profession and the museum she works in

Renee described the underlying principles that characterise her teaching and the educational character of Museum B. She said that across all university museums in the city Museum B is situated in, there was an overarching educational focus on object-centred teaching. This has been widely discussed in the literature on museum education, arguing that objects are the essence of museum education (Hooper-Greenhill, 1999; Pye, 2007). She said,

We all believe in a focus on the objects, so all of us value that side of things and make sure that the objects are always in the centre of our teaching (Pre-interview, Renee).

Regarding the museum, she works for, she explained that museum educators were given creative freedom to choose their own practices. In practical terms this was achieved by consulting colleagues in the department and the head of the department about the design and implementation of new programmes. Renee asserted that flexibility in teaching was encouraged by the museum she worked for. She added that her personal theory of teaching was close to the pedagogical principles at this

museum, which she valued because it allowed her to translate her teaching philosophy into practice. This finding is endorsed by Leatham (2006) and shows that the relationship between personal theory and practice is not context-free. It is mediated through the sociocultural contexts that museum educators work in (Ash, 2004; Briscoe, 1991; Rogoff, 2003). Renee explained that this compatibility became evident to her during her hiring process.

We all have very different styles in terms of delivery. Our choice of practices is based on a personal preference for practice, our teaching style, what we feel more comfortable with. Lea (head of education department) isn't very prescriptive [about] the types of activities that we do. We have a lot of freedom in that respect. Before taking on anything new I speak to Lea [to see] if she is happy for me to do that. I mean she nearly always is, if you're going to take something on then that's great... I knew already when I was hired, that my philosophy of teaching was very close to the pedagogical approach on science teaching taken by this museum, that's part of why I was hired, right? That's nice because it allows me to teach in a way that I am happy with and believe in... I also often bounce ideas off other museum educators in the department. For example, for Programme 3, we discussed things with Charlie (Primary Education Officer in Museum B) and then went away and spoke to Malcolm who is the Secondary Education Officer and discussed my ideas about the art session with him (Pre-interview, Renee).

Even though Renee said in her pre-interview that there was no overarching departmental philosophy imposed on her, it became apparent in subsequent interviews that implicit in the educational philosophy of the department, is a high regard for science and accommodating the science school curriculum. Renee traced this

principle to the head of department and the university affiliation of this museum. The literature on scientifically orientated university museums suggests that an important goal for university natural history museums is to embed learning within the goals of the formal national curriculum and science teaching in schools (Braund and Reiss, 2004). She claimed that all the members of the education team embraced it, even if it limited her to some degree from following all elements of her personal theory. That is the context in which educators teach may enable or limit the translation of their personal theories into practice (Leatham, 2002). Research echoing this argument is also found in language and mathematics teaching literature (Borg, 2003; Leatham, 2002; Li, 2013; Skott, 2001). Renee explained that the practices used in Museum A are compatible with her view on teaching history. She said,

Lea has always been quite flexible... I think if they [museum educators] can show that they fit in well and understand that sort of thing, then she's quite relaxed. I suppose it's Lea's philosophy that's probably the driving force, because she started on her own...and the fact that this is a university museum...The people that she's hired have probably fit that mould, I guess. She has a science background, [and] she believes very strongly in the importance of science education, giving children a scientific basis and supporting the national science school curriculum, as we all absolutely do...But, for example, if another director was more art focused, I could have more easily incorporated art related practices in my teaching...such as aesthetics, appreciation of objects, or drawing, and so forth, which I believe are valuable...For example in A Museum, the practices they use are different, because they are more history focused. These also echo with my experience of teaching history at schools. (Post-interview 1, Renee).

Analysis showed that her vision of teaching is built on a shared value of object-led learning encouraged by a departmental priority of science education. This is linked to the institutional character of the museum. There is no educational philosophy imposed on Renee and considerable creative freedom is given to her for the design and implementation of programmes. This was attributed to a flexible and enabling head of department. In the section that follows, the themes that emerged from the analysis of the interviews with, and observations of, Renee are presented to answer the research question posed by this study, *How, in a university museum, do museum educators' personal theories of learning relate to their educational practices?*

6.3 Introduction to Renee's personal theory and practice

This section presents Renee's elements of her personal theory on teaching and illustrates the relationship between the elements of her personal theory and practice. Information on factors that appear to influence her personal theory of teaching are provided. Analysis revealed that Renee's personal theory was based on her views about: i) the nature and production of knowledge; ii) learning; iii) learners; and c) cultivating a positive learning environment. Each section is dedicated to an element of Renee's personal theory articulated during her pre- and post-interviews. The elements of Renee's personal theory on knowledge and learning as well as the practices used, are discussed to reflect nuances in her personal theory and teaching (Museum A with humanities orientation and B with natural science orientation). This section draws on Renee's observed practices and interviews to highlight the relationship between her personal theory and practices in the context of teaching in university museums.

6.3.1 Personal theory relative to knowledge and learning and practices in Museum B

This subsection discusses the elements of Renee's personal theory relative to knowledge and learning. It examines the relationship between these elements in the natural science museum (Museum B). Renee's personal theory about the nature of knowledge in science museums, and education in general is presented. Then how this is related to her practices in Museum B.

Finally, the way in which Renee's element of her personal theory relative to knowledge shapes the element of her personal theory to learning and how it is consistent with her practices in Museum B are discussed.

Data gleaned by the author indicate that Renee's personal understanding, based on her experience in a natural science museum, is that knowledge in museums is fixed and objective. This mirrors a contextualist epistemology view, according to which knowledge is perceived as relatively unchanging and an objective that learners should be guided towards (Olafson and Schraw, 2006). In her words,

Based on my experience of teaching in a natural science museum I think that there is something objective for children to learn ... knowledge is there, it is objective... I think that's what museum education is about; that in the end the children leave having fully understood something about an object with no ambiguity. I think that is probably an overview of what I think (Pre-interview, Renee).

She stressed that overall learning in museums was centered on objects and understanding them better. "I think that my role as a museum educator is to help people relate and learn a bit more about objects than they would get from a visit on

their own” (Pre-interview, Renee). She specified that her aim was for learners to acquire knowledge about the collections. “I personally want them to understand [objects] a little bit more. I want to reinforce what they are learning at school as well, and use objects to demonstrate that knowledge better” (Pre-interview, Renee). This understanding of learning as the “acquiring or ‘reproducing’ of knowledge” (Tsai, 2002, p.773) mirrors a more traditional approach to learning and coincides with research on school science teachers’ (Tsai, 2002) as well as other museum educators’ personal theories on learning (Taylor, 2006; Taylor et al., 2008; Taylor and Caldarelli, 2004).

During Renee’s pre-interview, she also drew on her experience of teaching science at schools and asserted that in science teaching she perceived the nature of knowledge as fixed. This echoes research on museum educators suggesting that their professional background and experience influences their personal theory and practice (Bevan and Xanthoudaki, 2008, Ebitz, 2005, Tran and King, 2007). Renee said,

When I teach science, I feel there is a need to arrive at a specific outcome and learn things. Information is given first; for example, that carnivores have pointed teeth and herbivores have flat teeth. Then children look at the objects and draw conclusions using that information. Their feedback is discussed to ensure their understanding is correct, as knowledge is fixed in science. I want them to progress toward an outcome. The answers given must be factually correct (Pre-interview, Renee).

During her pre-interview Renee showed that she was aware of the different epistemological views that might exist within museums of the same discipline, and which might differ from her viewpoint and the one embraced by this university

museum. Indeed, as other researchers have shown, this perception of knowledge as a fixed body of information to be communicated aligns with the role of university science museums as an authoritative source of knowledge (Gesche-Koning, 2014; Mourits, 2014). This concept of the authority of the university museum as a source of “objective knowledge” is typical of a formal educational environment (Rogers, 2005).

Renee explained,

There are different approaches within science museums. I know that in Museum X (with a natural science orientation) in Y city, a lot of the time they will use objects and not mind whether the children get the right answer in the end. I think that in the end children should leave having fully understood something about that object [with] no kind of ambiguity about what it might be. This is also the approach taken in university natural science museums (Pre-interview, Renee).

Renee’s element of her personal theory relative to knowledge in a science oriented museum influences her personal theory pertaining to learning (guided-discovery learning approach and transmission). This is in line with her practices observed in Programme 3: i) using a scientific concept as a starting and concluding point to the discovery; and ii) exposing learners to structured activities that involve closed questions and information transfer to help them accumulate information relevant to their deeper understanding of a predetermined scientific concept.

Renee explained that helping learners arrive at a finding is achieved through the application of what she referred to as the “discovery model of learning.” One might argue that discovery learning encompasses processes which allow the learner to explore, interact and manipulate ideas or objects to arrive at a learning outcome (Elkind, 1976). However, even though this assertion might imply an emphasis on the

process of learning as an independent scientific enquiry with a focus on cultivating enquiry skills, further analysis showed otherwise. Renee's understanding of the discovery-learning model was reflective of a guided-discovery learning approach and accumulation of knowledge. This is in line with several studies that support the claim that there are limitations to discovery learning practices without the educators' guidance (Alfieri et al., 2011; Kirschner et al., 2006; Mayer, 2004; Tobias and Duffy, 2009). Renee explained that her understanding of knowledge and learning was part of a formal learning environment. She stressed that in her experience this approach was applicable in science teaching. Renee's personal theory in light of the importance she places on the discipline she teaches, gives weight to Tsai's (2002) hypothesis about the discipline-dependent nature of teacher's personal theories. She said,

In science museums, I think that it is important in the end to have no misunderstandings about objects or the concepts we are trying to get across in science. That is how I thought of knowledge when I taught science at school... That's why I usually like to introduce a topic to children, and then let them carry out an activity to come to specific conclusions with my guidance. I make sure the programme activities are structured. I suppose that is the discovery learning museum model... I think it's fair to say that this kind of teaching is closer to the kind of learning environment facilitated in a science classroom. I mean I use my knowledge of the school science curriculum to design programmes and teachers like that. My approach is probably quite similar with one in a class in that I kind of have a combination between being didactic and letting them explore a little bit which is probably quite like a classroom... Other museum educators in this museum do things a bit differently but it's a matter of personal style... Discovery learning is pretty much something I had in mind as

a teacher, like a concept or idea I want them to understand...and certain facts I want them to learn. I let the child discover things but I'll guide them, give out information and provide a structure. I'll use objects to give that concept a chance (Pre-interview, Renee).

Observations reflected that Renee translated the element of her personal theory relative to learning in science into practice, by grounding learners' exploration of a scientific concept and structuring their exploration in a manner that helped them reach a desired conclusion. The information accumulated from the post-interviews helped augment Renee's element of her personal theory relative to learning.

The following parts of this subsection discuss the details of Renee's element of her personal theory about learning as a guided discovery and transmission of scientific concepts: i) grounded in a scientific concept; and ii) facilitated through structured activities to help learners accumulate information relevant to their deeper understanding.

6.3.1.1 Grounding the exploration on a concept

In this part of the subsection relevant to learning in a university natural science museum, it is argued that Renee's element of her personal theory relative to learning highlights the importance of grounding student educations by presenting a concept at the start of a session. As an example, Renee was observed during Programme 3 always starting a lesson by introducing biodiversity in forests. During the introductory phase of the session, learners were asked to sit on the museum floor in a circle. An example is provided below,

This is our tree that we're working on today. It's called The Tree of Life, and it is becoming lively; we've got bugs down

at the bottom down here. Bugs are useful. Cockroaches eat lots of dead stuff, plants and even bits of animals, so they keep it nice and clean and stop it being smelly. So, we've got them down at the bottom. We've got some snakes curling along the lower branches. We've got some birds up quite high, and these butterflies, the blue butterflies, sometimes fly right up to the top of the trees. So, we've got them beautifully arranged because these are animals that live-in forests. Forests have so many different animals; there is a great biodiversity (Observation 7, Renee).

During the post-interview, Renee explained that starting the exploration with the introduction of a concept and then using objects to draw conclusions was typical of how discovery learning could be translated into practice. This is in line with Hutchings' (2007) notion that the provision of information may facilitate the learner's processes of discovery. She said,

In discovery learning, getting to the concept is the important bit, so I will start with the concept of biodiversity and then think about objects and questioning to back it up. There's much more with teaching science of me imparting knowledge and me telling them, 'This is the concept that we will be exploring today. You are going to do this and this is how it's going to be.' In science museums, you start with the concept that you are trying to teach (Post-interview 7, Renee).

The second example portrays the importance that Renee places on the accumulation of knowledge to reinforce the scientific concepts she introduces. During this episode from Programme 3, Renee asked learners to share new information gleaned during the programme.

Renee: We've had a brilliant day. Hopefully you have learnt lots and lots of things about forests and diversity of animals as well. What new things have you learnt today? Anything new that you've learnt? Yes?

Child 1: Dinosaurs are big.

Renee: Dinosaurs are big. I suspect you might have already known that, but yes, some dinosaurs were very big, some were very little. We're just talking about new things that we've learnt today, Luke?

Child 2: That forests have many different animals. Like scorpions.

Child 3: Scorpions glow.

Renee: Yes. They need ultraviolet light, don't they? They're spectacular.

Child 6: I never knew that cockroaches could hiss.

Renee: Could hiss, absolutely, yes. Why do you think they do that?

Child 6: Isn't it for protection, like if they're getting attacked or something?

Renee: Yes. They sound big and scary. That's right.
(Observation 6, Renee).

During her post-interview Renee discussed her understanding of the aims of science museum education. She said,

You know, when I was asking evaluation questions and stuff – remember when I was saying, 'What have you learnt today?' They would say things from this session like the fact that scorpions glow. Science education in museums I think, is

centred on learning about objects and what they represent, so learning some basic things and consolidating concepts is crucial (Post-interview 6, Renee).

The next part of the subsection relevant to learning introduces the practices that Renee confirmed guided learning and the accumulation of knowledge.

6.3.1.2 Structuring the learner exploration

This part of the subsection relevant to learning encapsulates the aspect of Renee's personal theory about guiding learners to conclusions. Analysis showed that Renee limited learners to the objects explored and the information they received, although she often gave out additional information on objects. She guided "discovery" by the questions she chose to pose.

After introducing biodiversity, as an example Renee asked learners to follow a trail around the museum. Research in museum education, shows that "trails" are a common practice used by museum educators to structure learner's discoveries (Cox-Petersen et al., 2003; Tal and Morag, 2007). Renee explained that six animals displayed on the museum floor, represented exotic animals that live in forests. She asked children to select one, sketch it, write some information about it and fill in the worksheet, as well as anything that caught their attention. When Renee was asked in the post-interviews about this episode, her explanation was congruent with the element of her personal theory expressed in her pre-interview. She said,

A major aim with this science programme is to further knowledge [about] biodiversity in a forest... It is more typical of discovery because it is guided. There was a structured starting point and a trail, so the exploration was guided. It limited them to only six animals they could choose from. I

also had in mind what they would be learning about the animals, because I would tell them specific information because of what was written on the cards I provided. This programme was more typical of discovery and had a set outcome. I could have just said to them, ‘Go, and find an animal. Choose where it lives in the forest.’ But then they may have come back with animals that did not live in the forest. That would have been for me... different to discovery... more constructivist, because that is more free and there is no outcome ensured (Post-interview 8, Renee).

Further data collected from observations of Programme 3 confirmed that her practices were guided by the principle of accumulating accurate knowledge. Renee facilitated the learners’ knowledge acquisition either by transmitting information or using close-ended questions to elicit correct answers. This model of learning based on transmission and accumulation of knowledge is criticised in museum education literature as undemocratic (Worts, 1995). However, many researchers have found that aspects of this model of learning exist in museum education practice (Black, 2005; Hein, 1998; Hooper-Greenhill, 2007b).

A typical episode took place during the guided trail activity. Renee was observed asking closed questions and offering additional information on animals.

Renee: What do you like about this animal?

Child 1: It’s bulky and cute.

Renee: Look at all the wonderful green colours shining. Did you notice how many legs insects have? (Looking at his drawing)

Child 1: About four.

Renee: Six legs. Three on each side. This kind of animal lives where?

Child 2: In a forest.

Renee: Why is this snake this colour?

Child 2: I don't know

Renee: What is it trying to look like?

Child 2: Grass.

Renee: Look at it carefully. Remember it lives in a forest.

Child 1: Dead leaves.

Renee: Snakes adapt to their environment to protect themselves from other animals. Have you ever seen a python?
It can eat a whole deer!

(Observation 8, Renee).

During Renee's post-interview, she explained that the approach that characterises her teaching is "about imparting information to the children...whether that is done directly or indirectly" (Post-interview 8, Renee). She stressed that she used questions to consolidate information,

The questions are probably not as probing because the focus is not on investigation, it's a concept, the idea of forests as an idea... I do want them to learn certain things about biodiversity in forests and, you know, to take away something without any misunderstandings (Post-interview 8, Renee).

In subsection 6.3.1 Renee's element of her personal theory about the nature of knowledge and learning in university science museums was explored. Analysis

showed that the elements of her personal theory relative to knowledge and learning in science were mirrored in her practices in Museum B.

The following subsection discusses Renee's element of her personal theory relevant to knowledge and learning in a university humanities museum and the practices she used in the context of Museum A.

6.3.2 Personal theory on the nature of knowledge and learning and practices in Museum A

This subsection highlights the fact that the element of her personal theory relative to knowledge and learning was influenced by the museum discipline she taught. Teaching in a humanities museum shapes her understanding of knowledge as information that can construct multiple interpretations. This emphasis on the construction of multiple personal interpretations based on evidence is in line with a criterialist approach to knowledge (Voet and De Wever, 2014). Similarly, her personal understanding of learning in the humanities is focused on the honing of open enquiry, meaning-making and broad analytical thinking skills. This mirrors a constructivist approach to learning, which Olafson and Schraw (2006) suggest is in line with a criterialist approach to knowledge. Renee's practices in Museum A mirrored the elements of her personal theory relevant to knowledge and learning in humanities teaching.

Renee explained in her pre-interview that, based on her experience of teaching history at schools and her knowledge of the curriculum, when teaching history with a museum collection, she knows that historical fact-finding is best reached by "helping students construct their own knowledge" in a way that is "sensible" and "evidence-based" by using facts during their interpretations of objects (Pre-interview, Renee).

She said that learning in history is characteristic of a “constructivist” approach. Her understanding of this term is to “let the child’s understanding lead” and that there may be no “specific conclusions” during the interpretation phase of object analysis. This is in line with an understanding of constructivism in museum education literature as a process of personal construction of knowledge (Chatterjee and Noble, 2016), which facilitates a deep understanding of objects (Hein, 1991). Renee emphasised that identifying objects correctly during initial stages of analysis was an important step of historical analysis (Pre-interview, Renee). She said,

I think that teaching history is more along the constructivist lines, whereas I think I feel a bit more of a need when teaching science to give an answer. Constructivist education, the way I understand it, is a bit more - let the child, their knowledge guide their learning. It’s more free and has no specific outcome necessarily. It’s about learning how to use evidence to come to your own conclusions, in a sensible way...that is in line with steps taken in historical enquiry. That is the important bit.... open-analysis and meaning making based on information... this is in line with how they teach history in this university museum... Analytical thinking skills.... that is achieved by employing questions that encourage that kind of thinking. When teaching history, there are activities where learners don’t necessarily come to the exact conclusion, knowledge can be more fluid... it’s less of a knowledge bank approach. However, I think I feel that...in history [museums], as with any museum, that there are facts that you do have to learn...about objects...to then be able and think creatively and make personal interpretations (Pre-interview, Renee).

Data from observations in Programme 1, confirmed that Renee focused on the learners' construction of meaning, interpretations and understanding throughout the session, while at the same time urging learners to use evidence to build what she called "sensible" interpretations based on correct information. The episode provides a typical example of Renee's nuanced understanding of knowledge and learning in a humanities museum. During this activity, learners were asked to share with the class the information they found, and to create a story about the skeleton next to these objects. Renee accepted various interpretations of how the objects were related to the buried skeleton, if students provided evidence. She also prompted their analysis based on their existing knowledge baseline. This reflects Kelly's (2007) and Black's (2005) position that a pre-requisite in facilitating learners' construction of new meaning in museums is building upon learner's prior knowledge. A dialogue is provided below.

Renee: What I want you to do is come up with a story about who this person was and what happened to him. How did he end up with his skull smashed and dead at the bottom of a ditch?

Child 1: It's a shell of a squid.

Renee: Brilliant, yes. Thanks, Jamie. Can you show us?

Child 1: It's a Bellamy.

Renee: Very close, it's called a Belemnite. Can you remember the interesting thing that we learnt about why some people used to carry these?

Child 1: Was it to protect them?

Renee: That's right Jamie, brilliant. People thought that this is what came down from the sky with lightning. They thought that if they carried that with them, it would protect them,

because lightning never strikes twice. What sort of person would have something like that with them? Any guesses? (Silence) Is it going to be somebody who is scientific? Or somebody who might believe in other things?

Child 2: An explorer?

Renee: An explorer perhaps, yes. What sort of place might they live if they must be protected from thunder and lightning? Is this a cold place, or a rainy place? Or a dry place?

Child 2: A hot place

Renee: Yes, probably a hot place with lots of lightning.

(After four objects have been discussed).

Renee: An American bison horn. Gosh that's come from a long way away. How do you think that might have ended up there?

Child 3: He might have had a pet bison.

Renee: Pet bison, you never know. Why would you have a pet bison?

Child 3: To travel.

Renee: To travel, awesome. Why else would you need a bison? Do you know what any other animals that are like a bison?

Child 4: Cows.

Renee: Yes, why do people normally keep cows?

Child 3: For milk.

Renee: Who's going to tell me what happened to them? (Observation 3, Renee).

Renee explained in her post-interview that she prioritised evidenced-based meaning-making, creative thinking, and multiple interpretations, in line with her understanding of knowledge and learning in history. Renee's personal theory relative to knowledge and learning in the humanities oriented museum differs from the one expressed in the context of her teaching in the natural science museum. This highlights the influence of the sociocultural context in which museum educator's work and gives weight to Castle's (2002) finding for museum educators that "the knowledge of different disciplines offers different ways of knowing the world" (p.1).

Renee said,

History teaching is more open-ended, so there is no right answer for who the skeleton was. If they have the evidence to back it up, the interpretation is up to them. It's about them learning how to look for evidence to back up their reasoning and developing their analytical thinking skills. You don't necessarily come to the exact conclusion of how these objects ended up together in a tomb, not that there is one conclusion... I suppose that is the point to Programme 1, that exploratory investigative nature to learning - that characterises learning in history...and the approach taken in this university museum, which promotes research... Whereas normally in science there usually is a right answer. I think I feel a little bit more of a need to give an answer... So, on this project it's more about imagination and creative thinking (Post-interview 3, Renee).

During Renee's pre-interview, Renee identified questioning through objects as key to developing historical enquiry skills; i.e. questions prompting observation, justification and reflective analysis. This is in line with Hooper-Greenhill (1999) who

identifies these practices as typical to facilitate enquiry learning in museums. Renee

said,

Learning in history is about honing open enquiry skills, you know, analytical thinking skills and learning how to make meaning of the evidence. So, rather than giving a big lecture or just trying to impart knowledge, it's much more about giving them [the learners] an activity or an object and them trying to think analytically and interpret it... The whole point to learning history is that exploratory investigative nature. One of the main objectives of the programme is developing questioning skills. Learning what questions to ask when handling objects. So, there are different types of questions I would use to build up their ability to ask the right questions and learn what questions can promote object-based enquiry. I ask learners to make a hypothesis about the identity of the object, questions that prompt observation and collection of information, and then more complex questions that aid personal meaning making (Pre-interview, Renee).

Data from observations confirm that Renee, in most episodes observed in Programme 1, used a pattern of questions. She always started the enquiry based on an initial hypothesis and then modeled questions to help learners collect evidence to confirm or negate their initial premise; for example, by using observation-based questions or prior knowledge. An example of a typical dialogue is provided below:

Renee: What do you think this is?

Child 1: Incense.

Renee: What is incense?

Child 1: Something that smells nice.

Renee: Excellent, yes. So, you used your sense of smell to explore it. What other senses have you used so far?

Child 1: Touch.

Renee: So, what do you think it might be?

Child 2: A Chinese burner.

Renee: How did you know? Why?

Child 2: Because I remember touching these things in a temple I went to.

Renee: A Chinese incense burner. So, you recognized that, did you?

Child 3: It might be a Mexican rolling pin.

Renee: Oh, yes. How does it smell?

Child 2: It stinks.

Renee: Yes, hmmm. Does it smell like baking?

Child 2: No.

Renee: Not really.

Child 1: It smells nice. It smells nicer than burning and baking.

Renee: Have you used your sense of sight yet? Have you looked carefully at it? (Observation 1, Renee).

During the post-interview, when Renee was asked about this episode, she confirmed that she used a flexible pattern of questions and tried to vary them per the children's starting enquiry and response. Renee stressed that her practice was to prompt learners to find evidence to support their thinking, either by finding ways to

positively support an initial hypothesis or through elimination. This entailed modelling what questions they could use to achieve that goal. She said,

In history... it's about asking questions to get them to think, to learn how to look for evidence to back up their reasoning. The first thing I usually say is, 'What do you notice about it?' or 'What do you think that is?' It's a starting point for the enquiry coming from the children. Then I ask them to justify their choice, to provide evidence. So, I am going through questions and either looking for a positive decision or a negative one regarding their hypothesis. For example in this episode, I said, 'What do you think it is?' and they noticed the incense smell. I then asked them to use other senses and think what each one showed about the object. I always model how to use senses to analyse an object at the start of the session. One child said he had touched a similar object in a temple. When another child suggested it might be a rolling pin I asked them to think about the smell. So, kind of going down, and then thinking about, 'Well, it can't be a rolling pin, because it does not smell like baking.' What is important here is getting them to think about an object in a deeper way (Post-interview 1, Renee).

Most observations reflect Renee's element of her personal theory relative to knowledge and learning in a humanities museum, where her priority is for learners to develop analysis and enquiry skills. Renee expressed in her pre-interview that it was also important when teaching in museums, that learners get information about objects right. An example is provided from the "What Is It?" activity where learners were given objects and asked to choose which option correctly identified the objects.

Child: I think it's a skull of an eagle. Because it's got the wings of an eagle. It's got a little round head. It's thin and it's easy to break as well.

Renee: Okay. Right. It's quite easy to break. Does that make it a good skull though?

Child: No.

Renee: Is it a good thing if it's breakable?

Child: It could be an eagle. Because of the spine and that.

Renee: Because of the spine. These bits here, pay attention, they look very like a spine on lots of different animals with a backbone, like humans. Also, it is quite fragile. So, it wouldn't be brilliant at protecting the brain. Probably not the best thing for a skull to do, is it? (Pause. Looks at child for an answer) ... So, you had some very good reasoning there, Ivana. That was very important. But it is the pelvis, or the hipbones of a chicken.

(Observation 4, Renee).

Data analysed from post-interviews saw Renee explain that she wanted to keep a balance between supporting independent enquiry and letting learners' thinking go down a path not substantiated by evidence. This finding suggests that Renee does not adopt a "history as anything goes" (VanSledright et al., 2011, p.20) attitude to learning, which might characterise "radical constructivism" where the role of the knower is privileged (Richardson, 2003). She explained,

Remember that learning in museums is about thinking about the object that's in front of you, looking at it carefully and learning a little about it... It is important for children [in any museum] to get some information right. I would correct a child if they were making incorrect assumptions about an object [with regards to facts]. I think if you ask a child, 'Is this an African or Asian elephant tooth?' They should not be making things up... Also, because this is a university museum, I think that in the end the children should leave

having fully understood basic things about an object. I try to avoid giving out the answer, especially when teaching history as the emphasis of learning is on analytical thinking... It's difficult to find the balance. So, when it comes to misunderstanding basic facts in activities not related to interpretation of objects or not using any evidence and we are running out of time I might have to guide them a bit (Post-interview 4, Renee).

In the previous subsection Renee's practices in Museum A and the congruent relationship to elements of her personal theory relative to knowledge and learning during history teaching in this humanities museum was explored.

The following two subsections discuss the remaining two aspects in Renee's personal theory that were found in her teaching in both museums.

6.3.3 Personal theory on learners, their abilities, and how this impacts on teaching

This subsection discusses Renee's view on learners and how this is translated into practice at both museums. Analysis showed that part of Renee's personal theory is to differentiate her practices to support a learner's abilities. Tran (2004) reported similar findings in his study of museum educators, despite the notion of "ability" being disputed in education literature (Hart et. al, 2004). However, observations showed that often Renee did not have the time or proper acquaintance with learners to accommodate their abilities on an individual level. Instead, Renee adopted broader differentiation practices, such as tweaking the level of questions posed, the time and help provided according to the general ability groups learners belonged to. Therefore, it is suggested that the reality of the context Renee teaches – time and familiarity with students afforded by museum school programmes – limits her ability to be consistent

with this element of her personal theory. Indeed, other researchers (Bennett et al., 1997, Leatham, 2006; Mansour, 2013) have shown that limited time and a lack of familiarity with students may hinder the educator's ability to fully follow his personal theory and differentiate his practices to each learner's abilities.

It was observed that in most episodes in Programme 1 and 3, Renee varied the amount of time, help and questions she gave to different ability groups of learners. With few exceptions, Renee differentiated her practices with learners based on the general ability of the group. For example, in Programme 3 Renee gave slower learners more time to think. She posed questions based on their observation of objects.

In Programme 1, with higher ability groups she asked more advanced questions. When questioned about this, Renee explained that it was essential to give slow learners enough time to think and tweak the guidance provided to accommodate this ability group. Equally, Renee wanted to challenge high-ability learners with questions that went beyond observation. Renee said in relation to the episodes observed with low-ability groups,

It's very important to allow children thinking time. If you ask children a question and they don't come right back at you with the answer and... you just say, 'Okay, well, you don't know' or 'I will tell you the answer,' that is a big mistake. You should allow time and provide more help with slower learners that need more assistance (Post-interview 2, Renee).

In relation to the episodes with faster and higher ability learners, Renee explained how she tweaked her practices to accommodate these students. She also identified time constraints and a lack of familiarity with learners as factors that

limited her ability to follow her personal theory of individualised differentiation practices. Renee said,

Persisting with questioning at the same level, with all learners... in a way that accommodates them on an individual level... in a limited amount of time is challenging when you teach in a museum.... If you don't know the children, it's difficult to bridge different levels of enquiry in a short amount of time. If the children are showing that...their questioning skills or abilities are quite low, I keep questioning short and sharp, more focused on observation than I would with a more attentive, imaginative, and able group. I tweak the practices I use per the abilities exhibited by children as groups (Post-interview 4, Renee).

This subsection argued that Renee uses differentiating practices based on learners' abilities. Analysis showed that limited time and familiarity with learners, circumscribes her ability to teach in a way that aligns with her personal theory of differentiating practices to accommodate learners' abilities on an individual level.

6.3.4 Creating a positive learning environment and practices

This subsection discusses the details of Renee's personal theories about creating a positive environment to support learning, and how this was manifested in her practice at both museums. Renee, in her pre-interview, said a positive learning experience has three characteristics:

- i) it consists of an organised and controlled environment;
- ii) it fosters rapport and a sense of safety; and
- iii) it encourages motivation and interest in learning.

Renee explained that these are the key conditions to facilitate learning and for cultivating a positive predisposition toward life-long learning in museums. This echoes literature suggesting that museums aim to cultivate a supportive, organised and interesting learning environment that will facilitate a life-long learning attitude towards museums (Hein, 1999b; Hartz, 2017; Hooper-Greenhill, 2007b; King, 2009; Nikonanou, 2009). Renee drew on her experience as a school and museum educator, which is in line with literature suggesting that museum educators' professional background and experience influence their personal theory and practice (Bevan and Xanthoudaki, 2008; Ebitz, 2005; Tran and King, 2007), and said,

I think for children to learn (referring to her experiences as a school teacher and a museum educator), they need to feel motivated, interested, and to feel a connection with you. So, by letting them have fun, having an exciting and positive experience that helps them to learn more. Maintaining an organised environment through positive behaviour management is a key aspect in achieving that. I don't want them to just come here and have great fun and that's it. I also think that my goal as a museum educator is to want them to have a thirst for learning. I like children to feel that a museum is somewhere they can come as a place for learning. So, their overall experience must be very positive (Pre-interview, Renee).

Each characteristic that Renee attributed to a positive learning environment and the practices she chose are discussed. This subsection underlines that, per Renee's pre- and post-interviews, a positive learning environment consists of:

- i) Creating an organised and controlled environment through time management practices, clearly stating instructions, clarifying expectations,

creating trust, using positive language, and experimenting with practices that control learner behaviour.

- ii) Cultivating rapport with learners and a sense of safety by memorising learner names and showing interest in their comments.
- iii) Encouraging motivation and interest by using praise, real objects, providing additional information on objects, and modelling excitement by using an animated teaching style.

Unlike other elements of her personal theories, which were influenced by the museum discipline she was teaching in, creating a positive learning experience was integral to Renee's overall commitment to teaching.

Cultivating a positive learning experience is a priority in all the sessions I teach. A lot of the strategies that I used were like the ones I used when I taught in schools. I think that once you've got a way that you're happy with then you tend to stick with it (Post-interview 8, Renee).

This subsection relies on post-interview data to analyse Renee's elements of her personal theory in terms of her choice of practices, because for the most part Renee did not elaborate on the way she translated her personal theory of a positive environment into practice, nor did she provide examples of such practices in her pre-interview. This shows the methodological importance of using post-interviews grounded on observed episodes of practice to better understand museum educators' personal theories and practice.

6.3.4.1 The creation of a controlled environment

This part of the subsection relevant to creating a positive learning environment focuses on Renee's personal theory about maintaining a controlled environment to

enhance positive learning in the museum. Several ways of achieving this were observed and confirmed by Renee in the post-interview discussions. Broader education literature suggests that these practices coincide with those used by teachers in schools to maintain a controlled environment (Babkie, 2006; Grossman et al., 2004; Herschell et al., 2002). These included:

- i) managing time
- ii) using introductions to provide specific directions, delineating expectations and communicating trust;
- iii) positive language,
- iv) a pattern of practices ranging in intensity from addressing learners by their names, smiling at them, using instructional language, and appealing to schoolteachers for assistance.

All the practices observed were characterised by positivity and subtlety, which mirror Renee's element of her personal theory about cultivating a pleasant learning experience.

During her pre-interview, Renee affirmed that maintaining a positive learning environment and keeping control of learners is important. Insisting to maintain control in a positive way and "pick her battles" with children, echo Tran's (2004) findings on museum educator's and is in line with suggested behavioural management practices in museum education literature (Hooper-Greenhill, 2007b). In Renee's words,

You expect challenging behaviour and children drifting away; you've just got to know how to manage their behaviour to maintain a pleasant learning environment. That's why it's important to keep an organised and controlled class. Your

classroom management practices need to be positive. So, for example, you make sure that everybody is looking at you and everybody is listening. You must make sure that the children are carefully supervised and that you are on top of their behaviour during activities. I think you must pick your battles. Sometimes, if they are drifting in and out, it is not the end of the world (Pre-interview, Renee).

Several observations provided evidence that Renee used time management practices to control the pace of each activity. She informed learners at the start of each activity how many minutes they had and then counted how many minutes the learners had left throughout each activity. For example, “You have five minutes left. You must hurry up. You should be finishing soon” (Observation 6, Renee). In the post-interview, Renee explained that allocating time for each activity helped her provide structure to maintain the learners’ attention. Renee said,

Time management is something that I must be in control of – you’ve got to limit them before they start misbehaving or drifting away... It’s important to let them do an activity for a controlled amount of time. Giving them time-checks all the way through helps, even though they don’t know what ten minutes is, they know that they’ve got to speed up a little bit and that this activity is going to end at some point. That helps keep things under control (Post-interview 6, Renee).

It was observed that Renee used introductions to clearly state instructions and delineate her expectations. She said, “I want you to be working in pairs and come back in half an hour. I know I can trust you to look around carefully and complete the task” (Observation 3, Renee). When Renee was asked about this in a post-interview, she confirmed that this was a teaching method she used regardless of her reading of a

group's behaviour. This highlights that the nature of her behaviour management was not remedial in nature. Renee said with regards to an episode in Programme 1,

I gave very clear instructions and conveyed my expectations. They needed to work in pairs. They needed to come back now. They were in a position of responsibility, and had to look around the museum carefully. They were in a position of trust. I guess we always start every session by talking about the rules and I think even if the group seem angelic and well-behaved, I think it's still worth doing that (Post-interview 3, Renee).

Renee used positive and non-imperative language that relayed a sense of choice to children to control their behaviour. She allowed learners to choose when they were ready to follow what she had asked for, "When you are ready, please line up over here." She gave instructions through praise, "Jessica, is listening very attentively, can I have everyone pay attention like Jessica?" (Observation 6, Renee).

When Renee was asked about those episodes, she explained that using positive language was a practice she learned during her PGCE training and intentionally used it to keep children under control. She said,

It's important to always use positive language. I guess you convey your expectations as to what you're looking for, without having to use imperative language; without having to use too much instructional language. When I was training to be a teacher, somebody said it's good to do that. It comes with practice. I have had to consciously think about that, and I'm glad that you've picked it up. Let's say if I wanted to say, 'Everybody sit down on the floor.' I might use an example and say, 'Okay, Lily, can I have you sit down? Great, everybody sit like Lily.' Using a good example, I find that

always works. And be suggestive, give some choice so things like, ‘Do you think that maybe you should...’ (Post-interview 6, Renee).

Observations showed that when learners were restless she followed a pattern of practices congruent with the element of her personal theory of maintaining a controlled environment. These included body language signals – such as smiling at learners, pointing at the activity they should be doing, using their names, and using instructive language. Renee stressed that using positive practices and maintaining a harmonious relationship with learners was vital to museum education and that subtle practices usually worked best. Tran (2004) and King (2009) have reported similar findings, with regards to science museum educators teaching school children. She said,

It’s very important to always start with positivity when children are misbehaving and not engaging in their activity. If they can see me, I use body language. I find it quite powerful sometimes, if I just look at a child and smile. Usually they’ll respond. If they’re then difficult, then I might just point them over to where they’re going.

If they ignore me again, I usually use their name...it’s so much more powerful if I said to you, ‘Denny’...that often works. It alerts them I’m on their case. In this sort of environment that usually does the job. The children, when they’re in the museum are usually well-behaved. So, you don’t have to come up against tough behaviour. And you only have them there for a limited amount of time, so it is best to try and have them on your side.

If that doesn’t have the desired effect, like with the group today... I would be a little bit more firm but would still try to

keep a pleasant tone. And normally that would ensure there is no friction with the pupils. If the behaviour dropped below that then I would expect a teacher to address it (Post-interview 4, Renee).

During the post-interviews Renee was asked to expand on her thinking about reverting to schoolteachers, a practice widely reported in museum education studies (Castle, 2001; King, 2009; Tran, 2004). Renee said,

Dealing with bad behaviour does not frighten me; I dealt with lots of it in schools, and so I'm not scared off by it. But with younger children it's very difficult because you need them on your side. If you are teaching in a school, you can build the relationship back up again absolutely...so it is quite tricky. Today with Jordan, I was grateful that the teacher was very responsive and dealt with him. It was sensible. I was thinking, 'I should be dealing with this.' Then I thought, 'No, because I don't know this child, I don't know what works and what doesn't.' (Post-interview 1, Renee).

The following discusses Renee's conceptualisation of a positive learning environment as one that cultivates rapport and a sense of safety. It also explores the practices she used for this part of her personal theory in her practice.

6.3.4.2 Cultivate rapport and a sense of safety

Renee used the practice of i) memorising learner's names; and ii) showing interest in their comments. During her pre-interview, Renee mentioned that cultivating rapport with learners created a trusting and emotionally safe learning environment. She emphasised the importance of these practices in light of her experience of the museum learning context i.e. limited familiarity and time with

learners. This shows, in line with Bevan and Xanthoudaki's (2008) argument, how Renee's experience as a museum educator influenced her teaching. Renee said,

In a museum context, you need to communicate with children you don't know; that's a massive difference for me from teaching in schools. It's something that I do miss from teaching that you have your class, you go through the year with them, and you know them. For a museum educator, you've got a new set of kids every day. So, you've got to build a relationship with them quickly and get them on your side, because otherwise they will not want to learn. If they don't trust you then nobody will learn anything. For the same reason, they need to feel emotionally supported and safe (Pre-interview, Renee).

In her post-interviews, Renee discussed two practices used to create rapport with learners and to cultivate a sense of safety. She said she memorised learners' names and rarely disregarded learners' comments. During post-interviews, Renee explained that the former was used to create a sense of closeness with learners and the latter was used to make them feel supported because she perceived learners' spontaneous comments as an attempt to bond with the museum educator. Her interpretation of their behaviour was grounded on her understanding of children's developmental psychology. Studies have shown that a sense of rapport is built between learners and teachers when teachers paid attention to the children's questions or comments (Zirbel, 2008). She explained that she wanted to take the opportunity to reinforce the connection between herself and the learners. She said,

Using their names helps with behaviour management as well as it being a human feeling that they're valued. You know, that is an important aspect as well... When children feel that

they want to share something with me then I think that means that they feel a connection with me, and for me to say, ‘Oh I haven’t got time,’ or ‘Okay, whatever,’ is quite crushing. Child development takes a long time, for some kids especially, to become less egocentric. So, they think that the fact that their grandma brought them to this museum once three years ago and they saw these stuffed animals or whatever is the most fascinating thing for me. So, I don’t want to crush them and change that...they might not feel emotionally secure if I do that... I want to leave them feeling like they’ve had a positive experience, which will hopefully make them want to come back. But yes, it’s on a human level that I am doing that and not just to support their learning (Post-interview 3, Renee).

6.3.4.3 Characteristic of a positive learning environment: Honing learner motivation and interest

This part of the subsection relevant to creating a positive learning environment focuses on Renee’s element of her personal theory relative to reinforcing learner motivation to cultivate a positive learning environment. These included: i) using praise and encouragement; ii) using real objects; iii) providing additional information on objects that learners show interest in; and iv) modelling enthusiasm in an animated way. These ways of achieving a positive and interesting learning environment echo research on teaching and learning (Babkie, 2006; Bucalos and Lingo, 2005; Epstein, 2005; Grossman et al., 2004; Herschell et al., 2002; Kern and Manz, 2004). Post-interviews confirmed that using these practices to cultivate learners’ motivation and interest in learning was embedded in Renee’s personal theory.

During her pre-interview Renee mentioned that engaging learners’ interest and honing their motivation were key elements to providing a positive learning

environment. When she was asked to elaborate on this element of her personal theory, she specified that praise encouraged and motivated learners. She stressed that this was particularly important in the context of museum education. An emphasis on motivation as a means to create a positive learning experience, reflects the principles of Free-Time pedagogy which is highly regarded in museum education (Falk and Dierking, 2002). In Renee's words,

If someone is interested in what they are doing and feels motivated, then their learning experience is very positive. I think giving compliments and encouraging them makes a big difference for the kids in terms of motivation. (Pre-interview, Renee).

Several observations confirmed that Renee typically praised learners for their effort and performance; for example, "You were great today, you should feel proud of yourselves." She provided individual praise to learners who were having difficulties; for example, "Wow, you have chosen really good colours here. You have done an amazing job. The details are beautiful. You are obviously very artistic" (Observation 6, Renee). During post-interviews, Renee was asked to explain her thinking behind such episodes. Her response mirrored her answer during her pre-interview. In her own words, "Obviously, things in museums are different because you have to do everything in a very short time and using praise makes a big difference in terms of motivation. Compliments and positivity are the best things" (Post-interview 6, Renee).

Additional observations provided evidence, confirmed in the post-interviews, that Renee took every opportunity to stress the authenticity of objects, for example, "All of the objects you see are real. That's what's cool and special about museums" (Observation 3, Renee). When Renee was asked about this observed practice in a

post-interview, she confirmed that highlighting the authenticity of objects was used to build the learners' interest. Several authors concur that object-handling in museums, especially of authentic objects, evokes enthusiasm, motivation and emotional connection (Kavanagh, 2000; Shue, 2004). In Renee's words,

Using real objects makes me feel that children can relate to them more, I think. They have more of a relationship with the thing after seeing a real one, and you always hear that question, 'Is this real? Is that real?' Kids place a lot of value on things being real. That is why I want to start always with the real objects, to bring things to life and stir interest. Because that to me is what museum learning is about and that is why it can be so engaging and that's what makes it different (Post-interview 3, Renee).

Observations also showed that Renee often shared facts about animals and provided additional information about various objects. Despite previous post-interviews indicating that this practice was used by Renee to help learner's build-up their body of knowledge in Museum B programmes, further analysis showed that this practice was used in both programmes towards a different goal: to interest learners in objects. Renee said,

I want them to be able to take away an interest in those objects and if that is sparked by, like, a fact or an understanding as well then I think all the better, really. Kids love to learn facts (Post-interview 3, Renee).

Observations showed that Renee's facial expressions, hand gestures and voice conveyed enthusiasm, for example, a vivacious tone in her voice, smiling, vibrant movements and engaging eye contact. This is in line with Tran's (2004) findings on

museum educators, according to which they use theatrics to hone learners' interest. In

the post-interviews Renee, likened teaching in museums to performing,

You've got to put your face on, haven't you? You're kind of performing. If you're enthusiastic then the children usually are as well. If I had stayed a bit flat and a bit dull and disinterested the whole time, then they probably would have too. So, I try to be quite animated with them, and chatting looking them in the eye, smiling, moving my hands around a lot. Well, as I said earlier, I tried deliberately to be quite enthusiastic about each activity as I do not have much time with these children (Post-interview, 8).

This subsection discussed creating a positive learning experience as an important element of the personal teaching theory held by Renee. Analysis showed that Renee's perception of a positive environment consisted of creating an organised and motivating environment that cultivated rapport and a sense of safety with learners. Analysis also showed that Renee's experience as a museum educator in museums A and B, teacher training and knowledge of children's developmental psychology informed her choice of practices.

CHAPTER SEVEN: CASE STUDY FOUR

CHARLIE

7.1 Introduction

This chapter presents the case study of Charlie, a museum educator for primary school children employed in the education department of Museum B, a university museum with a focus on natural sciences in the United Kingdom. He also teaches in a shared programme with a university humanities museum. Charlie's professional background is discussed, with a short commentary on the primary museum he works for and how it impacts his teaching practices. An examination of the context of the programmes studied, namely Programme 1 and Programme 2, and the museums they took place in, are in Appendix A.

Three key points emerge from this case study. The first point, is that Charlie's personal theory of teaching has three elements:

i) The first, concerns Charlie's understanding of teaching relative to the nature of knowledge. He made a distinction between the nature of knowledge in humanities as fluid and fixed and science as fixed.

ii) Second, part of Charlie's personal theory is that in the context of humanities he values the individual learning characteristics of students and believes that learning should entail analytical thinking and meaning making. In the context of natural sciences, Charlie believes that learning entails an accumulation of information to create an understanding of scientific notions.

iii) Charlie believes in building a positive learning environment that: i) is risk-free and cultivates rapport; ii) encourages motivation and interest; and iii) is controlled. He believes in “learning by playing.”

Charlie’s personal theory was consistent with his practices, however, due to factors such as, time and familiarity with learners he was not always able to translate all elements of his personal theory into practice.

Also, Charlie’s personal theories are influenced by his experience as a museum educator and his background as a school teacher and, in instances, the discipline of the museum he teaches in. The elements of his personal theory seem to be aligned with the pedagogical approach that characterise each university museum he teaches in. This seems to enable the translation of his personal theory into practice.

7.2 Profile of a museum educator and the museum he works in

7.2.1. Charlie’s background

Charlie attained an undergraduate degree in Philosophy and Social History in the UK. He obtained TOEFL accreditation for English as a foreign language and a PGCE teaching certification specialising in primary education with a focus on learning through play. He taught in primary school and nursery schools before museum education. Museum education was attractive to Charlie because it allowed him to combine teaching with his personal interest in natural sciences.

7.2.2 Charlie’s view of his profession and the museum he works in

This subsection describes Charlie’s view of his profession, teaching practice, and the museum he is employed at (Museum B, a university natural science museum). Charlie said Museum B has an object-centred educational approach. The prevalence

of this approach in museums is highlighted in Pye's (2007) and Hooper-Greenhill's (2007b) research on museum education. Curtis (2014) similarly stresses that "university museums have long had a public role including...a school's service that focused on object-handling sessions linked to curricular topics" (p.86). Charlie said he was given freedom by the museum management to develop a personal teaching style. Charlie explained that the educational principles of object-based pedagogy and focusing on the scientific content of the collections, as espoused by Museum B, coincided with his personal beliefs. The alignment between Charlie's personal theory and the aims of the museum he teaches in, might explain why Charlie was enabled for the most part to align his personal theory with his practice. This reflects Leatham's (2002) and Mansour's (2013) position that the sociocultural context in which an educator works in (e.g. the museum context) may enable or limit the translation of an educator's personal theory into practice. Charlie said, "We must cover our collections and as much teaching as possible must be object-based...focused on scientific knowledge and content and covering the science curriculum... We all support that" (Pre-interview, Charlie). This shows that Charlie not only asserted that this approach was consistent with his personal theory of teaching but his colleagues also espoused it. He said, "When we appoint people, they give a presentation of how they would teach someone, so we get an idea of their teaching style...and whether their teaching approach is compatible to ours." (Pre-interview, Charlie).

He explained that a common pedagogical approach did not necessarily translate into similar practices among museum educators in Museum B. This mirrors research on teacher thinking (Conti, 2007; Eraut, 1994), according to which variations in practices amongst teachers who identify with common pedagogical approaches can be indicative of "the distinct qualities a teacher displays that are persistent" (Conti,

2007, p.20). Charlie also explained that he was given the opportunity to translate other elements of his personal theory into practice when teaching programmes in Museum A (humanities museum). Charlie said,

There's as much freedom, if not more, in museum education, as there is in schools to develop an individual style. In Museum B, there's no prescriptive way to teach...Lea [the director of the education department in Museum B] wouldn't come in and say, 'You must do this, you can't do role-plays. I want you to do it in this way' ...that is pretty much the case for Museum A as well, based on my experience of teaching there. Or maybe it's just that my teaching philosophy specific to a history-based collection is very close to the approach taken by Museum A. Of course teaching with a collection that is history-based is different (Pre-interview, Charlie).

Charlie drew on his lesson plan for Programme 2 to juxtapose the ways in which the same programme can be delivered in ways that suit alternative teaching styles. He explained that his teaching style was directed, which meant it had more didactic elements. Charlie said,

If X delivered Programme 2, she would still talk about adaptations to feeding, body cover, sense and movement like me, but she probably wouldn't draw cartoons on the board like I do. She might put down animals in front of [learners] and give them 10 minutes to find an adaptation on that animal and then discuss it... I do it in a more directed way. Depending on one's teaching style... we plan a lesson accordingly. So, the same things would be covered but in a different way (Pre-interview, Charlie).

Charlie highlighted the importance of being exposed to conferences or training days as a way of informing one's personal theory and practices. This illustrates the

potential influence of on-going professional training on a museum educator's personal theory and teaching practices, which has been highlighted by researchers such as Bevan and Xanthoudaki (2008) and Ebitz (2005). In Charlie's words,

We go on training days and conferences. I went to one in X for a week that was based on learning in museums across Europe and comparing ideas and strategies about educators across Europe. Also, we went to training days about [teaching] children in university museums, which is another Pan-European project... I've also had a chance to see practitioners from other museums that I wouldn't usually get a chance to see or discuss learning with. I get a chance to see their styles and the types of programmes they run and the reasons they're running them. It's very informative (Pre-interview, Charlie).

This subsection, presents Charlie's professional background and discusses the dynamic between his personal theory, personal style of teaching and the museum's educational approach. It is argued that Museum B provides a balanced working environment with an object-centred approach and scientific focus while providing flexibility regarding teaching. This section shows that Charlie believes Museum B has an open approach to teaching, allowing for creativity in personal teaching styles and professional development. It also displays that Charlie feels enriched by ongoing professional learning in the form of workshops and seminars.

In the section that follows, the themes that emerged from the analysis of the interviews with, and observations of, Charlie answer the research question posed by this study, *How, in a university museum, do museum educators' personal theories of learning relate to their educational practices?*

7.3 Introduction to Charlie's personal theory and practice

This section presents Charlie's personal theory and practices. Information on factors that appear to influence his personal theory of teaching are provided (e.g. his background as a school teacher and museum educator in the two university museums sampled in this study). This finding is line with research that argues a major factor influencing museum educators' personal theory and teaching is prior professional background and experience in teaching (Castle, 2006; Pringle, 2008). Also, it illustrates the relationship between elements of Charlie's personal theory and practice in light of the teaching context of the humanities and natural science university museums he works in. The influence of the teaching context on the educator's ability to translate their personal theories into practice is supported by researchers such as Borg (2003), Drageset (2010) and Leatham (2002). Analysis revealed that Charlie's personal theory was based on his views about: i) the nature and production of knowledge; ii) learning and learners; and c) cultivating a positive learning environment. Each subsection is dedicated to one element in Charlie's personal theory articulated in his pre- and post-interviews. The elements of Charlie's personal theory on knowledge and learning explore the nuances in his personal theory and practices according to the context of teaching; humanities (Museum A) and natural science museum (Museum B). This finding gives weight to Tsai's (2002) hypothesis about the discipline-dependent nature of teachers' personal theories: "one teacher may have beliefs toward teaching science that are very different from those of teaching history" (p.780). Previous research in teacher education supports this finding and shows that teacher beliefs and personal theories about teaching may vary according to the discipline they teach (Cobb, 2002; Grossman et al., 1989; Hofer, 2000; Olafson and Schraw, 2006). The element of his personal theory on cultivating a positive learning

environment is discussed in the context of his teaching in both museums, as there were no distinctive differences across museums. These draw on Charlie's observed practices with interviews to discuss the relationship between his personal theory and practice. These are discussed in the same order below.

7.3.1 The nature of knowledge and learning and practices in Museum A

In the subsection that follows, Charlie's element of his personal theory concerning the nature of knowledge and learning in a university humanities museum and how these relate to his practice are discussed.

During Charlie's pre-interview, it became apparent that his view on the nature and production of historical knowledge was filtered by his perception of history as a discipline and his school teaching experience. He suggested that multiple "possible lines of enquiry" could be pursued when interpreting the same factual evidence. Such an approach to knowledge seems to mirror a criterialist approach to knowledge. "Criterialism" is "an understanding that historical knowledge is based on evidence, and developed through the use of criteria and arguments" (Voet and De Wever, 2014, poster). Charlie made a distinction between the nature of knowledge in history, in terms of information or factual evidence, and as a product of interpretations. The nature of the former is perceived as fixed while the latter is fluid. This symbiosis between information and interpretation, in understanding the nature of historical knowledge, is portrayed by Tilden in one of his six principles of interpretation. "Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information" (Tilden, 2007, p.18). Charlie said,

I studied history and I taught history in schools... There are many possible lines of enquiry. There generally isn't a 100%.... There is always room for reinterpretation of evidence... I think with history the answers can be a lot more fluid, particularly with people that aren't around to ask. If historical knowledge about people's culture is used to *understand* (emphasis added) a culture, then that type of knowledge is a lot more open-ended and you can't be as decisive about it. There are so many parameters that come into play when you try to make historical interpretations, they are multifaceted (Pre-interview, Charlie).

Observations showed that Charlie's personal theory about knowledge was reflected in his practices. Charlie encouraged learners to explore different lines of enquiry through the questions he posed. He also encouraged learners to filter their interpretations through various cultural contexts by alerting learners to the cultural nuances of objects. A typical episode is provided, during which learners were asked to share with the whole class the information they found on various objects and to use that information to assign meaning and interpret the objects in relation to the skeleton they were found with in a mock dig:

Charlie: Okay, guys. Right, we need to share your information.

Child 1: This is a bracelet. From Africa.

Charlie: Whom do you think it belonged to?

Child 1: A woman

Charlie: What did you find out?

Child 3: This is a comb.

(5 minutes later)

Charlie: So we have an Afro comb and a bracelet – which group is going next?

Child 5: Horse tooth.

Charlie: Horse tooth. So, what's that tell us about this person if they have horses?

Child 5: This person rides horses.

Charlie: Horsemeat is delicious, the French love eating it.

Child 4: Aww.

Charlie: Okay, this person probably has some connection with horses.

(10 minutes later)

Child 11: Are we going to find out who it is?

Charlie: Well, this is what you're doing. It's a black African with an Afro who drives cows on a horse, who seems to hunt animals, who likes music, [and is] proud of their appearance. You said it looks like they've been murdered.

Child 12: By who?

Charlie: We don't know. Have we got any evidence to tell us who murdered them?

Child 13: Someone who wants their stuff.

Charlie: Perhaps. But hang on a minute; all this posh, expensive-looking stuff is still here. So, if they were robbed, would that stuff still be there?

Child 14: Maybe they just took the cows.

Charlie: Ah, maybe the cows are valuable, yes. In some countries, particularly in Africa. I think you're probably right.

That's a good interpretation. These are only the things we can find out from our research and our evidence, which are probably quite true, so we come up with ideas and try and prove them with other evidence. This is how history ends up in your books. People come up with all these different ideas from the evidence that they have.

(Observation 1, Charlie).

When Charlie was asked about this during his post-interview, he explained that as the outcome of historical research is fluid, there are various ways in which objects can be interpreted in terms of their meaning and cultural significance based on evidence. Charlie juxtaposed this evidence based interpretive approach, taken with a research history collection, with his perception of the interpretive approach in art galleries. Even though the distinction he provides is an oversimplification, it suggests that the discipline of a museum may influence the epistemological approach adopted by a museum educator. Similarly Pringle's (2008) study illustrates that the personal theories and epistemologies of artist educators' are influenced by the discipline of the museum they teach in. Charlie said,

I look at it from an historical point of view, in that I'm telling them there isn't a right or wrong answer and they have to use their questioning skills to come up with theories and evidence to prove that right or wrong. With regards to the final activity, we have a vague idea of where the evidence points, but there is no fixed answer. They will also have some wild speculations, as well; they have loads of good ones. But it doesn't matter; if it's based on evidence, it doesn't matter. I have a one-legged skeleton, and one day, a child said, 'It's a pirate.' I said, 'Why do you think it's a pirate?' 'He's only got one leg'. That was good enough. I'll point out in the end that there is no right or wrong answer and that historical theories

are based on evidence and can change as further evidence is found or new analysis is made. So, you can carry on researching it; you could look at other lines of enquiry and this is the idea about how history works.

History museums, especially university museums focused on research, are not like art galleries. It's not a case of having something on the wall and interpreting it as you want. There are specific steps that lead you to various interpretations. I think this is the difference between subjects (Post-interview 1, Charlie).

Consistent with Charlie's view of the nature of historical facts as fixed, observations showed that if children misidentified objects, Charlie would correct them. For example, Charlie corrected the country of origin of an object that a learner got wrong. Charlie said, "I think that's a very good match. But I don't think it's an American bison. It's very similar but an American bison has this sort of stripe here. This is from Europe. Try and find which country it is from, please" (Observation, 3). When Charlie was asked about this episode in a post-interview, he said that identifying the objects correctly – what objects they are and where they originate from – was an initial step of the analytical process, because it provided a starting point to evidence-based interpretations (Post-interview 3). Charlie explained that he wanted the children to learn how to distinguish between evidence and interpretations and to produce findings that are substantiated. During another post-interview, Charlie expanded on his overall understanding of knowledge in history. His response suggested his personal theory was influenced by the principles of historical research, which he explained he was exposed to during his academic studies and his time as a school teacher. Literature confirms that historical research methodology, in line with the New History approach used in history education (Phillips, 2000), involves using

evidence-based methods to construct personal accounts (Seixas, 1999). This suggests that similarly to findings reported in the literature on museum educators (Bevan and Xanthoudaki, 2008; Ebitz, 2005; Tran and King, 2007) Charlie's academic and professional background influenced his personal theory and practice. Charlie said,

Historical thinking is a combination of creative thinking: playing with ideas, considering all possibilities, not ruling anything out while balancing evidence to give credibility to a theory. Sometimes children don't differentiate. That boy was a step away from giving them names and personalities. I had to encourage him to ground his theories on evidence. I did say a couple of times, 'Well, that's a really interesting theory. We could research that and find out how much of that is right.' I said at one point, 'Do we actually have evidence for that? Is there any way that we could prove that it is better than (another child's) idea?' or 'Those are both great ideas. Which one do we think is most likely?' This promotes group discussion centring on evidence and the children's life experiences and knowledge, and highlights how opposing theories need to be defensible through evidence...this is how professional historians research, there are different types of knowledge embedded in historical research...factual that is rather fixed and interpretive which is not (Post-interview 3, Charlie).

The pre-interview showed that Charlie's perception of learning in this museum was filtered by his understanding of learning in history as a discipline and his teaching experience in primary schools. Charlie's understanding of learning as facilitation of open-ended analysis skills and construction of personal meaning-making mirrors a constructivist orientation to learning (Hein, 2002; Tsai, 2002; Voet and De Wever, 2014). Charlie said,

I teach in Programme 1 (administered by Museum A) the way I would teach history in schools. I suppose it's the difference between a science lesson and a history lesson...learning a piece of history is about analysis skills, meaning making and construction of interpretations...Programme 1 is far more humanities-based session in that it's open analysis and meaning making. The goal in this museum is for children to become "museum experts" and learn how to conduct historical research, to develop their analytical thinking skills...Children must do an overall analysis of an unknown object and collect information. [They have] to think outside the box and have very wide speculation about the object from their observations and the evidence they have collected. You're asking [learners] to argue from the evidence with no real prior knowledge of facts. You're deliberately not telling them things and you're saying, 'Right, I want you to analyse this evidence.' There's no right or wrong answer in the way the evidence is interpreted. It's to do with the strength of their analysis and what they observe. I think the main aim is getting children to question things and analyse things and explain things. I want to get them to understand how they're learning from objects; how we make meaning of the world by handling and analysing them (Pre-interview, Charlie).

He explained that his view on learning was influenced by his goal of teaching learners to think like historians – that is, similar to professional historians, learning to draw on the "disciplinary 'toolkit' [of historical research that is] filled with established modes of inquiry, evidentiary criteria, and accepted patterns of analysis to help in their object-related work" (Bain and Ellenbogen, 2002, p.153). Charlie said,

My role is to encourage learners to hone their analysis and interpretation skills with objects...and replicate how museum experts work with history-based collections, to "become a

museum expert” ... It’s not to tell them things, but get them to use skills to tell me what the thing is and how it can be interpreted. I want them to go through a process of meaning making and analytical thinking... I often say, ‘I’m not the expert; you are the expert today.’ I try to use questions that would facilitate close observation and analytical thinking skills. I want to make sure that their thought processes work to analyse things and that they can come up with evidence for their answers and theories. I want them to learn to think like historians (Pre-interview, Charlie).

When Charlie was asked during the pre-interview to elaborate on his view of learning in terms of the practices he used to facilitate learners’ analytical thinking, he said he did not have a “single approach” and used a “hierarchy of questioning.” He explained that the pattern and choice of questions he used were based on his own analytical-thinking process, his knowledge of the objects, and his experience as a school teacher and museum educator. Analysis of observations, confirmed by post-interviews, showed that Charlie enhanced learners’ analysis and meaning-making skills by: i) posing questions to facilitate close observation and initial analysis of objects by using the senses; ii) prompting learners’ reasoning skills by asking them to justify claims; and iii) asking questions to facilitate theory building and the cultural interpretation of objects. These will be discussed in the following parts of this subsection.

7.3.1.1 Posing questions to facilitate sensory object analysis

and modelled questions that instigated close sensory observation and further object analysis. This type of engagement with objects as a means to facilitate analysis is a tenet of experiential and enquiry learning (Sadler-Smith, 1997; Tovey 2012). This

practice reflected Charlie's element of his personal theory that learning how to think in university humanities museums is facilitated through careful analysis of objects. A typical example is provided below.

Charlie: What can you tell about this object?

Child 1: It smells like coins.

Charlie: What does this tell us about this object?

Child 2: Coins are made of copper! So, this is also made of copper. (Child looks at the object and jingles it)

Charlie: It's good to see you try to make it make a noise, that's good. Make sure you have a feel of it as well and see what do you think then, what might that tell us?

(Observation 4, Charlie)

Charlie explained during his post-interview, that the questions he used encouraged learners to use their senses. He said,

You ask them to smell things and feel things; to tap them to make noises and think about the significance of all these features. I say, 'How could you find out about this object? What can you see on it? What's it made of? How does it smell? What would it smell like? If it's Stone Age what would it be made of?' ...these all help them understand how to use their senses to analyse objects (Post-interview 4, Charlie).

7.3.1.2 Prompting learners' reasoning skills by asking learners to justify

claims

This section argues that Charlie used questions to prompt learners' reasoning skills. Charlie posed questions that modelled how to use reasoning through the process of elimination, and encouraged the use of evidence to substantiate an argument. This practice reflects Hein's (2004) position that knowledge gained through direct encounter with objects should be sought through meaningful action that consists not only of a hands-on but also a minds- on system of learning by doing. This practice reflected Charlie's element of his personal theory regarding learning; namely, that the production of knowledge in a humanities museum should be based on rigorous analysis supported by evidence.

Charlie was observed asking learners to justify their answers and prompting them to think about the significance of the evidence they were collecting. It was observed that Charlie modeled a specific argumentation technique when eliciting the learners' analytical thinking process. Throughout the activities Charlie used questions that urged learners to either provide evidence in support of an argument or arrive at a conclusion through a process of elimination. He often told them,

"You can either work it out by proving that it is something, or you can prove that the other two things can't be right" (Observation 2, Charlie). A typical dialogue that exemplifies this practice is taken from the, "What is it?" activity. Learners were asked to choose between three options and to identify the object at hand. During this episode, a group of learners circled the third option on their worksheet: that the object at hand was a prayer wheel. Even though this was the correct answer, Charlie

prompted learners to explain why they had rejected the other two options by indirectly suggesting different identities.

Charlie: Well, it's a child's rattle, isn't it?

Child 1: No, it's not a child's rattle, because it's too heavy and it would injure them.

Charlie: That's a good reason. So, it's a weapon?

Child 2: No!

Charlie: Well, why is it not a weapon?

Child 1: It jiggles.

Charlie: Is it a good weapon or a bad weapon?

Child 1: Bad. It's not sharp enough.

Charlie: So, what is it?

Child 3: A prayer wheel.

Charlie: Any evidence for that? Why is it a prayer wheel?

Child 3: The little drawings on it.

(Observation 2, Charlie)

During the post-interview, when asked about this episode, Charlie explained that he tried to ask learners to justify their answers, because he wanted them to learn to use evidence to ensure their answers were a product of rational thinking. He said that if the learners gave the correct answer with regards to the objects' identity, he often "plays devil's advocate." Charlie linked this practice to the element of his personal theory that learning entails using evidence to substantiate claims throughout historical enquiry.

They'd written down that it was something else, very quickly. So, I came up and said, 'Well, it's a child's rattle, isn't it?' I wanted them to tell me their thought processes, I'm getting them to think about why one answer is incorrect and another correct. It's trying to get children – especially those that have immediately decided on an answer – to tell you their thought processes and to make sure that they have assessed all the evidence and they haven't just by random ticked one of them. That is the basis of historical enquiry (Post-interview 2, Charlie).

However, observations showed that sometimes Charlie varied the questions he asked with certain groups of learners. For example, he focused on questions based on observation and provided prompts during the analysis process with groups of learners who exhibited weak reasoning skills. When working with learners who exhibited higher abilities he was more insistent in questioning and posed questions that required more advanced analytical thinking. Post-interviews revealed that Charlie believed that individual learners have varying abilities according to their developmental stage, knowledge and learning style preferences. Even though the notion of “ability” is disputed in the education literature (Hart et al., 2004), Tran (2004) reported similar findings in his study of museum educators. In line with this element of his personal theory he believed in differentiating practices according to each learner's abilities. During some of the observed episodes Charlie differentiated his questions according to the individual learner's abilities. However, in the majority of episodes he used broader differentiation practices based on the general level of abilities exhibited by groups of learners. Charlie attributed this to the limited time and familiarity he had with learners. This finding mirror research (Bennett et al., 1997; Leatham, 2006; Mansour, 2013) which has shown how limited time and a lack of familiarity with

students, may hinder the educator's ability to fully follow his personal theory and differentiate his practices to each learner's abilities. Charlie drew on his experience as a school teacher and said,

I try and analyse learning styles and their levels of development and knowledge...you know, all of the factors that determine in a way an individual's abilities... I think you must read faces, body language and try to be fluid enough to respond to children's own abilities... I gained a lot of experience on how to do that from all the teaching I did in schools and the reading during my training... if children are reasonably switched on I will ask more challenging questions and persist more with things... ultimately I don't know these pupils well and I don't have time to built everyone's analytical thinking in the same way...most of the time I have to gauge their abilities as groups and differentiate my practices according to that (Post-interview 3, Charlie).

This section shows that in the majority of cases Charlie was able to translate his personal theory of learning by prompting learners' reasoning skills. It also highlights how elements of the visiting class teaching environment - time and familiarity with students - limit his ability to fully translate his personal theory relative to accommodating learners' varying individual abilities in his practice. The following section discusses how Charlie used questions to facilitate theory building and cultural interpretations of objects.

7.3.1.3 Questions that facilitate theory building and meaning making

It is argued that the last characteristic of Charlie's questioning practices was to pose questions that facilitated the learners' theory building and meaning making process. He asked questions that prompted learners' knowledge baseline and urged

them to use the basic information they discovered to interpret the meaning of the objects in multiple ways. This finding mirrors extensive research on enquiry learning, according to which the learner – through different types of enquiry – is encouraged to explore, manipulate ideas or objects and ask questions to arrive at a learning outcome or make personal meaning (Banchi and Bell, 2008; Elkind, 1976). This findings is also in line with Paris's (1997) argument that building on prior knowledge helps learners construct new meaning. Charlie used questions coupled with personal stories that helped learners take into consideration cultural differences that might influence the meaning of objects during the interpretation process of objects.

Data from observations reveal that Charlie, in most episodes observed in Programme 1, prompted hypothesising to aid theory creation or interpretation around the meaning of each object. When learners established the identity of an object, Charlie prompted them to start making hypotheses about the significance and meaning of objects; for instance, how that object was used, what it showed about the person or society, etc. He characteristically did not wait until the last activity to elicit interpretations. He often shared personal stories while asking questions to help learners become aware of cultural diversity when interpreting objects. Studies have shown that museum objects are ideal tools to cultivate an awareness of cultural diversity and characteristics with young students (Hooper-Greenhill, 1999; Castle, 2001). A typical example is provided below. It is taken from the exploration activity in Programme 1.

Charlie: How do you know this is a horse bone?

Child 1: I saw it on the picture [on the museum floor].

Charlie: Oh! You compared it with the skeleton in the museum – excellent. Why would someone have horses? Why would someone have horses' teeth?

Child 1: I don't know.

Charlie: Why do people keep horses?

Child 1: I don't know.

Charlie: You don't know why people have horses?

Child 1: Yes, to ride on.

Child 2: To travel with them in the olden days.

Charlie: So, people ride horses – do they use them for anything else?

Child 2: War?

Charlie: Yes, people ride them into war. You know in France they eat horsemeat. Horsemeat tastes good too! I tried it when I travelled there once.

(Observation 2, Charlie)

Charlie explained in the post-interview how his questions encouraged learners to use their experience and think about the meaning of evidence, the cultural context of objects and how to use it to substantiate their interpretations. In Charlie's words,

I start with questions on observations and then build it up [to] get them thinking about the bigger picture. I ask things like, 'Is it a wild animal? Like a wolf? Where do you think, this person might live? Why are they keeping this animal?' What I am trying to do is get them to predict who this person with all these objects might be and to come up with a theory. [Later] I will say, 'Why would someone have a horse bone?' It is trying to expand their thinking and question their immediate

assumptions... It is interesting to think about another culture and meaning of objects being so clearly different (Post-interview 2, Charlie).

This subsection discussed Charlie's questioning practices to facilitate theory building, interpretation and meaning making of objects. Observations showed that his practice reflected his personal theory relative to learning with a history collection in a university humanities museum. The following subsections discuss the elements of Charlie's personal theory relative to knowledge and then learning in the context of teaching in a university natural science museum.

7.3.2 Nature of knowledge and practices in Museum B

In the subsection that follows, Charlie's element of his personal theory about the nature of knowledge in a university natural science museum is presented. This was influenced by his viewpoint on scientific knowledge and his background of teaching science at schools. This reflects Leatham's (2006) position that an educator's personal theory relative to knowledge is discipline specific. Also, this finding is consistent with Knowles and Holt-Reynolds's (1991) and Pajares's (1992) arguments that teachers' prior professional experiences are formative to their educational thinking. Charlie believes that there is greater accuracy with scientific theories because a hypothesis can be tested. Charlie clarified that even though scientific ideas do not guarantee "100%" certainty, when teaching science to primary school children, because their analysis skills are limited, he treats scientific knowledge as fact. This understanding of knowledge mirrors contextualist epistemology views, according to which knowledge is viewed as relatively unchanging and an objective that learners should be guided towards (Olafson and Schraw, 2006). Charlie said,

Unlike history, with natural science there generally is, 'We're 99% right about this or 99% wrong'... Especially, at this level of teaching, science is about what is known. [In reference to his teaching experience in schools] At year six they are not learning how to use scientific methodologies in depth, to analyse in detail and reach their own conclusions (Pre-interview, Charlie).

During observations Charlie was seen relaying scientific facts to learners and elaborating on concepts such as adaptations, in the form of transmission, sometimes in combination with interactive activities such as object-handling and guided observation of objects. This was in line with Charlie's perception of scientific knowledge, his experience of teaching science at schools, and the way Charlie described his practices. Charlie said,

With the science programmes, I teach children solid facts and to a certain extent how to find out about solid facts. There are different ways of doing that; your objectives may well be that you want a child to learn ...about scientific concepts and how scientific concepts work, such as adaptation... the way you deliver it may mean that they may have to learn certain facts and transmit knowledge to them... through partial observation of objects...in a heavily directed and controlled way. There are certain ways that teachers teach science and cover things they have to cover. ...Science tends to have more right or wrong answers. For example, taking adaptations, you really haven't got very many options there if you want to turn a quadruped into a mover in water (Pre-interview, Charlie).

The following subsection discusses Charlie's element of his personal theory relative to learning in a university natural science museum and the way it is reflected in his practice.

7.3.3 Nature of learning and practices in Museum B

This subsection discusses Charlie's understanding of learning in natural science museum education and the practices used in his teaching to translate this element of his personal theory into practice. Charlie argues that his teaching approach directs the children's learning experience so that they accumulate knowledge and understand scientific concepts. This understanding of learning mirrors a more traditional approach to scientific learning (Tsai, 2002). Analysis showed there was congruence between this element of his personal theory and practice.

During his pre-interview Charlie explained that his understanding of learning in a natural science museum is that children should build on their knowledge to enhance their understanding of scientific concepts. This was based on his discipline informed view of learning. Charlie used Programme 2 as an example,

I want children to learn about the animals they are looking at, [and] I want them to learn about adaptation, how it works, and the underlying reasons as to why these adaptations happen. They might have noticed a duck has webbed feet but I want them to question why... The idea is to give them links between observational skills and questioning skills, and give them tools to come up with possible answers.... That's how learning works in a science context... By physically examining specimens, hopefully the next time they see a novel animal they might think, 'Oh, it looks like that because obviously, it lives up a tree', and link these ideas [to] observations (Pre-interview, Charlie).

Charlie explained that the type of learning environment he created in this university natural science museum was like a formal one. This finding is in line with literature according to which university science museums are portrayed as sources of

“objective knowledge” (Gesche-Koning, 2014), whose responsibility is to “teach” and share scientific consensus about the collection with society (Mourits, 2014). This concept of the authority of the university museum as a source of “objective knowledge” is typical of a formal educational environment (Rogers, 2005). Charlie linked that to his own experience and personal theory of teaching science in schools and museums, as well as the aims of a university natural science museum and the nature of school programmes. Charlie said,

... I think formal is a horrible word...it's used a lot in education; this formal learning and informal learning. It's more to do with – how direct it is etc. [Also] we are a university science museum so we want to cover the [school] curriculum, build upon the children's knowledge and get them thinking about the science they are covering in a deeper way...As I said before young children do not have the scientific knowledge base needed to conduct scientific enquiry, so the emphasis is on building up their knowledge and understanding. They learn about certain concepts at school but we are ideally placed to give them resources to follow the adaptations [of animals] and understand it better (Pre-interview, Charlie).

Charlie elaborated in his pre-interview upon the practices he used to facilitate the learner's accumulation of knowledge and deeper understanding of scientific notions in Programme 2. He said he used closed questions, transmission of information, and directed object handling. These practices are underlined by a traditional pedagogical orientation (Black, 2005; Hein, 1998). Many researchers have found that aspects of this pedagogical orientation exist in museum education practice (Black, 2005; Hein, 1998; Hooper-Greenhill, 2007b). Charlie said,

There's object handling and some analysis, questioning and giving out of information ... The underlying principle is to put constraints around the questions [asked to] focus their observation in a controlled way. It's a guided because we want to help them analyse certain features in that session. It's extending their knowledge from what they know to what they don't know, and having them make that jump with a lot of help or giving them out information... That way they expand their knowledge about adaptations and different animals. They also expand their ability to explore other habitats in a different way. (Pre-interview, Charlie).

Analysis of observations and post-interviews suggested Charlie's practices mirrored his personal theory of learning in a university natural science museum. In the context of Programme 2 Charlie's aim was to teach learners about the idea of adaptation and diversity. Charlie drew a pig on the smart board and asked learners to work out how the pig would have to adapt its senses, movement, body cover and feeding mechanism to live in the sea. To facilitate the learner's answers Charlie gave examples of animals in different habitats and used specimens to expose learners to variations for each type of adaptation while he transmitted information about each adaptation. Throughout Programme 2, Charlie used several practices to help learners understand adaptation, know what questions to ask, and how to link those questions during their guided observations of specimens. He interchangeably:

- i) transmitted information and modelled how to link information (about a habitat) with observations (to explain adaptations);
- ii) elicited learners' prior knowledge and experience;
- iii) used closed-ended questions (to direct learner's answers and observation) and;

iv) helped learners apply their knowledge to new examples.

These practices did not follow a linear progression. They are presented below.

7.3.3.1 Transmission of information and modelling the linking of information with observations

A significant part of the delivery consisted of Charlie providing information about the concepts in terms of their significance, mechanism and meaning. This practice is in line with the transmission model of learning, where museum educators act as experts with a responsibility to present and transmit facts and ideas (Hein, 1998; Hooper-Greenhill, 2007b). For example, during the start of the lesson Charlie told learners about the mechanism of adaptation, the importance of habitats, and how they influenced animal adaptation.

A typical example was:

Charlie: Let's talk about the forests these animals live in. Did you see the trees on our lawn?

Child 1: No.

Child 2: Yes.

Charlie: Those trees come from rainforests. Rainforest trees are twice as tall as our tower on our museum. Imagine if you live at the top of those trees and your habitat is up in the canopy. Imagine how hard it is if you must run all the way down the tree. Then you must go across the forest floor, where something might eat you. Then you must go all the way up to the top of the other tree. These animals are adapted to glide.

Child1: They have wings.

Charlie: Yes. This is a frog called a flying frog. They move from tree to tree by gliding. This one has great long toes for climbing. But then it has these funny wing-like things. If they want to move from the top of one tree to another, they jump and glide from tree to tree. This tree frog has got great big sticky pads for sticking to leaves on trees. But it has also got – how else does it move? How does it glide? Can you see?

(Observation 5, Charlie)

Charlie explained that transmitting information was a way of enriching learners' knowledge and providing a factual basis to assist their understanding of concepts. He said,

There's a lot of top-down knowledge coming from me; you've got to explain about habitats and specimens. With this one, because there are so many different objects that we use, we tell them what the objects are, or the habitat they live in. There's a point that I want them to come to at the end of the day... Learn more about adaptations and understand how they are influenced by habitats... And because of that it's got to be more structured and [facts] fed to them. (Post-interview 5, Charlie).

Charlie asked questions that prompted learners to use their prior knowledge or experiences with animals and habitats throughout the programme. This is explored in the following section.

7.3.3.2 Learners' prior knowledge and experience

Charlie asked questions that appealed to learners' prior knowledge and experience throughout the observation of specimens. He typically did that to facilitate their understanding and responses to questions he posed about animal adaptations.

Even though building on learner's previous knowledge is typically an enquiry learning method suggestive of a constructivist orientation (Richardson, 2003), in this case this practice is expressive of a more didactic model of learning as the overall cycle of enquiry facilitated by Charlie was heavily structured and aimed towards leading to a set learning outcome (Hein, 1998). An example is provided below.

During this episode Charlie was exploring the adaptations of squirrels. He said,

Charlie: Who has seen a squirrel run up a tree before?

Child 1: Me.

Child 2: They would be in our woodland area.

Charlie: Do they run quickly or slowly?

Child 2: Quick.

Charlie: Okay – have you noticed, do they look where their hands are going all the time? Or do they just look ahead?

Child 2: They stop.

Charlie: Okay – if they are not looking straight ahead as they run through your woodland area, and they are not looking where their hands are going, why don't they miss where their hands are going and go "Pffff," and end up a dead squirrel?

Child 1: Because it has whiskers.

Charlie: They have. And if I bring this round you will notice they have whiskers on the backs of their wrists, on their elbows, and one under their chin. They don't have to look because of this sense of touch, which is adapted to help them move through their habitat at speed.

(Observation 7, Charlie)

When Charlie was asked about this episode he said he used this practice to encourage learners to use existing knowledge to think about adaptation and consolidate their understanding. Charlie said,

There are other questions, like the squirrel one, which rely on personal experience and something that they haven't observed or particularly thought of before, even though they had that information... So, you are coaxing the answer out of children by helping them use their existing knowledge. So, you know, 'Has anyone seen the squirrel move before? Do they look straight ahead?' They all know they look straight ahead. They've never particularly thought, 'Why don't they fall out of trees if they're not looking where their hands are going?' But if you ask them, 'Why don't they fall out of trees?' they use their knowledge and find the correct answer.

I want to link adaptations to ideas and concepts and experiences that they are familiar with as well. So, the idea is to give them the familiarity, start with the child's own experience and build upon that (Post-interview 7, Charlie).

The next section, discusses the type of questions Charlie used during the exploration of animal adaptations to facilitate learners' understanding about the concepts explored in Programme 2. This practice was in line with his personal theory relative to learning in a university natural science museum.

7.3.3.3 Closed questions

Charlie used closed questions to direct the learners' observations. This is an example of what Charlie referred to during his pre-interview as the "constraints" he puts around questions to help learners focus on animal features and lead to conclusions concerning adaptations observed in specimens. This type of

questioning has been reported in studies, where the museum educator's practices have been characterised as didactic (Cox-Petersen et al., 2003; Tal and Morag, 2007). A typical example is provided below.

Charlie: Badgers, where do they live?

Child 1: In holes.

Charlie: What has this badger got to get it underground? How has it adapted?

Child 1: Claws.

Charlie: Look at the claws on the front legs; it has these little powerful digging front legs and these massive claws for tearing up the earth. They are fantastically effective diggers. They are perfectly adapted for living underground.

Child 2: There is a song about badgers on YouTube.

Charlie: I have seen it. Why hasn't it got long legs like a giraffe? It would be beautiful if it had long legs like a giraffe. Why has it got these short, stumpy things?

Child 2: To let it go down the hole.

Charlie: Yes, it wouldn't fit down the hole if it had legs like a giraffe, it would have to dig tunnels like tube train tunnels. They are perfectly adapted; they have a nice thick solid neck for pushing down under.

(Observation 8, Charlie)

During his post-interview, Charlie explained that rather than posing a direct question, he broke down the query to several closed questions to guide the learners' discovery. Charlie said it allowed him to direct observations in a manageable way.

I use a lot of questions that are leading towards an answer. So rather than asking a direct question like, 'How is the badger adapted to move?' I'll break the question down to quite a few questions. As a teacher, I cannot allow the individual's line of questioning to fully direct the course of the lesson and negate the aims and objectives planned (Post-interview 8, Charlie).

This part illustrated the importance of using closed questions to guide learner's observations. The next subsection provides the final example of a practice used by Charlie to deepen learners' understanding of scientific concepts.

7.3.3.4 Applying knowledge to new examples

Charlie asked learners to apply what they learned in a new way. He asked them to suggest how the pig he sketched on the board could adapt to survive in the sea. A typical dialogue is provided,

Charlie: If we put piggy in the sea, pigskin is not adapted to the water, it would go all wrinkly. Eventually the water would get inside the pig and kill it. So how can we adapt his body covering to help him survive?

Child 1: You could put on gills.

Charlie: That would help him breathe but what about his skin? We should keep that water out of him, stop him going all wrinkly like your fingers and toes in water.

Child 2: Swimsuit?

Charlie: But that would mean putting clothes on. I want to adapt his body.

Child 3: Scales.

Charlie: Scales, like a fish or a crocodile or a sea snake or a turtle. If we cover him in scales those will keep the water out of his body. All animals' bodies are adapted to move in their different habitats. So how do we adapt piggy to move in water? What do fish have?

Child 1: Tails and fins!

Charlie: I can draw this on the piggy to help it move in water.

(Observation 6, Charlie)

When Charlie was asked about this practice he explained that he used it to increase the learners' understanding of adaptation. Tran's (2004) study on science museum educator's teaching shows similar results. However, an additional finding in Tran's (2004) study was that the museum educator's also used this practice as a means to assess the learner's understanding at the end of the session. Charlie said,

They must choose the characteristic or adaptation that would best suit that habitat. I document the process of their thinking on the board. Hopefully this way they learn how to think about adaptations and do this with other animals they might come across to understand why they are adapted a certain way (Post-interview 6, Charlie).

The next subsection discusses the details of Charlie's element of his personal theory relative to creating a positive environment to support learning and how this was manifested in his practices in Museum A and B.

7.3.4 Creating a positive learning environment in museum education and practices

This subsection discusses Charlie's perception of a positive learning environment and the educational importance he places on fostering a "play state of

mind” throughout learning. Observations across both programmes showed that this element of Charlie’s personal theory was reflected in his practices.

During his pre-interview, Charlie suggested that learning regardless from the context it takes place in is best to take place in a positive environment to be efficient. He explained that a positive learning environment encourages a positive attitude towards museums and life-long learning. Indeed as other researchers have indicated (King, 2009; Taylor, 2006; Taylor et al., 2008), a key aim of the museum educators they sampled was to encourage students to return to the museums and enhance their interest in the museum collections. Charlie conceptualised a positive learning environment as one that provides the freedom to learn by principles embedded in the notion of “playing.” This echoes research in museums that “play” can provide experiences from which learning and enjoyment may occur (Diamond, 1986; Rennie and McClafferty, 2002). Charlie explained,

I think a positive learning environment is crucial to all learning. I would say that the best learning is done whilst you are enjoying yourself. The best type of learning occurs when learners are given the freedom to play with ideas, concepts and language. Integral to what we do in museums [with reference to the museums sampled in this study] is wanting children to see museums positively and come back to learn more... Giving them a very positive idea that in museums you can have fun finding things out. So, the philosophy of ‘play’ reinforces that (Pre-interview, Charlie).

Charlie specified that in the context of these museums he chose a directed model of play, influenced by his experience as a school teacher, because it allowed him to direct the course of children’s learning and allowed him to control learner

behaviour. This is in line with Fromberg's (1987) and Sylva's et al. (1980) argument that there are different types of play depending on the interaction between adults and children and the learning outcomes intended. Charlie said,

What do I mean by "learning by playing"? Learning and experimenting in a risk-free environment. Doing something enjoyable, in a risk-free and interesting way. So, playing to me is a way of learning, a tool [to learn] and a state of mind. There are many ways of achieving that. There are many different types of play models. Imaginary plays, free play, constructive plays and various loose groups of play, and they can merge in and out of each other, as well. Learning through play within a classroom or within a setting like this is more directed play. Many of the practices you will see me use come from my experience from teaching young children in schools.... It can be partially-directed play, where you will choose the objects and facts that the child is investigating and playing with, where you have some control. Then there's directed play where I can say, 'Today we will be explorers.' I decide what they play, what they play with, I will choose what I am going to illustrate through that game and I determine the rules. There are ways of managing learners' behaviour so that they listen to you but it still feels like playing (Pre-interview, Charlie).

Analysis of observation and post-interview data amplified the way Charlie conceptualised the notion of "play" and provided insight into the practices he chose to create a positive learning environment. Post-interview data allowed greater insight into this element of Charlie's personal theory, because Charlie could not elaborate the practices he used during his pre-interview. This shows the importance of using post-interviews based on teaching episodes to understand museum educators' personal

theories in greater depth and to appreciate the reasons behind the observed practices. Based on Charlie's pre- and post-interviews, a positive learning environment consists of:

- i) Creating a risk-free, supportive and creative environment by using role-play and framing the day as a mystery to be solved by using a game.
- ii) Encouraging learners' motivation and interest in learning through the use of theatrical body language; providing information on objects and accommodating learners' curiosity to build rapport with them; using real objects; and making the content of the lesson relevant to learners by drawing connections between activities and the real world.
- iii) Creating an engaging and controlled environment by manipulating pitch and pace of voice, setting rules in a humorous manner, using praise and appealing to the accompanying schoolteacher for assistance if necessary.

Indeed as other researchers and writers have shown, the creation of an engaging, creative and supportive positive learning environment is a core aim of all types of museums (Castle, 2001; Hein, 1999b; Hartz, 2017; Hooper-Greenhill, 2007b; King, 2009; Nikonanou, 2009; Roberts, 1997; Tran, 2004). The following parts of this subsection discuss Charlie's element of his personal theory relative to the creation of a positive learning environment in practice.

7.3.4.1 The creation of a risk-free and creative environment

This subsection focuses on Charlie's personal theory concerning the importance of creating a risk-free, safe and creative environment to safeguard

learners' positive learning experience. Two practices for achieving this were observed and confirmed by Charlie in the post-interview discussions. These were: i) role-play; and ii) framing the session as a mystery to be solved or a game to be played.

During his pre-interview, Charlie defined an environment that is risk-free as a creative environment where learners feel safe to experiment and make mistakes. Charlie viewed having the freedom to play with ideas as integral to learning. This is in line with Pringle's (2008) findings on artist educators, which have shown that risk-taking and experimentation is valued as part of the creation of a positive learning environment.. In Charlie's words,

Learning in a risk-free environment is very important.
Because then you feel that you can safely play with ideas and
if you get it wrong, there's no risk to you. It's important to be
in that state of mind and feel safe to experiment and learn
through your own mistakes (Pre-interview, Charlie).

The practices that Charlie used during both Programmes to translate this element of his personal theory into practice are discussed. He often asked learners to mimic animals and incorporate fictional scenarios. A typical example is taken from Programme 1, during which Charlie created a scenario where he assumed the role of a road builder and assigned learners the role of archaeologists:

Now, the story today is I am a road builder. Last week me and
my road builder crew were digging up the ground to put a new
road in and we found a human bone. I had to call the police
and they said, 'This is not a modern bone; this is really old.
You've got to stop work.' So, by law I must stop work. Now,
I'm not happy about this, because I'm losing money. I've
asked you lot in, the archaeologists, to uncover this and start
thinking about what you are digging out... You are living now

in a caravan, it leaks a little bit, the nearest shop is about an hour's walk away and it only sells those sandwiches that curl up during the day and go a bit stale. That said, you're not getting paid very much but you might find some good stuff (Observation 1, Charlie).

During the post-interviews, Charlie was asked to expand on his thinking behind role-play as a teaching practice. He drew on his teaching experience in museums to highlight the importance of this practice and provided greater detail on role-play. Charlie's response reflects Garvey's (1991) and Hooper-Greenhill's (1999) position, that role play is a practice characterised by pleasure, freedom to explore and is a stress-free way to learn. He said,

The great thing about using role-play as a teaching tool is – and it's a fantastic way of teaching – that you [the learner] put on a hat: if you make a mistake, it's not you making a mistake; it's the person you are playing...so you feel safe with your learning. You know some of these children visit will be visiting these museums for the first time, so it is important to make them feel comfortable. It's a very free way of being able to make mistakes. There's no right or wrong answer because it's somebody else doing it (Post-interview 1, Charlie).

Throughout Programme 1, Charlie framed the day as a game. He typically said "Happy hunting, guys," and introduced the programme by saying, "Today we will solve a mystery: what is the story behind this dead person?" During Programme 2, Charlie based the delivery on an interactive story he created around an animal he drew on the smart board. He introduced the task of "adapting" this animal to different habitats as an interactive game.

When Charlie was asked about these episodes, he linked these practices to the element of his personal theory about creating risk-free and creative environments. This is in line with researchers (Hein, 1995; Rennie and McClafferty, 2002) who suggest that “play” and “discovery” learning practices enhance young learner’s imagination, creativity and learning. Charlie said that “playing a game” or “solving a mystery” were familiar ways of learning and experimenting for young children. Therefore, for Charlie, using practices that children are used to and that allow them to be playful reinforces a sense of ease, that in turn facilitates learning. Also, Charlie explained that these practices communicated to children that learning is a creative process.

I introduce things that are novel to them, but teach them through styles and activities that they are familiar with; which, for their age are stories, solving a mystery, playing a game. This helps them feel free to experiment and ‘play’ with ideas in a way that is not threatening but familiar. When you are playing, you are not going to feel humiliated if you make mistakes and you’re not going to get hurt. I don’t want people to believe that education should be about right or wrong, failing or succeeding. There is no wrong answer when you are playing, there’s no consequence for getting something wrong. It’s creative learning without risk. It makes learning fun (Post-interview 5, Charlie).

Data analysis displays the congruence between Charlie’s practices and the element of his personal theory relative to creating a positive learning environment that is risk-free and creative. The following section demonstrates how fostering motivation and interest as well as building rapport with learners cultivates a positive learning environment.

7.3.4.2 Encouraging learners' motivation and interest and building rapport

This part of the subsection relevant to creating a positive learning environment, focuses on Charlie's element of his personal theory about reinforcing learner motivation and interest as well as building rapport to support learning and cultivate a positive attitude towards it. An emphasis on motivation and interest as a means to create a positive learning experience, reflects the principles of Free-Time pedagogy which is highly regarded in museum education (Falk and Dierking, 2002). Several ways of achieving this were observed:

- i) Theatrical body language.
- ii) Providing information on objects to model enthusiasm about learning to accommodate learners' special interests and build rapport.
- iii) Using real objects as hooks to stimulate learner interest, and
- iv) Making the lesson relevant to learners by drawing connections between activities in the real world.

Post-interviews confirmed that using these practices were embedded in Charlie's personal theory relative to creating a positive learning environment creating motivation and interest, as well as rapport. During his pre-interview Charlie stated that motivating learners was an explicit goal. Charlie explained that excitement and rapport were useful tools to stimulate future interest in museum learning.

Motivating children about learning, and finding ways to interest them in learning, is an explicit goal in my teaching. I want them to come away with a positive experience of having learnt in the museum and feel they can come back to a museum, no matter what museum it is and go, wow, that's

fantastic I can see this. Teaching should be done in a way that is exciting...creating a sense of rapport with your students is also pivotal; it allows you to foster a connection with them. Then they are happy to learn and in general more interested in museums and the educational experience we create. (Pre-interview, Charlie).

It was observed that Charlie's facial expressions, body movement, and voice were theatrical; for example, he altered his voice to mimic different animals or people, used vibrant movements, and engaged in eye contact. These practices are in line with Tran's (2004) findings on museum educators, where they use theatrics to hone learners' interest. Charlie drew on his experience as a museum educator and likened teaching in museums with children to performing as a means of engaging learners' interest in a short period of time. This reflects literature suggesting that museum educators' professional background and experience influence their personal theory and practice (Bevan and Xanthoudaki, 2008; Ebitz, 2005; Tran and King, 2007). Charlie said,

Teaching is partly a performance in this situation because you usually have 45 minutes or so for a session. You have a lot of stuff to go through, so you've got to be very lively and you've got to be animated in a way that engages the children. If I were teaching adults, I may not sound quite as animated. It's almost a caricature of myself when teaching children because they need to be motivated all the way through (Post-interview 7, Charlie).

It was observed that Charlie was always eager to share anecdotes with students. During post-interviews, Charlie said that natural history was his personal interest and sharing information relevant to that subject was his way of modelling his

enthusiasm to learners and helping them feel welcome in the museum. This practice is widely reported in museum education studies (Castle, 2001; King, 2009; Tran, 2004).

He said,

I am particularly interested in the subject [of natural history] and I just find it important to excite them about learning more and coming back here... Ensuring that children enjoy their visit and feel welcomed is an important aim set in this museum, as well as promoting research as it is... I'd like to think that I am encouraging the next generation of natural historians and scientists, and getting them excited about the world, and ready to study it and see museums, as well as working places where things happen (Post-interview 6, Charlie).

Charlie added that not only did he feel it was his duty to provide information that would encourage further interest, but that if learners had expressed personal interest in an object, providing additional information allowed him to create rapport between himself and the learners. He said,

I know pretty much exactly what I'm going to say when I'm teaching, but then I also have that ability to say, 'Okay, you've asked a very interesting question, let's look at that.' I like it when people ask questions, because it shows they're interested. Part of my job is to foster that interest. If somebody asked me something, I will tell the answer and throw in something else that's a little bit interesting and shows I am paying attention to them... Sharing information creates a sense of trust and connection (Post-interview 3, Charlie).

During observations, Charlie often stressed that objects were authentic and encouraged the handling of objects to hook learners' interest. For instance, during

Programme 2, he often used objects to illustrate the points he was talking about. An example, was when he was talking about animal skin adaptations. He passed around a snakeskin to explain reptilian scales. During Programme 1 he typically said, “We try and use real objects because we want to find out about the real world” (Observation 2, Charlie). Charlie drew on his experience as a museum educator and explained the importance of using authentic objects and object handling as a way to re-enforce a sense of learning by playing. Several authors concur that object-handling in museums evokes a playful sense of enthusiasm, motivation and emotional connection (Kavanagh, 2000; Shue, 2004) “in ways that other information-bearing materials do not” (Chatterjee et al., 2016, p.4). Charlie said,

I use objects as hooks to grab children’s attention. Museum objects are novel and authentic so they engage children easily. If do a lot of talking, like in this programme [Programme 2], they’ll be listening, but mentioning the object and have them look at those objects can bring them back to what you’re talking about. Personally, I think that’s how we’ve evolved to learn; by full, physical interaction with things. All higher animals play with things and touching objects whilst you’re playing with ideas is something all higher animals do. That’s basically their sense of play. That’s the natural way that children and people have evolved to learn (Post-interview 8, Charlie).

A few additional observations suggested that Charlie used another practice to created relevance between the content he was teaching and the learners, to increase motivation. During Programme 1 he said,

Most archaeology is found when people are building new buildings or new roads, just like the Channel Tunnel, the

railway. When they were digging that up they found all sorts of things. They found Iron Age things, Bronze Age things and all sorts (Observation 3, Charlie).

During his post-interview, Charlie explained that drawing personal connections between learners, objects and real-life experiences was an importance means to motivate their learning. This practice echoes Castle's (2001) finding on museum educators with regards to the practices they used to motivate learners. He said,

I think relating these things to real means that I am reminding them there is a relevance to this. It is not just a game that we've made up for them; there are links with reality. If you introduce things in a way that directly connects to them then you can teach kids pretty much anything... I try and make it relevant to them (Post-interview 3, Charlie).

Data analysis displays the congruence between Charlie's practices and his personal theory about creating a positive learning environment based on motivation and as well as building rapport with learners. The following section demonstrates Charlie's view that the creation of a controlled and well-managed environment is complementary to a positive learning environment.

7.3.4 The creation of a controlled and well-managed environment

This part of the subsection relevant to creating a positive learning environment focuses on Charlie's element of his personal theory about a controlled and well-managed environment to maintain a positive learning environment. Even though there is research which supports that a disciplined and controlled environment is a necessary characteristic of a positive learning environment (Xohellis, 1997), this aim stands in stark comparison to the type of learning environments that artist educators

value, where a positive environment in a museum focuses on the visitors' individual needs and the development of visitors' aesthetic and moral character (Sullivan, 1996). This suggests that there is a plurality in the way museum learning environments are envisioned amongst museum education professionals. Pringle (2008) suggests that the professional background of museum educators might be one reason to account for those differences. A few ways of achieving this were observed and confirmed by Charlie in the post-interviews. They were characterised by playfulness, tolerance, flexibility, and positivity. The practices were: i) manipulating pitch, volume and pace of voice to grab or maintain learners' attention; ii) setting rules in a humorous manner; iii) using praise and justifying remarks on learners' behaviour; and iv) appealing to the schoolteacher for assistance if necessary.

During his pre-interview, Charlie said, "Teaching in a museum is a balancing act between exciting children and engaging them in the process of learning. Finding that balance is not easy" (Pre-interview, Charlie). Analysis showed that, for Charlie, "finding that balance" with learners entailed controlling children's behaviour and attention in such a way that their enthusiasm remained high, creating a positive learning experience. Charlie explained, "Dealing with discipline issues and managing children so that you capture their attention and keep their behaviour under control should be done in a way that does not dampen their enthusiasm" (Pre-interview, Charlie). This statement echoed Charlie's comment, that "playing" in the museum is "directed."

During his pre-interview, in relation to the practices he used to achieve this element of his personal theory, Charlie explained, "Dropping your voice or dropping

the pace is as important as increasing it at times. Depends on the situation. The children's concentration and energy levels" (Pre-interview, Charlie).

Observations confirmed that Charlie typically altered the pace, volume, and tone of his speech. He varied these practices per the learners' behaviour. For instance, he chose to whisper when children were talking over him, spoke slowly when children were not focused, and spoke very fast when introducing many facts. When Charlie was asked about these observed practices in a post-interview, he confirmed that he used his voice to manage children. Studies have shown that manipulating the pace and tone of speech coincides with practices used by teachers in schools to control students' behaviour (Babkie, 2006; Herschell et al., 2002). He said:

Some of the characters were a bit jumpy and full of energy. I think that probably stemmed more from a very high percentage of special needs kids and very active kids with short concentration spans. I was losing them, the children were getting a bit too excited, so I had to tone it down, drop my voice and speak slowly. I used a deep voice to bring the level of noise and excitement back to normal... It's just a strategy I use so that they have a break between that excited, 'I'm just going to tell you this, and I want to tell you this, and I'm excited about this,' to 'Ooh, I see, he's saying something I've got to listen to, [I] have to concentrate a bit.' I use intonation to carry a message (Post-interview 5, Charlie).

Many observations provided evidence, confirmed in the post-interviews, as to other ways in which Charlie translated this element of his personal theory into practice. Charlie set a few rules in comprehensible and humorous ways. During the introduction of the exploration activity in Programme 1, Charlie wanted to establish the rule of "not running" in the museum. He said,

If you run and slip you might end up being the first person ever killed by a dinosaur. It will be very embarrassing for you if I should ring up your parents and say, 'I am sorry they are not coming home today, they have just been injured by a Tyrannosaurus Rex'. They are not going to believe me. (Laughter) (Observation 2, Charlie).

When Charlie was asked about this practice in a post-interview he explained that he always established rules of conduct. He used "humour" as a behaviour management tool because it was consistent with the element of his personal theory about creating a playful learning environment. He said,

I usually always set some general rules, but, per the children's behaviour, I drop or use this introduction. In the same way, I might highlight rules about object handling: 'Well, these are all real, so we touch them gently. How do we touch them? We touch them with respect.' You should be relaxed and friendly towards the children, because that way they instantly like you and trust you, so they listen to you. I may seem from time to time very informal with the children and jokey about things, but I take that approach not because I want to be everyone's best friend but because I want to relax the children into that sort of play-state frame of mind (Post-interview 2, Charlie).

It was also observed that when learners were not engaged with an activity Charlie was never strict or negative. He used positive language or appealed to their logic. He either praised learners – "Your previous ideas were excellent; can you please try to figure this out as well? Look how much fun everyone else is having," or "Great work guys" (Observation 3, Charlie). On occasion, he politely appealed to their logic by explaining why it was in their best interest to re-engage in an activity or stop a disruptive behaviour: "There is no point in me talking if you are not listening. You will need this information for your hunting" (Observation 1, Charlie). Usually,

learners listened to him and happily followed his advice. When Charlie was asked to explain his observed practices, he confirmed that praise and appealing to learners' logic was a positive way to manage learners' behaviour. This reflects Csikszentmihalyi's (1997) view that using positive emotions, such as praise and freedom to choose ones behaviour, motivates the learner. Charlie said,

Behaviour management is generally based on positivity and praise, so things like, 'Oh, look, she's being quiet, but you're not being so quiet, could you be like her?' I do expect them to be reasonably respectful... So, if I want to control their behaviour, all I must do is make a remark. I moderate their behaviour by giving them a reason why they should be doing something, or why they should not. Once you explain things to children they usually will do anything you want them to. So, I might say, 'I'm sorry, I can't hear you because this person over here is talking. Do you mind because that's quite rude?' (Post-interview 3, Charlie).

During a few episodes, it was observed that if learners did not appear to be concentrating during group activities Charlie did not discipline them. Charlie drew on his experience as a museum educator and mentioned in his post-interview that due to limited familiarity with learners, it was difficult to interpret their reactions. This echoes research on teachers' thinking (Borg, 2003; Leatham, 2002; Li, 2013; Skott, 2001) that the context in which educators teach may enable or limit the translation of their personal theories into practice. Charlie preferred to be flexible because learners could perceive strict discipline from an unfamiliar adult as threatening. During a handful of episodes when behaviour was challenging (that is, they would not stop talking over him or did not reengage in an activity despite Charlie's efforts) he appealed to the schoolteacher for help. Studies have shown that museum educators

usually rely on accompanying schoolteachers to control the student's behaviour

(King, 2009; Tran, 2004; Piscitelli and Weier, 2002). When Charlie was asked about those episodes, he said that on rare occasions where his positive efforts were fruitless, he employed the teacher's help because they were more knowledgeable about student characteristics and knew how to deal with them in a positive manner. He clarified that the practices he used to manage learner's behaviour in museums were often different to those he used as a school teacher. This highlights the influence of his experience as a museum educator on the practices he chose. He said,

Discipline and management-wise there is certainly a difference between teaching in a school and a museum. I'll give them a little bit more leeway when I'm talking to them in the museum. I think I'm a little bit more relaxed about it, because often I know that if children aren't necessarily looking at me; it doesn't mean that they're not listening. I don't know them as individuals and I don't know what their behaviour is generally like, so there is a limit to how much I can understand about their normal behaviour and how I judge whether they've gone too far in certain ways, or how they're going to react if I discipline them...It's best to turn to their school teachers who know them well. And I only have them for an hour, so there is that. It's best to be very positive (Post-interview 3, Charlie).

Data analysis displays that creating a controlled environment in a way that manages learners' behaviour and attention but does not dampen their enthusiasm was part of Charlie's personal theory relative to creating a positive learning environment. It also provided evidence that there was congruence between this element of Charlie's personal theory and practices observed.

CHAPTER EIGHT: DISCUSSION

8.1 Introduction

This chapter discusses the significant findings of the four case studies presented (see Chapters Four to Seven), with the theoretical literature on personal theory and museum education. There is scant research into understanding museum educators' personal theories and practices, and the relationship between the two in university museums. This study plays an important role in adding to the understanding of how and why museum educators teach in university museums. Although the focus of this research is on museum educators within a specific museum context, the dearth of literature in this specialised field made it necessary to draw on a wide range of teacher-related literature about personal theory and beliefs to develop and substantiate the arguments in this discussion.

This choice was also guided by the fact that the museum educators' in this study work in contexts, and showed elements of personal theories and practices closer to those of formal educators than museum educators working in more informal contexts (e.g. artist educators. See Pringle, 2008).

The research question posed in this study is,

How, in a university museum, do museum educators' personal theories of learning relate to their educational practices?

This study argues that, in the case of the museum educators sampled, the relationship between personal theory and practice is context-specific. Contrary to literature portraying the relationship between personal theory and practice in terms of rigid congruence (Beswick, 2005; Bryan, 2003; Fang, 1996; Mitchell and Hedge,

2007; Tobin, 2012) or incongruence (Davis et al., 1993; Hyson, 1991), this study suggests that the sociocultural context in which these museum educators work (e.g. the museum context and the visiting class teaching environment) provides affordances and limitations, when it comes to translating personal theories into practice. This influences the alignment between personal theory and practice, and is consistent with recent research arguing that the relationship between teacher personal theory and practice, “should be studied within the sociocultural contexts of their work” (Mansour, 2013, p.1230). Leatham (2002) suggests in his framework that the relationship between the two is “context-dependent” (p.152). That is the context in which educators teach may enable or limit the translation of their personal theories into practice (Leatham, 2002). Research echoing this argument is also found in language and mathematics teaching literature (Borg, 2003; Leatham, 2002; Li, 2013; Skott, 2001), where findings indicate that the context of teaching influences the relationship between personal theory and practice.

This study moves beyond descriptions of “congruence” and “incongruence,” between personal theory and practice to “studying the underlying reasons” (Phipps and Borg, 2009, p.381) behind alignment or tension between the two. This “enable[s] both researchers and teacher educators to better understand the process of teaching” (Phipps and Borg, 2009, p.381) in university museums. This study, in line with Leatham’s framework (2006), favours viewing the teaching of the museum educators sampled in these university museums as a rational and pragmatic activity, as there is always a justification underlying each practice even when it diverges from personal theory in a response to the teaching context.

In addition, this study explores literature about educational and learning environments (Rogers, 2005) to characterise elements of the personal theory and practices of these types of museum educators, teaching in the context of university museums. The terms used to describe and characterise the type of learning environments facilitated by museum educators and museums in this chapter, are based on Roger's (2005) definitions of formal, non-formal, participatory and informal types of learning environment. It is argued that the educational environments fostered in university museums by museum educators with a professional background in school teaching can have many characteristics of a formal education environment. This adds to our understanding of the breadth of educational environments in museum education, regardless of whether this agrees or not with what is envisioned as suitable or even desirable in wider museum education literature. Also, it highlights the influence of the professional background of museum educators and the characteristics of the museum context they teach in shaping the educational environment fostered during museum programmes.

The discussion of the relationship between elements of personal theory, practice and context is structured around three key findings relating to museum educator personal theories. They include personal theory elements relative to:

- i) The nature of knowledge;
- ii) Learning and learners; and
- iii) The need to develop and maintain a positive learning environment.

Findings about the museum educators' personal theory relative to knowledge and learning are discussed together, for each museum discipline in turn (section 8.2

for the natural science museum and section 8.3 for the humanities museum). This decision was made because these two elements of personal theories are interconnected or “nested” (Tsai, 2002) and, as such, are influenced by the museum context (i.e. in terms of separate discipline and management) in similar ways. The relationship between a museum educator’s personal theory, relevant to creating a positive learning environment and practice, is discussed in section 8.4 to illustrate that the discipline and management of each museum does not seem to play an important role in the way this element of personal theory is translated into practice. The fact that both museums are university museums, seems to be a common denominator in shaping the museum educator’s personal theory element relative to a positive learning environment, and the way it is translated into practice. An overview of the major findings can be seen in Tables 1 and 2.

Table 1. Key elements of the personal theories of museum educators at a humanities museum

Personal theory (PT)	Alex	Bridget	Renee	Charlie
Nature of knowledge	Fluid (pre-interview) and Fluid and Fixed (post-interviews)	Fluid (pre-interview) and Fluid and Fixed (post-interviews)	Fixed and Fluid (pre-interview) and Fixed and Fluid (post-Interviews)	Fixed and Fluid (pre-interview) and Fluid and Fixed (post-interviews)
Nature of learning and learners	Meaning-making and honing of analytical thinking skills (pre- and post-interviews) Learner varying abilities (post-interviews)	Meaning-making and honing of analytical thinking skills (pre- and post-interviews) Learner varying abilities (pre- and post-interviews)	Meaning-making and honing of analytical thinking skills (pre- and post-interviews) Learner varying abilities (post-interviews)	Meaning-making and honing of analytical thinking skills (pre- and post-interviews) Learner varying abilities (post-interviews)
Positive learning environment	Positive learning environment: Rapport (pre- and post-interviews) Safety (pre- and post-interviews) Interest (pre- and post-interviews) Control/Order (post-interviews)	Positive learning environment: Rapport (pre- and post-interviews) Safety (pre- and post-interviews) Interest (pre- and post-interviews) Control/Order (post- interviews)	Positive learning environment: Rapport (pre- and post- interviews) Safety (pre- and post-interviews) Interest (pre- and post-interviews) Control(pre-and post-interviews)	Positive learning environment: Rapport (pre- and post- interviews) Safety (pre- and post-interviews) Interest (pre- and post-interviews) Control (pre- and post-interviews)

Table 2. Key elements of museum educator personal theories at a natural science museum

Personal theory (PT)	Renee	Charlie
Nature of knowledge	Fixed (pre- and post-interviews)	Fixed (pre- and post-interviews)
Nature of learning and learners	Accumulation and understanding of a body of knowledge (pre- and post-interviews) Learner varying abilities (post-interviews)	Accumulation and understanding of a body of knowledge (pre- and post-interviews) -
Positive learning environment	Positive learning environment: (pre- and post-interviews) Rapport Safety Interest Control	Positive learning environment: (pre- and post-interviews) Rapport Safety Interest Control

8.2 Natural Science Museum: Personal theory and practice relative to the nature of knowledge and learning

This section draws on the findings from the natural science museum to discuss the relationship between museum educator personal theories and practices relative to knowledge and learning. This section makes four claims. First, it argues that a museum educator's personal theory relative to knowledge and learning stems from discipline dependent views i.e. in response to the discipline of the museum collection.

Second, it claims that the context of this museum, i.e. its university institutional character and management, enables museum educators to follow their personal theory of knowledge and learning when teaching. This is because the underlying epistemological and pedagogical approach of the natural science museum aligns with their personal theories. Findings suggest that this may be the case, because the museum educators' personal theories tend to come from their experience as school teachers. This aligns with a more formal approach to teaching preferred by university scientific museums and the educational environment encouraged by this museum's management. There is limited evidence in the case of Renee to suggest that the context of this natural science museum, in terms of the priorities set by the management, may limit the translation of the full spectrum of her personal theory about learning into practice.

Third, it is argued, that as the museum context influences the museum educator's personal theories, it enables them to translate personal theories into practice. The museum educator's practices tend to mirror their personal theories relative to knowledge and learning.

Last, it is argued that museum educators with a similar personal theory may use different practices to translate similar elements of their personal theories.

The first claim is that the museum educator's personal theory relative to knowledge and learning is discipline specific and corresponds to the discipline of the museum collection they teach in. This finding is endorsed by Leatham (2006) and shows that the relationship between personal theory and practice is not context-free. It is mediated through the sociocultural contexts that museum educators work in (Ash, 2004; Briscoe, 1991; Rogoff, 2003).

As the findings show, Charlie and Renee stated that they hold different views on the nature of knowledge and learning in the natural science museum compared to their teaching in the history museum. They attributed this difference to the underlying epistemology and learning outcome of each discipline they taught. For example, Charlie explained, in his pre- and post-interviews, that in science, in contrast to teaching history, there are often “more right or wrong answers” (pp.308-309). Similarly, Renee said she considered the nature of knowledge as fixed in science (p.252). This means that prescribed activities tend to have an outcome Charlie and Renee want learners to progress towards.

This finding about museum educators’ gives weight to Tsai’s (2002) hypothesis about the discipline-dependent nature of teachers’ personal theories: “one teacher may have beliefs toward teaching science that are very different from those of teaching history” (p.780). Previous research in teacher education supports this finding and shows teacher beliefs and personal theories about knowledge vary with the discipline they teach (Olafson and Schraw, 2006). For example, cross-disciplinary research on college students and student teachers, found that there are elements in the personal theory of each that are activated in the context of a discipline (Cobb, 2002; Hofer, 2000).

This finding seems to be supported by Leatham (2006) who explains that holding different beliefs about the nature of knowledge in each discipline is possible, because the way personal theories are structured in the mind allows “a person [to] believe one thing at one instance and the opposite in another” (p.95), depending on the discipline they teach.

Further evidence to substantiate the claim that the discipline of the museum context influences the museum educator's personal theories, can be found in the theoretical alignment that exists about teaching in the same museum discipline between two different elements in Renee and Charlie's personal theories; those related to knowledge and learning. This seems to suggest that, as endorsed by Tsai (2002), elements in an educator's personal theory are theoretically interconnected or "nested" because elements in a personal theory function as a system and can be influenced by the discipline they are exposed to.

Table 2, summarising the findings across the two case studies in the natural science museum, shows that Renee and Charlie described learning as an accumulation of knowledge (pp.254-255 and p.311) and a process through which scientific concepts are understood (pp.254-255 and p.311). This finding is in contrast with King's research (2009). She found that science museum educators' have a more constructivist orientation to learning, but it coincides with the findings of other researchers (Taylor, 2006; Taylor et al., 2008; Taylor and Caldarelli, 2004) who report similar results as this study does about museum educators' personal theories from various professional backgrounds working in non-humanity discipline museums. This understanding of learning as the "acquiring or 'reproducing' of knowledge" (Tsai, 2002, p.773) mirrors a traditional approach to scientific learning consistent with Renee and Charlie's contextualist view of the nature of knowledge in science teaching. A contextualist epistemology views knowledge as relatively unchanging and an objective that learners should be guided towards (Olafson and Schraw (2006). This is in line with Tsai's (2002) results concerning science teachers, where science educators with a contextualist and more traditional theory of knowledge were found to believe in guided or traditional forms of learning.

This close alignment between the museum educators' personal theory regarding learning and knowledge agrees with previous work suggesting that there is a connection between the two. Per this line of research (Cunningham and Fitzgerald, 1996; Fielstein and Phelps, 2001; Kincheloe et al., 2000; Kuhn et al., 2000; Olafson and Schraw, 2006; Speer, 2008); each approach to knowledge consists of related finer-grained beliefs about pedagogy and the role of the educator. This reflects Zheng's (2013a) assertion about complex systems, such as personal theory, that they "consist of different types of elements which connect and interact in different and changing ways" (p.332) per the context they are exposed to, discipline being one potential contextual parameter.

Second, this section argues that the management and institutional character (as a university museum) of the natural science museum allows educators to follow their personal theory on knowledge and learning in practice because the underlining epistemological and pedagogical approach of this museum aligns with the personal theories of the educators. Renee explained how this was made possible by the hiring practices in this museum (pp.249-251). Museum educators need to demonstrate that they fit in with the existing philosophy on science museum education espoused by this museum management to be hired.

Findings also suggest that the alignment between museum educators' and this natural science university museum may occur, because the museum educators' personal theories tend to be influenced by their previous experience of teaching science in schools.

In the findings, Renee and Charlie provide evidence that their experience as school teachers influenced the formation of their personal theories relative to

knowledge and learning in science teaching. These findings are consistent with the arguments of Knowles and Holt-Reynolds (1991), as well as Pajares (1992). They concluded that teachers' prior professional experiences were formative to their educational thinking.

Charlie referred to his experience as a science school teacher, to explain why he treats scientific knowledge as fixed knowledge to be communicated to children (pp.308-309). He said that at the age of 11 children have not learnt scientific methodologies and have limited scientific knowledge. Therefore, when teaching primary school children science, he focused on bolstering children's scientific knowledge and transmitting fact (p.309).

This perception of knowledge as a fixed body of information to be communicated aligns with the role of the university science museums as an authoritative source of knowledge. One of the responsibilities of a **university museum** is to "teach" and share scientific consensus about the collection with society (Gesche-Koning, 2014). Mourits (2014) asserts that a university collection "is valuable to connect science and science education with society, to communicate about research on knowledge and how data are being collected...and about the reliability of knowledge" (p.92). This perception of university collections as "teaching tools" (Verschelde and Adriaens, 2016, p.13) can perhaps be traced to the historical antecedents of university museums. Most of the older collections, e.g. Oxford University Museum of Natural History or the Smithsonian Institute, started out as didactic teaching collections (Verschelde and Adriaens, 2016). Historically, in **university museums**, "objects...were key elements to comprehend the universe and

nature, and thus, to transmit knowledge...[they] became the initial nuclei of didactic collections” (Mansard, 2014, p.73).

Renee asserted that this view on knowledge underlines the epistemology of science university museums and is espoused by the natural science history museum sampled in this study. She said this is the case in the learning context of university museums and might not be reflected in other types of natural science museums (p.245). Renee said that knowledge is “something objective” (p.252) and that children should have “no ambiguity” about the meaning of a certain object (p.253). The literature on university museums suggests that reinforcing knowledge is prevalent with these science oriented museums (Braund and Reiss, 2004). Reflecting Renee’s comment, literature also suggests that in museums that are not part of universities, such as the National Natural History Museum in London, knowledge may no longer be a “static image of science of a fixed body of knowledge that is largely beyond doubt” (Lawrence and Tinkler, 2015). This concept of the authority of the university museum as a source of “objective knowledge” is typical of a formal educational environment (Rogers, 2005).

Even though Charlie expressed a dislike of terms such as “formal” and “informal” to describe his teaching, both Renee and he, in describing the type of learning environment they foster in the natural science museum, agreed that it is closer to a formal learning environment and “the kind of teaching environment facilitated in a science classroom” (pp.254-255 and p.310). The literature on scientifically orientated university museums suggests that an important goal for natural history museums is to embed learning within the goals of the formal national curriculum and science teaching at schools (Braund and Reiss, 2004).

Another example, of how the museum educators' background as school teachers teaching science influences different elements of their personal theory and practice toward science knowledge and learning is provided by Renee. She explained that she used her knowledge of the school curriculum to design programmes with science learning goals that reflect the school curriculum and are important to school teachers (p.255). Foreman-Peck and Travers (2012), in line with Hawkes and Muir (2009) wrote that "schools generally acknowledge that museums have the potential to offer valuable learning experiences **that** can both support curricular development and raise pupil aspiration and achievement" (p. 29).

Curtis (2014) similarly stresses that "university museums have long had a public role including...a school's service that focused on object-handling sessions linked to curricular topics" (p.86). This perhaps, explains why the nature of the learning environment in this university museum, seems complementary to a formal learning environment that is highly structured and does not give learners much control over content or learning goals (Rogers, 2005). Despite the apparent correspondence between Renee and Charlie's personal theories and the approach taken by the natural science museum they work in, there is some evidence to suggest that in the case of Renee, this museum context limited the full translation of her personal theories into practice. This finding seems supported by Leatham (2002) who stresses that the teaching context may cause various degrees of diversion between an educator's personal theory and practice.

In the findings Renee mentioned that the museum director's commitment to support the science curriculum gave her impetus to ensure a scientific basis for every activity she taught (p.251). However, Renee explained, that this approach hampered

her from widely using the full spectrum of practices she preferred, such as art-related activities aligned with the creative learning outcomes she personally valued in museums (pp.249-251).

Third, it is argued, that as the museum context was predominantly conducive to Renee and Charlie's personal theories and there seemed to be no other limitations, their practices mirrored their personal theories.

Findings indicate that Charlie and Renee's personal theories relative to learning and knowledge, i.e. their traditional approach to learning and contextualist approach to knowledge, was observable in their practices. Charlie and Renee's practices of fostering the accumulation of a specific body of knowledge through transmission of information (Tsai, 2002) (for Charlie see p.308, pp.310-311 and p.312 for Renee see pp.256-261), or guided explorations (Renee, pp.250-259) (Elsbree et.al., 1967) and closed-ended questioning (for Renee see pp.256-262 and for Charlie see p.310) are characteristic examples of practices that reflect the elements in their personal theories (Koballa et.al, 2000). Despite the interactive or "guided discovery" elements in some of the practices used by Charlie and Renee, and Renee's self-professed understanding of learning in science as guided "discovery" (pp.254-255), it can be said that their practices were underlined by a traditional pedagogical orientation. Emphasis was on the "accumulation" of knowledge and "[giving out] of information" (pp.254-255 and p.309) as a learning outcome rather than improving a learner's skill at pursuing scientific enquiry independently (Black, 2005; Hein, 1998).

Lastly, it is claimed, with regards to the relationship between personal theory and practice, that museum educators with similar personal theories may use different practices to translate a similar element of their personal theories. Both Charlie and

Renee believe that the outcome of learning should primarily be the accumulation and understanding of knowledge (see sub-section 7.3.3 in chapter seven for Charlie and 6.3.1 in chapter six for Renee). However, they use different practices to translate this vision into practice. Charlie primarily used teacher-centred practices, such as transmission (see sub-sections 7.3.2 and 7.3.3), while Renee often used a mix of teacher-centred (transmission) and child-centred practices (guided exploration in the museum) (see sub-section 6.3.1).

Similarly, to Charlie, Renee explained, during her pre-interview that, “Our choice of practices is based on a personal preference for practice, our teaching style...what we feel more comfortable with” (p.248). Variation in practices can be indicative of “the distinct qualities a teacher displays that are persistent” (Conti, 2007, p.20) and might not stem from a thoughtless or reactive position (Eraut, 1994). Such variations in the way similar personal theory elements were translated into practice, were observed across the four case studies in the humanities museum.

8.3 Humanities Museum: Personal theory and practice relative to the nature of knowledge and learning

This section draws on the findings from the humanities museum to discuss the relationship between the museum educators’ personal theories and practice relative to knowledge and learning at the humanities museum.

Patterns of convergence arise across all four case studies in the humanities museum (discussed in section 8.3) and the natural science museum (discussed in section 8.2), regarding the factors that influence museum educators’ personal theories and the way they relate to practice, despite differing personal theories and practices. The sociocultural context in which museum educators operate (i.e. the museum

discipline, university institutional character and management as well as in some cases the characteristics of the visiting class teaching environment and the museum educator's knowledge relative to a museum collection) as well as the museum educator's background (i.e. former school teachers and museum educators in university museums), are key to understanding how personal theories relate to practice and to a certain extent converge. This is in line with extensive previous findings reported in teacher literature (Borg, 2003; Drageset, 2010; Forrester, 2008; Leatham, 2006; Martin, 2008; Stemhagen, 2011) and some museum education literature (Castle, 2001; Pringle, 2008).

This section makes three claims. First, it argues that a museum educator's personal theory relative to knowledge and learning is discipline specific.

Secondly, the findings suggest that the context of this museum, i.e. its university institutional character and management, enables the museum educators to follow their personal theory on knowledge and learning relative to history teaching, because the underlining epistemological and pedagogical approach of this humanities museum align with the personal theories of these museum educators. This alignment between the museum educators and the humanities museum could be attributed to the hiring practices of this museum and the museum educators' background as school teachers teaching history. It is suggested by the findings that the educational environment in the humanities museum is more non-formal than in the natural science museum, per Roger's (2005) typology.

Thirdly, it is contended, that as the epistemological and pedagogical approach underlying this museum context align with the museum educator's personal theories for history museums, it allows them to translate their personal theories into practice.

However, during some episodes, the degree of alignment between personal theory and practice varied. Other factors relating to the socio-cultural context of the museum educators' teaching (i.e. the limited time as well as familiarity with students and the museum educator's knowledge of the collection), appeared to impinge on the museum educator's ability to translate elements of their personal theories expressed during pre-interviews into practice. This became clear during post-interviews, which as Leatham (2002) supports, might suggest that educators find it easier to identify the factors that might cause a divergence between their personal theory of teaching and practice during interviews, based on instances of observed practice.

The **first** claim emerging from the findings is that the museum educator's personal theory relative to knowledge and learning, appear to be influenced by the subject matter or discipline they work in, i.e. the discipline of the museum collection. This is in line with Leatham's (2002) understanding of the nature of personal theory. The influence of the sociocultural context in which museum educators' work is highlighted in Castle's (2002) research with volunteer museum educators in a history museum. Castle found that "the knowledge of different disciplines offers different ways of knowing our world" (p.1). This colours the museum educators' personal theories of "how truth is determined" (Shulman, 1987, p.9), taught and learned (Castle, 2002).

As the findings show, all four museum educators link their views about the nature of knowledge and learning in the humanities museum they teach in, to the epistemology and learning goals underlying the specific discipline of this museum, i.e. history (see for each case study respectively the subsections on knowledge and learning). For example, Bridget and Alex expressed the view that in history,

knowledge did not represent “an objective” (p.205), “external or finite” truth (p.160). Charlie explained that in history, “the answers can be a lot more fluid [than in science] ...there generally isn’t a 100% ...the same evidence can be viewed in different ways” (pp.292-293). This did not mean that the four participating museum educators did not agree that certain historical facts were fixed (e.g. p.165, p.210, p.263 and p.296). Charlie clarified that perhaps the difference was that humanities-based teaching entailed more “open-analysis and meaning making” (p.298). This coincided with Renee’s view, shared by Alex and Bridget, that learning in history focuses on the development of analytical and creative thinking skills with personal meaning making (see sub-sections 6.3.2, 4.3.2 and 5.3.2).

This finding mirrors extensive research among teachers, where it was found that subject matter influences a teacher’s epistemological conceptions, viewpoints on the nature of student learning and choice of appropriate instructional activities (Cobb, 2002; Grossman et al., 1989; Hofer, 2000; Kagan, 1992; Leatham, 2006; Olafson and Schraw, 2006; Tsai 2002) (see section 8.2 for details).

The influence of the subject matter or discipline of the museum collection on the museum educator’s personal theories, is further suggested by the theoretical compatibility between the museum educator’s orientation to knowledge and learning. Findings show that these museum educators, when teaching history in the museum context, tend to have a constructivist orientation to learning. Olafson and Schraw (2006) suggest, such an approach to learning is in line with the criterialist approach to knowledge that these museum educators seem to espouse. “Criterialism” is “an understanding that historical knowledge is based on evidence, and developed through the use of criteria and arguments” (Voet and De Wever, 2014, poster) to construct

multiple personal interpretations (Voet and De Wever, 2014). This highlights the influence of context on personal theory and gives weight to Tsai's (2002) hypothesis that, elements in an educator's personal theory are theoretically interconnected or "nested" because elements in a personal theory function as a system and can be influenced by the discipline they are exposed to.

Table 1, summarising the findings across the four case studies in the humanities museum, shows that the museum educators' perception of learning is focused on meaning making. This understanding of learning as "constructing personal understanding" (Tsai, 2002, p.775) mirrors a constructivist orientation to learning. This finding resonates with Castle's (2001) research on museum educators' personal theories relative to learning in humanities non-university museums. Also, in line with a constructivist orientation, is the museum educators' view that learning entails honing analytical thinking skills to construct personal meaning (Hein, 2002; Voet and De Wever, 2014). However, these museum educators do not adopt a "history as anything goes" (VanSledright et al., 2011, p.20) attitude to learning, which might characterise "radical constructivism" where the role of the knower is privileged (Richardson, 2003). Rather, these museum educators were in favour of learners' claims being based on factually correct information, established through particular analytical strategies and heuristics used in historical research (VanSledright et al., 2011, p.20). This understanding of learning is often linked (Olafson and Schraw, 2006) to a "criterialist approach" relative to the nature of knowledge (VanSledright et al., 2011). In this respect, it can be said, that even though the museum educators surveyed had a personal theory that historical knowledge is fluid, they also believed that the creation of historical knowledge or interpretation entails the use of fixed information as evidence. This symbiosis between information and interpretation is

portrayed by Tilden in one of his six principles of interpretation. “Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information” (Tilden, 2007, p.18). Historian James Kloppenberg (1989) writes, “beyond the noble dream of scientific objectivity and the nightmare of complete relativism lies the terrain of pragmatic truth, which provides us with...imaginative but warranted interpretations” (p.1030).

Alex, is the only museum educator who explicitly referred to the value of individual meaning making and the value of group learning in facilitating meaning making. He also referred to the concept of the zone of proximal development. Both concepts suggest that Alex’s personal theory seems to also have a sociocultural orientation to learning (p.172). Olafson and Schraw (2006) suggest, that this approach to learning is also in line with the criterialist approach to knowledge that Alex seems to espouse.

Alignment in an educator’s personal theory relative to knowledge and learning has been suggested in teacher research e.g. Cunningham and Fitzgerald, 1996; Fielstein and Phelps, 2001; Kincheloe et al., 2000; Kuhn et al., 2000; Olafson and Schraw, 2006. Equally, Nakou (2001) has suggested, that in museum education, each epistemological view is closely connected to a corresponding theoretical view of learning.

Second, this section argues that the university institutional character and management of the humanities museum, enabled museum educators to follow their personal theory of knowledge and learning of history in their teaching. The epistemological and pedagogical approach of this type of history museum aligns with the personal theories of the museum educators. The influence of the teaching context

on the educator's ability to translate their personal theories into practice is supported by Leatham (2002). This alignment may be traced to the hiring practices of this museum and to the museum educators' prior experience as school teachers. The latter is in line with Castle's (2006) research that argues a major factor influencing the teaching of museum educators in a museum, gallery or park is prior experience in teaching.

In the findings Alex, who is head of education at this museum, said museum educators were hired if they fit in with the museum's pedagogical approach (p.158). Charlie confirmed that despite being hired by another museum, this museum's theoretical orientations echoed his personal theories relative to the teaching of history in museums (p.288). Findings seem to suggest that this is the case for Renee as well.

The most representative examples across the four case studies are presented below. They illustrate how the museum educators' school teaching experience with humanities subjects influenced their personal theories relative to learning. In addition, they show how these align with the approach to learning underlying this university museum. Charlie drew on his experience of teaching history in schools, to explain why he treats learning in the context of the humanities museum as a process of construction. According to Charlie, "learning a piece of history,"(p.297) entails understanding the skills of analysis and construction of meaning.

Bridget asserted that learning in museums was similar to the learning processes fostered in schools. She said the difference lay in the tools, or objects, used to facilitate students' process of enquiry, meaning making and analytical thinking (pp.211-212). Bridget's view seems to challenge museum literature that often portrays school learning environments as rigid educational environments, that are polar

opposites to the conceptualisation of participatory or informal learning environments (Garcia, 2012; Spock, 2006).

Alex, similarly asserted with reference to his teaching of history in schools, that learning history was about “teaching students to think like historians...[which] entails learning about the process of historical enquiry and thinking. I want students to experience this in the museum” (p.167). Alex’s view on learning history in museums is influenced by the way history learning in schools encourages students to learn how to conduct research the way professional historians do. That is, to learn to draw on the “disciplinary ‘toolkit’ [of historical research that is] filled with established modes of inquiry, evidentiary criteria, and accepted patterns of analysis to help in their object-related work” (Bain and Ellenbogen, 2002, p.153). This is in line with New History approaches to history education (Phillips, 2000), and involves what Seixas (1999) referred to as “doing the discipline” (p.328): learning history using evidence-based methods and standards to construct personal accounts. This approach encourages student-centred learning away from the rigidity of formal learning environments (Rogers, 2005; Van Drie and Van Boxtel, 2008).

The museum educators’ personal theories on learning align with this university museum’s pedagogical approach which helps them follow their personal theory relative to learning in their practice. A functional characteristic of university museums, is their role in increasing public awareness about how the curatorial members of museum staff conduct research and to communicate their analytical thinking skills (Senac, 2012). The president of the Association of Academic Museums and Galleries (AAMG), the equivalent group for university museums in the United States, asserts that, “While all museums are educational in purpose, academic

museums are unique in their mission to teach and train succeeding generation[s]...their primary purpose is to support the mission of their parent institutions...advance research...Connecting town and gown, the academy and the public” (Hartz, 2017, p.3). Alex and Charlie confirmed that “learning how history and archaeology museum professionals work” (p.168) and “becoming a museum expert” (pp.297-298) was a major goal in this university humanities museum, because the management wanted to make object analysis and research accessible to learners.

The most representative examples across the four case studies are presented below. They illustrate how the museum educators’ school teaching experience with history and humanities subjects influenced their personal theories, relative to knowledge and how these align with the epistemological approach of this university museum. Renee provides an example of how her background as a school teacher teaching history influences this element of her personal theory. Renee explained that she drew on her knowledge of the school history curriculum to inform her understanding of the nature of knowledge in the history museum (p.262). Van Drie and van Boxtel (2008) confirm that a priority in the history school curriculum is for students to construct historical interpretations based on primary sources.

Charlie and Alex referred to their experience as history school teachers to explain why they viewed knowledge in the history museum as “open-ended”, “fluid” and “multifaceted” (see sub-sections 4.3.1 and 7.3.1). Alex explained that, in the same way that textbooks are used in schools, in museums objects are used as pieces of information to be “read” to extract evidence to build personal interpretations (pp.169-170).

It is argued that the museum educators' personal theories on knowledge align with this university museum's epistemological approach, enabling the museum educators to follow their personal theory relative to knowledge in their practice. Alex confirmed that in the humanities museum he works for, knowledge is seen as multidimensional and encourages, a range of different interpretations from visitors to extend beyond those offered by experts (p.166). This view reflects a move away from transmission of knowledge from museum staff to narratives developed by museum educators with students, which is more characteristic of a non-formal learning environments (Roberts, 1997). Alex voiced the view, in reference to the type of learning environment facilitated in this humanities museum, that it was somewhere along the continuum between formal and informal (p.158).

This museum's epistemological position accords with the view of "university museums as places for challenge and experimentation instead of their traditional roles as repositories of factual knowledge" (Curtis, 2014, p.82). Literature suggests that university museums in the humanities and arts view their role as promoting a polyphony of interpretations. For example, King and Marstine (2006) argue that "the founding purpose of most university art museums gave them ...a penchant for experimentation. This resulted in a focus distinct from that of college natural history museums" (King and Marstine, 2006, p.268).

However, based on the humanities museum sampled in this study, a university museum with a history-oriented collection does not seem to encourage intellectual risk-taking or the questioning of museum authority, in the way that university art museums might. This might be because university art museums "can become places for critical inquiry perhaps more comfortably than other kinds of museums, because

they operate in an academic climate where the questioning of authority is encouraged” (King and Marstine, 2006, p.268). Many university art museums employ artists as museum educators as “by the mid-1980s, institutional critique had become a significant trend in postmodern artistic practice” (King and Marstine, 2006, p.269). This in turn, may encourage a more participatory learning environment than often found in university museums of other disciplines, such as the humanities museum sampled in this study, which seems to share many characteristics with a formal and non-formal learning environment (Rogers, 2005).

Charlie juxtaposed the nature of knowledge in art and history museums by saying that “history museums, especially university museums focused on research, are not like art galleries” (pp.295-296). It’s not just a case of having something on the wall and interpreting it as you want. There are specific steps that lead you to various interpretations. I think this is the difference between subjects.” Even though this distinction is an oversimplification, “how far beyond the meaning and ‘identity’ of the object is it appropriate for a line of enquiry to develop? Can the search for the creative development of ideas be justified if it could lead to a misinterpretation of the original objects?” (Foreman-Peck and Travers, p.35, 2013), remain open to debate and might yield different responses, according to the discipline and institutional affiliation of a museum.

Several authors argue that if museums are to fulfil their role as progressive, informal learning environments, it is important to cultivate in learners “the desire to explore the unknown” (Xanthoudaki, 2015, p.253), “put [learners] outside their comfort zone” (Price, 2013, p.158), and focus on “intellectual speculation, personal

meaning, and exploring how we, as people in a fluid and mobile society-interact with and learn from cultural objects” (Garcia, 2012, p.54).

Curtis (2014), argues that all university museums are in a unique position, because cutting edge thinking characterises the mission of universities, to become places where collections provide stimuli for intellectual experimentation and critical consideration by the public.

Third, it is contended, that as the museum educator’s personal theories are mostly aligned to the pedagogical approach underlying this humanities museum, all four museum educators could predominantly translate their personal theories into practice. However, in line with Leatham’s (2002) argument, in some cases contextual factors limit their ability to fully translate elements of their personal theories in practice. Similarly, Pringle’s (2008) study illustrates that artist educators’ personal theories and the context of their teaching influence their practice.

The following practices used by the museum educators – and shown in the Findings chapter (see sub-sections 4.3.2, 5.3.2, 6.3.2 and 7.3.1) - suggest that museum educators’ in most cases, mirrored their constructivist orientation in their practice (Paris, 1997; Piscitelli and Weier, 2002; Richardson, 2003) by:

- i) using examples from the learners’ lives to help them make sense of new experiences;
- ii) modelling questions for problem solving with objects and asking learners to apply these to new objects;
- iii) starting an enquiry from the learners’ existing knowledge; and using questions and prompts to help children build on prior knowledge to experience new understanding.

Despite some of these practices entailing some level of guidance from museum educators, these practices are in line with Black (2005) and King's (2009) conceptualisation of teaching in museums along the lines of a constructivist orientation. "It does not follow [in constructivism] that the learner must construct theoretical notions by themselves. Indeed, this would be highly unlikely" (King, 2009, p. 218). It is difficult to do so "without some telling" (Osborne, 1996).

Findings illustrate that the museum educators translate their criterialist approach to knowledge in their practice. For example, by: i) asking learners to collect, analyse and use evidence to substantiate their interpretations; and ii) encouraging personal meaning making (see sub-sections 4.3.2, 5.3.2, 6.3.2 and 7.3.1).

On some occasions, there was varying consistency between the museum educators' personal theories as expressed during their pre-interviews and their practices. Findings suggest that sometimes the contingent sociocultural context of the visiting class teaching environment (i.e. limited time and familiarity with students and in Bridget's case her knowledge of the collection) impinged on the museum educators' ability to translate elements of their personal theories relative to learning and learners. The relationship between the museum educators' personal theory and practice cannot be fully understood without analysing the influence of their teaching context on their practice (Leatham, 2006; Richardson, 1996). The visiting class teaching environment provides constraints and opportunities for museum educators to enact elements of their personal theories (Bennett et al., 1997, Leatham, 2006; Mansour, 2013).

An example drawn from Bridget's case reflects Fives and Buehl's (2012) argument that personal factors such as the educator's subject-related knowledge may

hinder the enactment of a belief or element in a personal theory, “contributing to the...lack of relation between teachers’ beliefs and practices” (p.481). Findings show that limited knowledge of the science museum collection used in the history museum programme and time available, meant Bridget did not know the best questions to ask to aid learners’ construction of meaning in a way that was consistent with her personal theory on learning (p.210).

Another example, applicable across all four case studies, shows how limited time and a lack of familiarity with students, hindered the museum educators’ ability to fully follow their personal theory and differentiate their practices to each learner’s abilities (pp.179-181, pp.224-228, pp.271-272 and pp.304-305). Predominantly, differentiated learning focused on blunter practices of differentiation such as building the level of difficulty of questions and varying the use of prompts, according to the abilities exhibited by learners as a group (i.e. “high”, “medium” and “low” ability groups). This suggests that the learning environment they created was non-formal. Teaching was adapted to the learner’s needs, albeit to a limited extent (Rogers, 2005). For example: i) Alex explained that he limits questioning to basic analytical questions with “low” achievers ; ii) Bridget and Charlie focused on observation-based analysis and not high forms of analysis with “low” achieving learners ; and iii) Renee gave prompts with “low” achievers and challenged “high” achievers with questions that required creative thinking.

Even though the notion of “ability” is disputed in education literature (Hart et. al, 2004), Tran (2004) reported similar findings in his study of science museum educators. In the case of Renee, findings showed that she differentiated her practices when teaching in the natural science museum, unlike Charlie who did not.

Alex explained that museum educators are usually able to adjust their practices to the learners' needs as a group, due to their experience as museum educators teaching the same programme to many groups of students (p.181). This suggests that among other things their experience as museum educators in university museums informs their practice. This mirrors Castle's (2006) findings, in which newcomers to museum teaching, were only able to adapt practices to learner's abilities after they had taught a significant number of programmes (Castle, 2006).

8.4 Natural Science and Humanities Museums: Personal theory and practice relative to the creation of a positive learning environment

This section draws upon the findings of the current study at the natural science and humanities museums to make two claims about the relationship between museum educators' personal theories and practice relative to developing and maintaining a positive learning environment.

The first claim, is that all participating museum educators expressed a personal theory endorsing the need to create a positive learning environment. Findings indicate that these museum educators place importance on this element of their personal theories because they want to: i) facilitate student learning and; ii) encourage a positive attitude towards life-long learning in museums. The museum educators' notion of a positive learning environment seems closely aligned with the underlying aims of university museums, enabling museum educators to enact their personal theories in practice.

The second claim, is that museum educators create and maintain a positive learning environment in several ways. It is argued that the museum educators' background as school teachers, as well as their experience of teaching in university

museums, inform the repertoire of practices they used to maintain a positive learning environment and translate this element of their personal theory in practice.

The first claim, as aforementioned, is that all museums educators' personal theories had a focus on creating a positive learning environment. This element of their personal theories seems closely aligned with the underlying aims of university museums. Tables 1 and 2 on pages 338-339, summarising the findings across case studies in both museums, show that all museum educators said that the creation of a positive learning environment was a key element of their personal theories. Findings suggest that this is the case because of the museum educators' wider understanding of what learning entails. For example, Bridget and Charlie referred to the facilitation of a positive learning environment as a staple of good teaching regardless from the educational context they teach in (p.229 and p.318). Charlie linked this view to his belief about the importance of "learning by playing" to achieve that (pp.319-320). This echoes research in museums that "play" can provide experiences from which learning and enjoyment may occur (Diamond, 1986; Rennie and McClafferty, 2002).

Findings show that museum educators perceived a positive environment as one that engendered rapport with students, created a sense of emotional security, curiosity and interest, and a maintained a controlled environment (see sub-sections 4.3.3, 5.3.4, 6.3.4 and 7.3.4). This ensured that students work in a disciplined environment, are welcomed and supported by the museum and become motivated about museum collections.

Overall, findings suggest that all museum educators want to create a positive learning environment to help students learn and develop a positive attitude towards lifelong learning in museums (p.182, pp.228-229, p.273 and p.318). Alex and Bridget

linked the latter aim in their personal theories to the core mission of museums and said it was a “buzzword in museum education” (p.229).

These findings share similarities and differences with findings in previous studies conducted with museum educators teaching school children in science and history museums not associated with universities (Tran, 2007; Taylor and Neill, 2008; Neill, 2010). Museum educators in some research, like the view of those sampled in this study, indicated that their key aims were to encourage students to return to the museums and enhance their interest in the museum collections (King, 2009; Taylor, 2006; Taylor et al., 2008). However, other studies, show that museum educators felt that facilitating student learning as part of a positive learning environment was not a priority (Cox-Petersen et al., 2003; Tal and Morag, 2007). Research specific to art museums indicates that the perception of a positive environment among artist educators seems different in some respects. Artist educators, value risk-taking and experimentation as part of the creation of a positive learning environment (Pringle, 2008). This might suggest that the museum context, and possibly the professional background of museum educators, might account for differences in the conceptualisation of how a positive learning environment in museums is created.

The notions of a positive learning environment espoused by the museum educators in this study is suggested are consistent with the aims of university museums (Hartz, 2017). In turn, this study claims that the university museum context of these museums enables the museum educators to follow their personal theory relative to creating what they characterise as a positive environment in their teaching.

In relation to the museum educators’ perception of a positive learning environment as one that focuses on learning, the literature suggests that their

perceptions align with the characteristics of an educational environments prioritised by university museums. University museums' outlook on the nature and character of a museum educational environment seem to favour traditional notions of teaching (Spock, 2006). Hartz (2017) suggests that university museums "primary purpose is to support the mission of their parent institutions (i.e. universities) ...as learning laboratories, they advance...research and student achievement" (p.3). That is, for **university museums**, a successful and positive museum experience often prioritises the learning of subject matter and research skills. This does not necessarily demonstrate the value of an informal museum learning environment (Foreman-Peck and Travers, 2012). It seems that the educational environment that university museums perceive as positive fosters notions of a learning environment characteristic of more formal education environments (Hartz, 2017; Rogers, 2005).

This aim stands in stark comparison to other museum learning environments, where a positive environment focuses on the visitors' individual needs and development of visitors' aesthetic and moral character (Sullivan, 1996). The latter aims describe a positive experience that is characteristic of a participatory and informal learning approach (Rogers, 2005).

In relation to the museum educator's perception of a positive environment as one that cultivates a positive attitude towards lifelong learning and museums, findings suggest that there is also an overlap with emerging aims of university museums. Literature suggests that the antecedents of this aim in university museums can be traced to the aims of the wider museum education community, and a university's third mission or social responsibility agenda (Chatterjee and Hannan, 2016; Hartz, 2017; Panciroli and Macaudo, 2016). Hartz (2017) explains that this might increasingly be

the case, because the agenda of university museums is informed by concerns in two separate spheres, “the dual role of academic museums reflects their allegiance both to their parent institution [i.e. universities] aims as well as the aims and code of ethics of the museum wider community” (p.8).

It is held in literature that the wider museum education community prioritises the creation of a positive environment, in terms of engendering interest, enjoyment and curiosity to provide personal enrichment and cultivate a lifelong learning attitude toward museums (Black, 2005; Hooper-Greenhill, 2007b). This view of the role of museum education is usually associated in the literature with the special educational characteristic of museums as informal environments of learning (Hein 1999a; Hooper Greenhill, 2007b) and their association with free-time activities and pedagogy (Freizeit Pädagogie) (Falk and Dierking, 2002; Xohellis, 1997). Foreman-Peck and Travers, (2012) write, “museums are unique places of interest for nurturing curiosity and inspiring learners to develop their understanding about the world we live in” (p.28). In this case, university museums seem to both espouse aims associated with a more formal education environment outlook in museums, and embrace aims associated with a more informal education outlook for museums, popular within the wider museum education community.

On the other hand, the literature suggests that universities have been called to run a “Third Mission” that “deals with the [university’s] interaction in communities” (Panciroli and Macaudo, 2016, p.10), to create an environment that engages visitors and fosters life-long learning among other goals (Collins and Lee, 2005). This includes every structure within the institutions, including museums. It is suggested that university museums are “‘incubator[s]’ of the university’s third mission”

(Panciroli and Macaуда, 2016, p.11). The degree to which these aims, stemming from government policy, have been implemented by the university museum community is open to debate (Curtis, 2014). There is evidence to suggest that the “third mission” is embraced by the university museums in this study. Findings show that Alex and Charlie confirmed that ensuring students felt welcome to return to the museums and enjoyed their visit was part of the educational rationale of the museums they work in (p.182 and p.318).

A **second claim** is that the museum educators’ element of their personal theory relative to creating and maintaining what they perceive as a positive learning environment is mirrored in their practice. Many of the practices used by these museum educators, as described by broader education literature provided below, coincide with practices used in school classrooms to maintain positive learning environments. Findings from this study confirm that many practices used by these museum educators derive from their experience as school teachers, which may explain why these learning environments have many characteristics of a formal learning environment.

Examples of methods used by the museum educators, which coincide with practices used by teachers in schools to maintain a positive learning environment include (see sub-sections 4.3.3, 5.3.4, 6.3.4 and 7.3.4):

- i) To create rapport with learners’ educators, use welcoming body language, empowering words/praise, students’ names, provide additional information on objects children show interest in, and initiate an exchange of personal experiences (Bucalos and Lingo, 2005;

Emmer and Gerwels, 2006; Goodwin and Judd, 2005; McAdams and Lambie, 2003; Strain and Joseph, 2004);

- ii) To foster an emotionally secure environment described by Alex as “stress-free” (p.182) and by Charlie as “risk-free” (p.320), they familiarise children with the layout of the museum, signpost the aim and content of each activity, give positive feedback, and use role play (Epstein, 2005; Kern and Manz, 2004);
- iii) Cultivate learner interest, curiosity and motivation by modelling enthusiasm, role play and praise, and making activities relevant to learners with additional information on topics (or objects in this case) that learners show interest in (Bucalos and Lingo, 2005; Goodwin and Judd, 2005; Zirbel, 2008) and;
- iv) Create an organised and controlled environment by managing expectations, time, language, humour, rules, voice pitch and body language, using strategic ignoring and give students the opportunity to choose their behaviour (Babkie, 2006; Grossman et al., 2004; Herschell et al., 2002).

Findings show that other practices used by the participants of this study to cultivate a positive learning environment stemmed from their experience, as museum educators, of working in an educational context with limited time or familiarity with students, as well as the availability of collections. Examples of practices that compensate for, or take advantage of, the learning environment of these museums are:

- i) the use of authentic objects to spark interest (p.196, p.284 and p.406); ii) exaggerated enthusiasm and theatrical body language to quickly build rapport with children (p.241, p.285 and p.325) and; iii) allocating the disciplinarian role to school

teachers when possible to avoid any potential feelings of negativity as museum educators are not familiar with the learners' behavioural background and characteristics (pp.187-188, p.244, pp.278-281 and p.334). Tran (2004) has reported similar findings, with regards to science museum educators teaching school children. This shows that their experience as museum educators in these university museums also influenced the participants use of practices.

However, the justification the museum educators provide for some practices are disputed in museum education, for example, whether the authenticity of objects plays a role in stimulating learner interest (Meecham, 2016). Pringle (2008) suggests that authenticity, provenance and authorship are distinctive issues of museum and gallery education and do not form part of the professionalism of schoolteachers.

There were some episodes where individual learners misbehaved during transition activities when their school teacher was not present to control them or could not manage to do so (pp.187-189 and pp.243-245). In those cases, Alex and Bridget chose firmer practices (e.g. strategic ignoring, raised voices, reprimands) when more subtle practices did not work. Alex and Bridget acknowledged in their post-interviews that maintaining a disciplined environment for the class was consistent with their personal theory relative to maintaining a positive learning environment. They explained that if they allowed individual students to be disruptive it could create negative feelings which might hamper learning for the rest of the class. Wider educational research (Diener and Dweck, 1980; McCombs, 1991) supports the museum educators' concern that to foster a positive attitude towards learning, learners need to be free of anxious and negative mental states that may be caused by other student's disruptive behaviour (Csikszentmihalyi and Hermanson, 1999).

Disciplining learners is a disputed pedagogical approach in museum education literature (Hooper-Greenhill, 2007b). However, there is research which supports that a disciplined environment is a necessary characteristic of a positive learning environment (Xohellis, 1997).

Berliner (2004) suggests that experience informs teachers what practices to use to mirror their personal theory, even if the practices used are less desired by the educators than other practices in their repertoire. Berliner (2004) provides an example of a teacher who may prefer to use praise to motivate students but may discover that criticism may have a more motivating effect for some students. Breen et al. (2001) note that “situational demands...and the specific social relationships... entail the teacher’s selective reliance on particular principles [they espouse] and those practices that the teacher regards as expressions of them” (p.473) to suit learner needs (Phipps and Borg, 2009).

This chapter discussed the argument made in this study that in the case of the museum educators sampled in university museums A and B the relationship between personal theory and practice was context-specific. Discussion showed that the sociocultural context in which these museum educators work (e.g. the museum context and the visiting class teaching environment) provides affordances and limitations when it comes to translating personal theories into practice. Also, the discussion showed that the educational environment fostered in university museums by museum educators with a professional background in school teaching and accumulated experience of teaching in university museum settings can have many of the characteristics of a formal education environment. That was particularly relevant in the case of the natural science museum, which suggests the influence of the

discipline on the teaching of the museum educators. This chapter also highlights the professional background of museum educators and the characteristics of the museum contexts in which they teach, and the influence of these factors in shaping the educational environment fostered during museum programmes. Lastly, this chapter showed that there were important similarities in the museum educators' personal theories in each museum, despite occasional differences in how these were individually translated into practice by each museum educator.

CHAPTER NINE: CONCLUSION

9.1 Introduction

This chapter is divided into four sections. After the Introduction, part two answers the research question and examines the contributions of this research. The following section looks at the implications of this study and recommends areas for future research. The final section delineates the limitations and strengths of this study.

9.2 Key findings and contribution to knowledge

This section summarises the key findings that answer this study's research question and discusses its contribution to current knowledge about museum education in the following two subsections.

9.2.1 Summary of key findings

This subsection presents a summary of the key findings of this study. The research question explored was *How, in a university museum setting, do museum educators' personal theories of teaching relate to their educational practices?*

There are four key findings outlined and explained below:

- i) There were important similarities in the museum educators' personal theories: all the museum educators' personal theories consisted of elements relative to knowledge, learning and learners as well as the facilitation of a positive learning environment. The museum educators' personal theories of teaching relative to two areas - the nature of knowledge and learning and learners - varied per the discipline of the museum they taught in.

- ii) The professional experiences of these museum educators influenced the content of their personal theories. They were motivated by their common background as former school teachers and, for some, their accumulated experience as museum educators teaching in university museum settings.
- iii) In these university museum settings, the personal theories of teaching of the museum educators were often aligned with their practices, and in a few cases, they were not due to contextual influences.
- iv) Despite similarities in the four personal theories of teaching, there were differences in how these were individually translated in practice by each museum educator.

a) To answer this research question it was necessary to first establish what the personal theories of the museum educators were. The Findings chapters show that there were key similarities in the museum educators' personal theories, in that all the museum educators' personal theories consisted of elements relative to knowledge, learning and learners as well as the facilitation of a positive learning environment. The museum educators' personal theories of teaching relative to two areas - the nature of knowledge and learning and learners - varied per the discipline of the museum they taught in. For example, in the natural science museum, Charlie's conceptualisation of learning was that of transmission of information, while in the humanities museum, he perceived learning as a process of construction and personal meaning making. The nature of the different elements in the museum educators' personal theories are expanded upon below (see section 9.2.2.1 Practice and theory: beyond description).

b) In establishing what the museum educators' personal theories of teaching were, a second key finding emerged from the Findings chapters: the professional experiences of these museum educators influenced the content of their personal theories. Their personal theories were influenced by their common background as former school teachers and, for some, their accumulated experience as museum educators teaching in university museum settings.

Having established what the museum educators' personal theories were, in answering the research question of this thesis (on the relationship between personal theory and practice in a university museum context) a third and fourth key finding emerged:

c) The third key result from the Findings chapters is that in a university museum setting, the relationship between the personal theories of teaching and practice of these museum educators showed that the museum educators' personal theories were aligned with their practices but in some cases, they were not. Whether the museum educators could align or not their practices with their personal theories of teaching appeared to depend on the sociocultural context they worked in (e.g. the university museum context and the characteristics of the visiting class teaching environment, etcetera.).

The outcomes show that where there was alignment between the epistemological and pedagogical approach taken by these **university museums** and the museum educators' personal theories, then the museum educators' practice was consistent with their personal theories. For example, the natural science museum in this study saw its role as an authoritative source of knowledge, whereby knowledge was perceived as a predetermined fixed body of information to be communicated to

learners. This approach contains characteristics typical of formal learning environments per Roger's (2004) typology (e.g. decision making authority does not lie with learners, learning objectives are planned without the learners' participation etcetera.). As shown in the Findings, this aligned with Renee and Charlie's predominantly traditional approach to learning and their contextualist approach to knowledge, which influenced their personal theories relative to teaching in a natural science museum. Alignment between the museum educator's personal theories and the natural science museum approach enabled these museum educators to translate their personal theories into practice. Renee and Charlie created, in their practice, a learning environment with many characteristics typical of a formal learning environment, aligned with their personal theories and the approach taken by the university natural science museum.

Where there was not alignment between the museum educators' personal theories and the epistemological and pedagogical approach taken by these university museums, findings show that this constrained the museum educator's ability to translate elements of his/her personal theory into practice. This was the case with Renee when teaching in the natural science museum. The natural science museum's approach to focus on a scientific basis for each activity, hampered her from using the full spectrum of practices she preferred, such as art-related activities aligned with the creative learning outcomes she personally valued in museums. Another example from the way the sociocultural context in which the museum educators worked limited their practice, can be traced to the characteristics of the visiting class teaching environment they worked in.

Across all four case studies in the humanities museum, it was found that limited time and familiarity with learners appeared to constrain the museum educators' ability to translate their personal theories relative to learning and learners into practice. Instead of differentiating and adapting their practices according to the learners' individual abilities, they took a broader view of differentiation and adapted practices according to the ability group they perceived learners to belong to (e.g. low, medium or high).

d) The fourth key outcome from the Findings chapters, in response to the second part of the research question about the relationship between personal theory and practice, is that despite similarities in the four personal theories of teaching there were differences in how these were translated into practice by each museum educator. This was more apparent in the case studies in the natural science museum. For example, both Charlie and Renee believed that the outcome of learning should primarily be the accumulation and understanding of knowledge. However, Charlie focused on teacher-centred practices (e.g. transmission), while Renee used a mix of teacher-centred (e.g. transmission) and child-centred (e.g. guided exploration in the museum) practices to translate their common view on learning in practice.

9.2.2 Contribution to knowledge

This subsection argues that this study contributes to research about museum educators in university museums in the following ways:

- i) Enhancing our understanding of particular types of museum educators' personal theories of teaching and practice in university museums. This study gives a rich account of the personal theories of teaching and

practices (and the ways these are related) for this group of museum educators. This has previously received scant attention in the literature;

- ii) Provides fresh insights into the relationship between the personal theories of teaching and practice of some museum educators working in university museums. This study argues that contrary to a rigid view of congruence and incongruence often used in general education research, the practice of these museum educators is related to their personal theories of teaching in context-specific ways. It illuminates the reasons behind tensions between these museum educators' personal theories of teaching and practice;
- iii) Adding to our understanding of the breadth of learning environments in museum education, regardless of whether this agrees or not with what is envisioned as suitable or desirable in wider museum education literature. It displays the influence of the professional background of museum educators on their personal theories and practice. The characteristics of the museum context in which they teach also influence their practice and type of educational environment fostered.

These points are elaborated in the following parts of this subsection.

9.2.2.1 Practice and theory: beyond description

Several previous studies in the field of museum educator's teaching focused on school programmes examined the description of practice (Cox-Petersen et al., 2003; Piscitelli and Weier, 2002; Swartz and Crowley, 2004; Tal and Morag, 2007; Tran, 2002). Some (Cox-Petersen et al., 2003; Tal and Morag; Tran 2002) note that museum educators' practices were lecture-oriented, didactic, and used low-order

questions. Others, such as Piscitelli and Weier (2002), suggest that museum educators use a mixed approach of didactic and learner-centred practices.

This study moves beyond description toward an explanation of the practice of a few museum educators working in university museums. It offers research evidence that accounts for the rationale or personal theories of teaching that underpin these museum educators' practices. Findings suggest that the pedagogical orientations of museum educators' personal theories of teaching varied according to the discipline of the museum they taught in. In the case of teaching in the humanities museum, the key pedagogical theoretical orientations that underlined the museum educators' personal theories of teaching seemed to be constructivist and sociocultural learning theory, criterialist epistemology, and pedagogical approaches related to the development of a positive learning environment to reinforce learning, etcetera.

In the case of teaching in the natural science museums, the key pedagogical orientations that seemed to underlie personal theories of teaching included traditional and transmission learning models, contextualist epistemology, and pedagogical approaches related to the creation of a positive learning environment to reinforce learning, etcetera.

This study offers research evidence, relative to the relationship between personal theory and practice, to suggest that despite similarities in the four personal theories of teaching (i.e. relative to knowledge, learning and learners, and the facilitation of a positive learning environment), the way these are translated into practice by each museum educator may vary due to personal teaching styles (Conti, 2007). An explanation is given for some reasons (e.g. affordances and limitations of museum context, museum educator backgrounds, characteristics of the visiting class

teaching environment they work in, knowledge of the collection etcetera.) behind the patterns of congruence and/or diversion between personal theories and practice. Breen et al. (2001) advocate this research approach as a productive way to enable “research to go beyond description towards the understanding and explanation of teacher action” (p.471). This fundamental approach has been identified by museum education scholars as an area that needs further research if we are to further understand and develop the profession of museum educators (Arts Council England Heads of Museum Education conference, 2013; Tran, 2004).

Among the few studies which have looked at the relationship between museum educators’ belief systems or personal theory and practice in a theory driven way are Castle (2001), King (2009), Pringle (2008), Taylor and Neill (2008) and Tran (2004). However, these studies focus on a different type of museum educator (e.g. artist educators, volunteers, educators in nature centres) and/or different types of museums (e.g. art galleries, nature parks and non-university museums).

9.2.2.2 Fresh insights into some museum educators personal theory of teaching relative to practice

This study challenges suggestions that the best way to view the relationship between personal theory of teaching and practice is through either rigid congruence as has been widely promoted in general education literature (Beswick, 2005; Bryan, 2003; Ellis and Karr-Kidwell, 1995; Fang, 1996; Mitchell and Hedge, 2007; Tobin, 2012) or incongruence (Cooney, 2002; Davis et al., 1993; Hyson, 1991; Vacc and Bright, 1999; Zembylas, 2005). This study maintains, in line with Pringle’s (2008) research which was conducted in another museum environment i.e. art and a non-university museum, that for the case of museum educators working in university

museums perhaps a more powerful way of examining how their personal theory of teaching is related to practice is by looking at the influence of the sociocultural context in which these museum educators work. This study maintains that in the case of museum educators working in the university museums sampled in this study, the relationship between their personal theories of teaching and practice was context-dependent. It was found, as an example, that the pedagogical and epistemological approaches of university museums were predominantly aligned to personal theories of teaching of these museum educators. The museum context for the most part (with the partial exception of Renee see page 251) enabled the museum educators to translate many elements of their personal theories into practice. Sometimes other contextual factors (e.g. time and limited familiarity with students) or the museum educator's knowledge of the collection used in a programme hindered the museum educator's ability to translate elements of his/her personal theory of teaching into practice.

In line with Leatham's (2006) framework, this study suggests moving beyond descriptions of "incongruences" between personal theory and practice to "studying the underlying reasons behind such tensions" (Phipps and Borg, 2009, p.381) to better understand these museum educator's teaching rather than pointing out inconsistencies.

This approach recommends that what in the past was perceived as incongruence may better be described as a diversion of practice from the personal theory of teaching, due to rational underlying reasons related to the teaching context in which these museum educators work (e.g. university museum context and the characteristics of the visiting class teaching environment). This approach frames museum educators in university museums as rational and pragmatic professionals,

who are sensitive to their environment and who are enabled, and limited, by it. This study favours an understanding of teaching as an activity that is context-dependent and based on reason (Leatham, 2006). Even though no claims are made in this study about the value of the participants' practice, it is suggested that it does not stem from a thoughtless position (Eraut, 1994), rather they are "professionals who make reasonable judgments and decisions within complex and uncertain... schools [in this case, museums] and classroom environment [in this case visiting class teaching environment]" (Felix, 2011, p.144). This argument resonates with recent research in the field of mathematics teaching (Drageset, 2010; Forrester, 2008; Stemhagen, 2011) and language teaching (Borg, 2003; Martin, 2008).

How a belief or personal theory may be related to practice is often superficially explored (Leatham, 2006; Li, 2013; Skott, 2001). This study suggests there is a need for a better understanding of the personal theory of teaching and how it relates to practice in museum education in university museums.

This study shows that it is important to recognise that the way elements in a personal theory of teaching are activated in practice seem to depend on the educational context. For example, Renee and Charlie espouse different views about the nature of knowledge and learning depending on the discipline of the museum collection they were working in (see Discussion chapter). This resonates with previous research which suggested that elements in an educator's personal theory about subject matter may differ (Cronin-Jones, 1991). It is consistent with studies in general education which argue that elements in personal theories are not necessarily stable constructs across all teaching situations (Fang, 1996; Jones and Carter, 2007; Mansour, 2013; Pajares, 1992; Verjovsky and Waldegg, 2005) but part of "complex

systems” (Zheng, 2013a, p.332) which interacts with and are influenced by the teaching context in “different and changing ways” (Zheng, 2013a, p.332).

9.2.2.3 Understanding variety in museum learning environments

This study adds to our understanding of the breadth of learning environments in museum education while shining a light on outside influences, e.g. museum educator’s professional background, their personal theories of teaching and practices as well as the characteristics of the museum he/she teaches in. As an example, in the natural science museum the learning environment was predominantly formal with scant flexibility and minimal shared decision making between museum educators and learners (Rogers, 2005). Standardisation of the educational process and outcome was high. In the humanities museum, the learning environment was non-formal, as the museum educators were often responsive to visitors’ needs, adjusted their practices to accommodate learners and allowed learners some independence and personal meaning making (Falk and Dierking, 2002; Rogers, 2005). These learning environments are in line with the aims and educational approach found in university natural science and humanities museums (Curtis, 2006; Hartz, 2017; Mansard, 2014) (see Discussion chapter).

The learning environments in humanities and natural science university museums tend to be different from those found in most art galleries. This highlights the variety of learning environments that may exist in different museums. Some art galleries facilitate open-ended experimentation and equal power sharing between teachers and learners: characteristics of a participatory learning environment (Pringle, 2008). In some art galleries, such as the Tate Britain and Tate Modern in London, learning occurs through critical engagement with the learner, as well as group

meaning-making and “a process of dialogue, questioning and conversation, between the visitor or participant and an artwork, between visitors and staff, among visitors, staff and artists, and among visitors themselves” (Pringle and DeWitt, 2014, online, paragraph 29).

Pringle and DeWitt (2014) said, “the ultimate goal of learning programmes [in art galleries] is not to transmit a set of facts about art or art history to participants but to facilitate new ways of thinking about and experiencing art. Such a view does not always sit easily with views of learning held within formal education pedagogy and policy at present” (online, paragraph 18).

Even though participating university museum educators occasionally use their accumulated experience as museum educators in university museums to inform their practices e.g. exaggerated body language to quickly engage and connect with learners, findings show they mostly rely on their experience as school teachers. For example, Renee and Charlie’s experience as science school teachers propel them towards a more traditional, transmission approach to learning in natural science museums facilitating a more formal learning environment. This choice of learning theory contrasts with the learning theories espoused by museum educators, who incline to more progressive or informal learning environments. Artist educators illustrate this point. Pringle and DeWitt’s (2014) research on learning staff in Tate Britain and Tate Modern in London, which focused “on the perceptions and practices of those who construct learning experiences in art galleries” (paragraph 1), suggests that artist educators tend to prefer a participatory learning environment, “congruent with the value placed on the disruptive role of art voiced by particular artists, curators and theorists” (Pringle and DeWitt, 2014, online, paragraph 16). This is linked to the artist

educator's background in art practices paying homage to transformational experiences, learning through moments of rupture, and the "confidence to experiment, take risks and 'not know'" (Pringle and DeWitt, 2014, online, paragraph 40). These differences seem to highlight a connection between museum educators' professional background and the characteristics of the learning environments they espouse and facilitate.

9.3 Implications for professional training and future research

This section discusses the implications of the research findings in this study and future research opportunities. The first part discusses the implications relevant to the professional training of museum educators. In the second subsection, the author recommends future areas of research.

9.3.1 Professional training

The importance of a personal theory of teaching on practice has implications for the training of novice museum educators in university museums and in-service professional development.

Existing literature (Freeman-Richards, 1996) suggests that identifying personal theories of teaching is an important feature of student-teacher learning: "teacher education programmes would do well to consider ways in which participants can be encouraged to explore their beliefs, current practices and the links between them" (Phipps and Borg, 2009, p.388).

Case studies exploring experienced museum educator personal theories of teaching and practice in university museums may provide insights beneficial to novice museum educator training for educators who want to work in this type of museums

(Alakawi, 2018; Noethen, 2006.) This is not to imply that they should espouse these museum educator's personal theories of teaching or practices or that the latter are suggestions of best practice. Case studies, are used in teacher education for initial teacher training (Flowerdew and Miller, 1992; Freeman and Richards, 1996) to provide opportunities for constructing understanding about teaching that aids educators to grow professionally and develop their personal theory of teaching and practices (Meserth, 1996; Shulman, 1986). This is a widespread practice in teacher development programmes, and could apply to museum educator novice training programmes in university museums.

Many teacher development programs...have as a goal for their participants, the development of a personal theory of teaching practice...The articulation of a theory requires that teachers develop an awareness of their practice, make explicit the beliefs that undergird it and the principles that drive it, generate explanations for what happens in their classroom, and plan actions as a result of this process. Being able to say what they do and why, with the aim of improving their teaching/learning environments, enables teachers to grow professionally and personally, and in doing so, to give meaning and value to what they do (Burkett, 2014, p.19).

This study suggests that in-service education programme developers who want to introduce a range of pedagogies in university museums, similarly to training practices used during in-service programmes in mainstream education (Richardson, 1994; Loucks-Horsley et al., 2010; Zeichner and Liston, 2014), could do so by first exploring museum educators' personal theories, current practices, and the links between the two.

9.3.2 Future research into museum educator personal theory and practice

There are a few research opportunities stemming from this study. The finding that the practices of these museum educators was related to their personal theories of teaching in context-dependent ways, is an important insight to help us understand the teaching of museum educators in university museums.

It is not enough to superficially identify “tensions” between personal theory and practice, “rather attempts need to be made to explore, acknowledge and understand the underlying reasons behind such tensions” (Phipps and Borg, 2009). For that reason, and in line with Phipp and Borg’s (2009) findings on language teaching and Pringle’s (2008) on artist educators in art galleries, this study asserts that contextual factors need to be part of any analysis of the relationship between museum educators’ personal theories of teaching and practices.

Future research should be conducted with larger research samples and include other museum disciplines, non-university museums, museum educators with diverse professional backgrounds and characteristics, different “classroom” contexts, diverse visitor profiles, and encompass novice and experienced museum educators. A broad approach would allow for a comprehensive understanding regarding the relationship between museum educators’ personal theories of teaching and practices, including variations in personal theories of teaching and practice relating to a museum educators’ professional background, experience and the museum context they work in.

Perhaps, when there is a substantial body of research on museum educator personal theories and practice, this knowledge can be used to “inform curriculum

policy [in museums] in relation to any [educational] innovation that may be plausible” (Breen et al., 2001, p.472).

9.4 Limitations and strengths of the study

This section presents the limitations and strengths of this study. The first subsection begins by discussing three key limitations. The first, relates to the sample and general nature of the findings. The second aspect, discusses the difficulty inherent in extrapolating museum educators’ personal theories of teaching and the third examines the use of semi-structured observations.

A strength of this study pertains to the methodology used to overcome difficulties related to answering the research question. The second primary asset pertains to the richness of the data in an under-researched area of museum educators and museums. There were limitations which I will discuss below.

9.4.1 Limitations

The first limitation of this study relates to the fact that the findings are based on a small group of museum educators (four), all of whom have a particular background (former school teachers with a PGCE) working in a particular type of museum. They work in a university museum setting teaching a limited age group of children (10- or 11-year-olds), during museum school educational programmes in a single United Kingdom city. The sample selection was based on the scarcity of research about museum educators in this type of museum. Therefore, the narrow choice of participants (museum educators who were former school teachers with a PGCE) as well as the choice of a particular type of museum (university museums) are sample-related limitations of this study. Caution must be exercised in generalising the outcomes to the broader population of UK museum educators, as different types of

museum educators work in other types of museums. The same limitation applies to generalising the outcomes of this study to all types of museums- beyond university museums in the UK. Also, this study does not evaluate these museum educators' personal theories of teaching or practice, nor make any claims pertaining to their pedagogical value or suitability for a museum teaching environment. A larger sample and a different research design would be needed for that.

An important limitation of this study is how a researcher could claim insightful knowledge into the personal theories of teaching of museum educators. Pajares (1992) stated that personal theories “cannot be directly observed or measured but must be inferred from what people say, intend, and do – fundamental prerequisites that educational researchers have seldom followed” (p. 314). However, as mentioned in the following subsection below, to mitigate against this limitation, interviews before and after observations about concrete instances of practice were conducted with the participating museum educators. Doing so has been shown in similar studies with teachers to increase the likelihood of getting closer to an educator's personal theory of teaching (Argyris and Schon, 1996; Brown and McIntyre, 1995).

The use of semi-structured observations, despite being a suitable data collection method in light of the research question of this study, can also limit the information collected about practices (Creswell, 2002). Robson (2007), explains that semi-structured observational methods help achieve reliability and validity in data collection, “at the cost of a loss of complexity and completeness by comparison with the informal route [unstructured notes]” (p.313). In this study the advantages of this observational method outweighed potential limitations (see Methodology chapter).

9.4.2 Strengths

The richness of personal theories about teaching captured in this study was achieved by prompting museum educators to explain observed episodes during post-interviews (Argyris and Schon, 1996; Brown and McIntyre, 1995). Evidence from the findings suggest that it allowed for thoughtful reflection. This study used one pre-interview overall and four post-interviews directly related to classroom practice per programme to give museum educators a chance to explain their personal theories of teaching in the light of different teaching episodes. Data collection strategies were designed to facilitate investigation surrounding the typical experiences of these museum educators.

Another strength of this study is in the wealth of data and the intrinsic interest in exploring an under-researched topic in terms of the types of museums used in this study (Zikmund et al., 2012). Walford (2007) stresses that the criteria for the selection of research sample should be based on whether it is intrinsically interesting in itself or the activities it participates in.

The exploration of four experienced museum educators' personal theories of teaching and practices in two university museums that deliver primary school museum programmes is interesting, because it creates a better understanding of teaching in the context of these museums.

The relationship between the participating museum educators' personal theories of teaching and practices are linked to general discussions about museum educator thinking and teaching in museums, and the professional development of museum educators in university museums.

This study answers calls from within the museum education community (Arts Council England Heads of Museum Education conference, 2013; Rasmussen and Winterrowd, 2012; Yellis, 2000) for more research into museum educator thinking and

practice in a way that it includes, and respects, the perspectives of the practitioners. The exploration and analysis of personal theory of teaching and the way it is related to practice, of those museum educators working in university museums, moves toward the creation of an intellectual foundation to support further understanding of museum educator teaching in university museums.

APPENDICES

APPENDIX A: SETTING THE CONTEXT OF MUSEUMS AND PROGRAMMES IN THIS STUDY

Museum A

Museum A is a humanities university museum in a United Kingdom city with a history and anthropological collection. Often referred to as a “Museum of Museums” because of its celebrated period displays, it is renowned for its contemporary research, museum curatorship and award-winning educational programmes. Its educational programmes encompass all school-year ages and include a wealth of family programmes, outreach, and school visit activities. Programmes range from hands-on workshops, object-handling and detective sessions to guided trails.

Programme 1

Programme 1 is award-winning and started as a small project in 2003 following a meeting of the museum education team with the Local Education Authority Advisory Service. Described as the “jewel in the crown offered to Year 6 children” by a deputy principal at one of the participating primary schools, it is an innovative project that uses object-based learning to encourage children to develop in a positive learning environment. It is designed by the educational team of Museum A in collaboration with the team in Museum B and run with the primary years’ museum educators at Museum B of the same university city.

The museum programme enhances curricular activities of school children as part of the regional schools-museum partnership, at a time in which “advisors were encouraging schools to look beyond the limitations of numeracy, literacy, and a

narrow interpretation of the National Curriculum” per the programme brochure of the museum. The project has been evaluated for every child who has taken part – 3,250 at the time of the research study concluding. “Evaluation has been universally positive,” stated the head of a governmental partnership of four regional museums including the museums in this city. It was described by a student as, “an exquisite journey into the world of history”.

In 2009, museum education staff analysed and evaluated the project through meetings with teachers. 2011 was the fourth year that this expanding programme ran. Eighteen Year Six classes from eleven primary schools take part each year. The mission and emphasis of this programme, according to the website of this museum, is to:

Encourage children to better understand the role of a museum in exploring heritage and the world. The learning involved is kinaesthetic and multi-sensory, promoting active analytical thinking, discussion and objective reasoning. The emphasis is on non-literary learning outside the classroom environment... teamwork and personalised learning agendas... This project has allowed a large-scale sustainable project to develop that reinforces school partnerships, facilitates educational cohesion within museums and promotes confidence in learning among children

The museum expresses the view, in its promotional literature, that the cross-curricular nature of this project has potential for dissemination to other museums with diverse collections. According to the Head of Education in Museum A, “The X project [Programme 1] has developed from real teamwork between museum educators, teachers, curators, conservators, volunteers and a lot of children.”

The programme has three distinct phases. Only one takes place in the museum:

i) Outreach 1

This takes place at the participating schools so children can familiarise themselves with the education officers and their museum collections by handling museum objects. The children focus on an object of their choice, generating questions that the museum educators answer.

ii) The museum day

Each class comes to the museum for one day to explore a contemporary research collection. This is the main part of the programme and it's obligatory, unlike the other two phases. Visiting school children are exposed to events ranging from an archaeological dig, to documentation, conservation, research, interpretation and display. The day is divided into three sections. First, the "What is it?" game takes place where the children explore and handle objects to experience analysing, identifying, questioning and discussing objects. Secondly, two archaeological digs occur where the children map the dig site, choose objects for their collection, then measure and describe what they found. They later visit different departments of the museums and talk to museum staff. Lastly, the children return to the object that they collected during the dig and explore Museum A and Museum B to collect information and identify the objects. They then discuss their hypotheses to produce interpretations of the objects.

iii) Outreach 3

Some schools take up the option to create an onsite “museum” allowing their students to hold objects. Museum educators are then invited to see what each class has produced.

Museum B

Museum B is a natural science university museum in a United Kingdom city with entomology, geology, mineralogy, and zoology collections. It is a centre of global scientific research and award-winning educational programmes. It has a wealth of educational programmes, which include community outreach, family, and school programmes. The format of the programmes range from lectures and guided trails, to object handling and hands-on workshops.

Programme 2

This programme has run in Museum B for many years and is one of its most popular school offerings. Programme 2 draws on the work of Charles Darwin and presents children with the concepts of natural selection and evolution. This exploration into adaptation and habitats allows children to observe and handle specimens.

The programme is taught through a combination of lecturing, limited questioning, and guided object-handling.

Programme 3

This programme is a collaboration between Museum B and a prestigious foundation that works with forests. This foundation’s aim is to spread knowledge about forests and sensitise children to the value of oak trees, in particular.

At the start of the session, the children were asked to sit in a circle on the museum floor. The museum educator introduced the concept of biodiversity in forests. A worksheet was given to the children. The museum educator told how to spot the specimens she had marked in the museum and described how the children should fill in the worksheet. The worksheet comprises of one section where children can draw an animal and another where they can write information about the animal. The second activity gave the children a museum trail during which children explore the museum floor, select an animal they wish to observe, and fill in the worksheet. During this activity, the museum educator helps the children that need it, and prompts them to look closely at specimens. Children create a collage of the animal they selected. At the end of the session children place their collage on a “tree of life” and the museum educator asks them to share any new information they learnt that day.

APPENDIX B: PRE-INTERVIEW SCHEDULE FOR MUSEUM EDUCATORS

Description of participants

- 1) Head of the department of education in the humanities museum that designed and delivers Programme 1 (ME1: Alex).
- 2) Second museum educator from the humanities museum delivers Programme 1. She is part of the museum's primary school programme design team (ME2: Bridget).
- 3) Museum educator from natural science museum who runs Programme 1 and Programme 3. A member of the primary school programme design team (ME3: Renee).
- 4) Second museum educator at the natural science museum. He assisted in the design of Programme 1, designed Programme 2 and runs both programmes. He is part of the museum's primary schools' programme design team (ME4: Charlie).

Guidelines for the interview

The interviewer informs the interviewee about the research aims, interview duration, and allows questions before the interview. Confidentiality and anonymity is guaranteed. Interviewees sign a consent form.

Questions

Background information

1. To begin with, would you like to tell me a bit about yourself, starting from your academic and/or professional background?
2. What made you decide to become a museum educator?

3. How would you define the role of a museum educator? What is your role as a museum educator? Does the museum influence your role as a museum educator? (*Prompt: what do you hope to achieve? Ask about his or her role as a museum educator in previous employment if applicable.*)
4. Focusing on educational programmes for primary school class visits, can you please describe briefly the different kinds of programmes in your museum and talk about their respective aims?
5. In your opinion, what is the pedagogical approach behind X museum's primary school educational programmes? How about the general educational policy?

Main Interview: Part 1

1. What are your personal theory elements when teaching primary school museum programmes?
2. What practices do you use to translate these personal aims and why?

Main Interview: Part 2

1. Ask museum educator to elaborate on all the answers given above and explain the rationale behind answers. End interview with this question:
 - a) Would you like to add something that I did not give you the opportunity to talk about?

Thank you so much for your time! It is greatly appreciated!

APPENDIX C: POST-INTERVIEW SCHEDULE FOR MUSEUM EDUCATORS

Description of participants

- 1) Head of the department of education in humanities museum who designed and delivers Programme 1 (ME1: Alex).
- 2) Second museum educator from the humanities museum who delivers Programme 1. This museum educator is also part of the primary schools' programme design team of the same museum (ME2: Bridget).
- 3) Museum educator from natural science museum who runs Programme 1 and Programme 3. This museum educator is also part of the primary schools' programme (ME3: Renee).
- 4) Second museum educator in the natural science museum who assisted in the design of Programme 1, designed Programme 2 and runs both programmes. He is part of the primary schools' programme design team at this museum (ME4: Charlie).

Guidelines for the interview

The interviewer informs the interviewee about the study aims, the duration of the interview, and enables the interviewee to ask questions before the interview. Confidentiality and anonymity is guaranteed. The interviewee signs a consent form.

Introduction

Thank you for meeting with me today. The following questions concern your reflections on the session of Programme X and your thinking about specific episodes that occurred in this session.

Questions

Reflections on Programme X

- 1) How did the session go? Please give examples to illustrate your points.
- 2) Did you tweak your pedagogical practices in this session? Can you please give examples?
- 3) Was there anything about this session, perhaps anything different, worth mentioning? How did you handle it and why?
- 4) The remaining questions will enquire about the pedagogical thinking behind specific episodes recorded during observation, and selected based on criteria described in the methodology section of this document. For example, what were you hoping to achieve when you asked the children to do the activity in pairs? Can you please describe what happened during this episode? (Note to author: ask museum educator to name the practice he/she used, and then ask why he/she used it?)

Thank you very much for your time! It is greatly appreciated!

**APPENDIX D: RESEARCH QUESTION, PARTICIPANTS, DATA
COLLECTION METHODS, TIMELINE AND LENGTH OF
INTERVIEWS/OBSERVATIONS**

Museum educators' personal theories of teaching and practice

Key Participants	Data Collection Method/Observations	Date	Time/hours
Alex Programme 1	Pre-interview	1 September 2011	1.5 hours
	Observation 1	19 September 2011	4 hours
	2	26 September 2011	4 hours
	3	3 October 2011	4 hours
	4	10 October 2011	4 hours
	Post-interview 1	19 September 2011	1 hour
	2	26 September 2011	1 hour
	3	3 October 2011	1 hour
	4	10 October 2011	1 hour
Bridget Programme 1	Pre-interview	5 September 2011	1 hour, 20 minutes
	Observation 1	20 September 2011	4 hours
	2	27 September 2011	4 hours
	3	28 September 2011	4 hours
	4	5 October 2011	4 hours
	Post-interview 1	20 September 2011	1 hour
	2	27 September 2011	1 hour
	3	28 September 2011	1 hour
	4	5 October 2011	1 hour
Charlie Programme 1	Pre-interview	2 September 2011	2 hours, 5 minutes
	Observation 1	22 September 2011	4 hours

	2	29 September 2011	4 hours
	3	6 October 2011	4 hours
	4	13 October 2011	4 hours
	Post-interview 1	22 September 2011	1 hour
	2	29 September 2011	1 hour
	3	6 October 2011	1 hour
	4	13 October 2011	1 hour
Charlie Programme 2	Observation 1	10 January 2012	1 hour
	2	11 January 2012	1 hour
	3	12 January 2012	1 hour
	4	13 January 2012	1 hour
	Post-interview 1	10 January 2012	1 hour
	2	11 January 2012	1 hour
	3	12 January 2012	1 hour
	4	13 January 2012	1 hour
Renee Programme 1	Pre-interview	2 September 2011	1 hour 25 minutes
	Observation 1	23 September 2011	4 hours
	2	30 September 2011	4 hours
	3	7 October 2011	4 hours
	4	14 October 2011	4 hours
	Post-interview 1	23 September 2011	1 hour
	2	30 September 2011	1 hour
	3	7 October 2011	1 hour
	4	14 October 2011	1 hour
Renee Programme 3	Observation 1	6 February 2012	1 hour
	2	7 February 2012	1 hour
	3	8 February 2012	1 hour

	4	9 February 2012	1 hour
	Post-interview 1	6 February 2012	1 hour
	2	7 February 2012	1 hour
	3	8 February 2012	1 hour
	4	9 February 2012	1 hour

APPENDIX E: OBSERVATION TABLE

Episode Description	Personal Theories	Congruency/Incongruency
Ahmet is active and keeps misbehaving. He runs his finger over the walls, which have objects and pictures and jumps on the stairs. Alex told him that if he touched any real museum object then the whole class would not be allowed to visit the museum experts in the conservation department. Then Ahmet touched the pictures on the wall. Alex pretended he did not see and did not react. Ahmet continued jumping on the stairs but did not touch any other museum objects and followed his class up the stairs. (Disciplining child, incongruent to honing positive learning environment. Ask museum educator about it)	Knowledge: Nature of knowledge as fluid	
	Learning: Learning as a process of analytical thinking (and construction of meaning)	
	Practices to facilitate the process of analytical thinking and construction of meaning: (object handling, questioning, discussion, interpretation, peer learning)	
	Learning as an outcome of a positive learning environment in museum education. Rapport	-
	Learning as an outcome of a positive learning environment in museum education. Stress free	
	Learning as an outcome of a positive learning environment in museum education. Interest	

APPENDIX F: INDICATIVE SCREENSHOT FROM NVIVO9

The screenshot displays the NVivo9 interface. On the left, a hierarchical tree of codes is visible under the 'aims' category. The 'giving kids idea of museums as positive place to have fun etc' code is selected, showing its sub-codes. On the right, a text excerpt is displayed, showing a quote from a participant.

aims

- accessibility
- enthusiasm and creativity
- focus on the analytic process
- getting kids to differentiate between what is real.
- give them understanding the process of the museum and the path of an object to
- giving kids idea of museums as positive place to have fun etc**
 - giving kids a great experience of museums
 - that they have a positive experience and they will want to come back
- keep students interested and engaged
- object based learning
- objectives or goals of program
- outreach
- point of behind scenes is to show them there are jobs there and its not boring
- structure is different for different parts bc aim is different
- understanding archaeology can be found when people are building new buildings
- understanding role of documentation and art in understanding science
- approach
- behavior management
- critically reviewing and reflecting on the lessons for possible improvement
- factors that affect practice (interactions and approach)
- practices
- role of museum educator

[C:\Internals\All Chris files MM & Adapt\All Chris MM\Chris MM post-interviews\postinterview_Chris_MM_STE-013.Transcript_dB> - \\$ 2 reference Coverage\]](#)

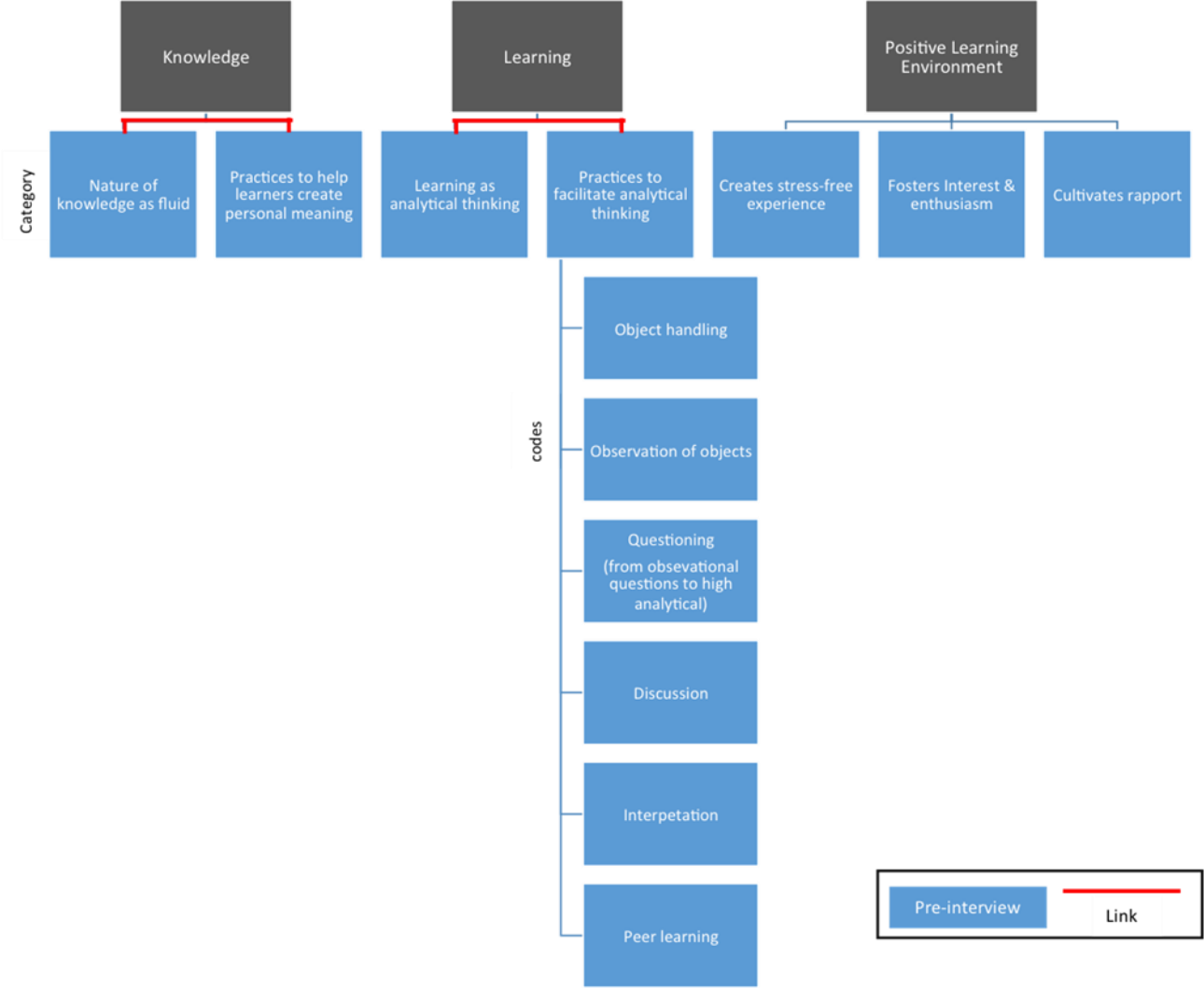
References 1-2 - 1.41% Coverage

Yes. I think we did really achieve what I wanted to achieve, which is all giving them a really good experience of muse
them a very positive idea that museums are rea
to go and you can have fun and you can have fu
out. Their evaluations show that they understoo
it's a great place to go. You an research. One of
wrote, "and you can research things."

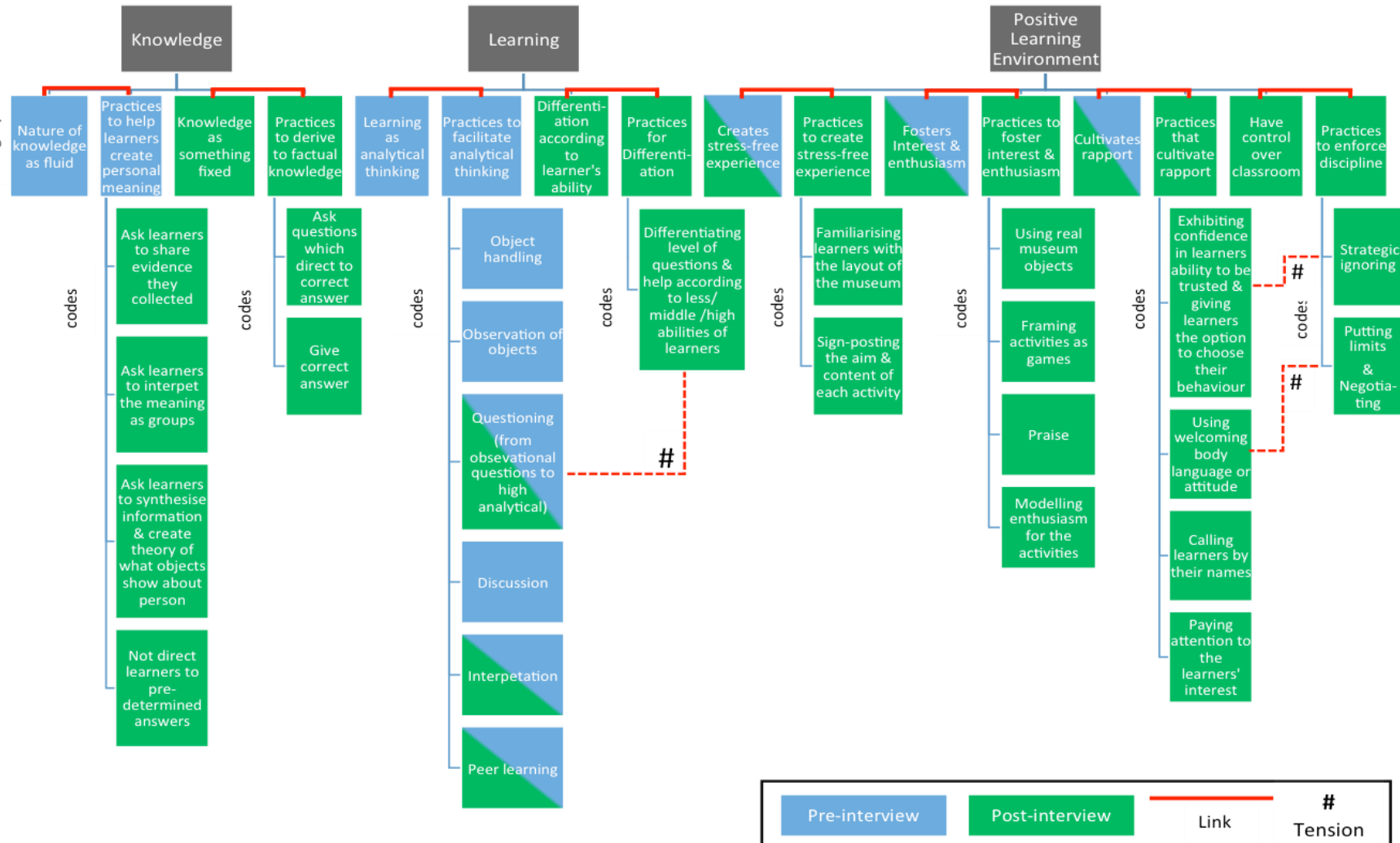
So I think that was really good. They were all int
they were all engaged.

So from a traditionally non-visiting area, that's a
achievement.

APPENDIX G: ANALYSIS OF PRE-INTERVIEW DATA, CASE 1.



APPENDIX H: ANALYSIS OF PRE-INTERVIEW AND POST-INTERVIEW DATA, CASE 1.



**APPENDIX I: SYNTHESIS OF PRE- AND POST-INTERVIEW DATA,
CASE 1.**

Personal Theories	PT subtheme	Pre	Post	Comments
The nature of knowledge in museum education.	Process of meaning making (fluid)	✓	✓	Well-developed element of personal theory in both interviews (see notes)
	As content (fixed)	○	✓	The two natures of knowledge are complementary. In some episodes' knowledge as content was not observed (rationale provided: programme activities)
Learning as a process of analytical thinking and construction of meaning.		✓	✓	This element of his personal theory was referred to in both interviews
Practices used to facilitate the process of analytical thinking and construction of meaning:	Peer learning to facilitate analytical thinking;	✓	✓	Well-elaborated element of personal theory in post-interviews
	Types of questions used through objects to facilitate analytical thinking.	✓	× ✓	There were exceptions - new element of his personal theory on abilities and not knowing children well enough. Issue interfering with build-up of analysis and questions
Learning as an outcome of a positive learning environment in museum education. Rapport (Practices- Rapport)	Building trust with learners	○	✓	Well-developed element of personal theory in both interviews (see notes)
	Welcoming	○	✓	Same as above (see notes)
	Addressing learners by their names	○	✓	Element of his personal theory behind this practice observed (big repertoire of practices for translating each element of pt.)
	Answering learners' questions	○	✓	Well-developed element of his personal theory in both interviews (see notes)

Learning as an outcome of a positive learning environment in museum education. Stress Free (Practices - Stress free)	Children navigate the museum space	✓	✓	Well-developed element of his theory in both interviews (see notes)
	Signpost the aim and content of each activity	○	✓	Same (see notes)
Learning as an outcome of a positive learning environment in museum education. Interest (Practices - Interest)1`	Using real museum objects	✓	✓	Elaborated on post-interviews
	Praise and positive feedback after mistakes are made	○	✓x	Congruent EVEN during instances where he must discipline and put limits (still congruent with being positive) Rationale: school teacher's lack of behavior management ability.
	Role-play and games	○	✓	Same (see notes)
	Modeling enthusiasm	✓	✓	Same (see notes)

Legend	
✓	Found in data
x	Found the opposite
○	Not found

APPENDIX J: SYNTHESIS OF PRE-INTERVIEW, POST-INTERVIEW AND OBSERVATION DATA, CASE 1.

	PT subtheme	Pre	Observed Episode	Congruency/ Incongruency	Post	Overall Congruency/ Incongruency
The nature of knowledge in museum education.	Process of meaning-making	✓	4,14	○	notes	Yes
	As content		17	□	Two elements of his personal theory are complementary. Elaboration on this element of his personal theory. (programme structure: differentiation)	Yes (due to elaboration of this element of his personal theory)
Learning as a process of analytical thinking.		✓	2, 7, 9, 23,24,25, 40	○	Notes	Yes
Practices used to facilitate the process of analytical thinking:	Peer learning to facilitate analytical thinking	✓	5,8	○	Expands on element of his personal theory (notes)	Yes

Learning as an outcome of a positive learning environment in museum education. Rapport	Questioning through objects to facilitate analytical thinking.	✓	13,18,44, 55	○□	Many episodes incongruent (reason: pt. on ability of learners and time available with students)	Yes (he added new element of his personal theory.)
	Building trust with learners		6,10	○	Notes	Yes
	Being welcoming		1	○□	Yes, but some episodes disciplines children (reason teacher's poor behaviour management skills)	Yes, overall true to his overarching element of personal theory on positive learning environment
	Addressing learners by name		33	○	Notes	Yes
	Answering learners' questions		30,43	○	Notes	Yes
Learning as an outcome of a positive learning	Children navigate the museum space	✓	3	○	Notes	Yes

environment in museum education. Stress Free	Signpost the aim and content of each activity		18	○	Notes	Yes
Learning as an outcome of a positive learning environment in museum education. Interest	Using real museum objects	✓	22,32	○	Expands (notes)	Yes
	Praise and positive feedback after mistakes are made		19,22,	○	Notes	Yes
	Role-play and games		51,56	○	notes	Yes
	Modeling enthusiasm	✓	40	○	Expand (notes)	Yes

Legend	
✓	Mentioned in Pre-interview
1	Correspondence to episode observed
□	Incongruency
○	Congruency

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