

Museum Learning

Theory and Research as Tools for
Enhancing Practice

**Jill Hohenstein and
Theano Moussouri**

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As museums are increasingly asked to demonstrate not only their cultural, but also their educational and social significance, the means to understand how museum visitors learn becomes ever more important. And yet, learning can be conceptualised and investigated in many ways. Coming to terms with how theories about learning interact with one another and how they relate to 'evidence-based learning' can be confusing at best.

Museum Learning attempts to make sense of multiple learning theories whilst focusing on a set of core learning topics in museums. It draws attention to the development of theory and its practical applications in museum contexts such as aquariums, zoos, botanical gardens and historical re-enactment sites, in addition to more traditional art, science, and social history museums. Importantly, it considers learning not just as a cognitive characteristic, as some perspectives propose, but also as affective, taking into consideration interests, attitudes, and emotions.

This volume will be of interest to museum studies students, practitioners and researchers working in informal learning contexts, and will help them to reflect on what it means to learn in museums and create more effective environments for learning.

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Contents

<i>List of contributors</i>	vi
<i>Acknowledgements</i>	viii
1 Introduction	1
2 Theory and museum practice	11
3 The importance of methods and methodology for museum practice	31
Topic chapters	53
4 Museums and the making of meaning	55
5 Narrative, discourse and matters of communication	99
6 Degrees of authenticity in museums	136
7 Remembering, reminding and reminiscing in museums	170
8 The role of self and identity in learning	196
9 Motivation: from visiting to devotion	232
10 Questioning culture and power in museums	264
11 Conclusions	290
<i>Glossary</i>	296
<i>Index</i>	306

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1 Introduction

Theory can be seen as a lens through which research is filtered. As a result, the ideas that are seen to be important for use in developing evidence-based practice are all influenced by particular perspectives about learning, about research, and about museums. This is not always done in a conscious way in museum practice. As practically minded people, museum professionals are often drawn to empirical research and models that are developed in order to address pertinent questions for museum practice. We argue that, although there is nothing inherently wrong with these approaches, issues of theory-evidence gap, methodology and theoretical assumptions require attention. Similarly, models developed with practitioners in mind need to be mindful of and address these issues. This is an area where academic researchers and museum professionals can work together to develop theoretically sound and practice-relevant frameworks, through research-practice collaborations.

This book represents the culmination of multiple years of work on the part of us, and many others in the worlds of both museums and learning theory. We have been aware for some time, through literature, work experiences, and conversations with various stakeholders, that it has been difficult to formulate a way to coherently discuss theories about learning in museum contexts in a manner that is accessible but also represents theories as they are seen in the world of academia. That is, the divide between academia and practice seems to grow rather than shrink in many ways, despite the attempts to bridge gaps. We hope this book helps to provide a useful window between theory and research on the one hand and practice on the other. In this introductory chapter there are several topics we will highlight: definitions of learning, what we refer to as a museum, the purpose of considering learning theory in museums as we see it, as well as the outline of the chapters that follow.

Though on the surface it might seem rather obvious, there are many different institutions that could count as a 'museum'.

The Museums Association in the UK states that ‘Museums enable people to explore collections for inspiration, learning and enjoyment. They are institutions that collect, safeguard and make accessible artefacts and specimens, which they hold in trust for society’ (Museums Association, n.d.). This definition purposely includes art galleries and historical collections. We are using the term museum rather more broadly here to include both these traditional museums, containing objects of value (however that is defined), which offer a public the opportunity to see these objects so they may experience them in an authentic way. But we are also referring to science centres in which there may be very few ‘objects’ of value, but rather there are hands-on experiences of phenomena that the scientific community has discovered. In addition, zoos and botanical gardens which both contain living ‘objects’ can be thought of in ways that are similar to museums. Furthermore, heritage and archaeological sites constitute other forms of what can be thought of as open-air museums. There are also historical houses and other buildings of interest that qualify as museums in this view. Finally, newer ways of interacting with publics through dialogue events, re-enactments, and demonstrations can be considered within the auspices of museums. Gurian (2002) categorised museums into five types: object-centred, housing objects of value; narrative, including those that interpret the story of particular groups (e.g., United States Holocaust Memorial Museum); client-centred, including children’s museums and science centres, many of which do not have collections but instead provide experiences and afford visitors opportunities to witness phenomena; community-centred, being of – and for – the community in which they are based; and national, which tend to attempt to represent the interests of a whole country. Though each type of museum may have specific needs and details with respect to the consideration of learning, there are undoubtedly many things that are shared by these institutional types.

Though much of the research that we present has been carried out in more ‘traditional’ object-centred and client-centred museums, it is important to consider the ways that other contexts may have similar or different relations to the findings of research and be able to utilise the guidance that various theories might put forth. Of course, the studies reviewed here take a specific view of museums, although this is not always explicit. Museums are often seen as social institutions for personal, social, dialogical, collective or emancipatory learning, with various degrees of reference to the ideological process of education or learning policy and mission. At the same time, we acknowledge that there is a growing use of digital technologies in museums for presentation of exhibit material as well as interactive guided tours, amongst other uses. Although we refer to studies

involving digital technologies in museum learning in several places throughout the book, including a section in Chapter 6 on authenticity, we do not devote a great deal of space specifically to how learning can be enhanced (or indeed inhibited) by the use of digital technology. This may be an omission on our part. However, it was necessary to make choices about what we were able to include, due to space limitations.

We want to clarify from the outset that we think of learning as something that is cognitive, affective and psychomotor (Bloom, 1956). Whereas a very traditional view of learning would perhaps suggest that priority should be given to the cognitive aspects of learning (e.g., knowledge for facts and 'understanding' how or why things have occurred in the way they have), we also hold dear the notion that learning is much broader than just cognitive gains. That is, learning is also emotional, attitudinal and aspirational, but bodily, too. This means that people develop and change in the ways they feel about various ideas and concepts such as impressionist art, biomedical technologies, changes in positions of power across the globe, etc. They also can sometimes become highly skilled at an activity, such as driving a car, without being able to think about or talk about the details involved in carrying out that activity. So, though there is still an emphasis on cognitive learning in various educational institutions, including museums, we think it is important to recognise the non-cognitive in learning theory and research. That being said, much of the research in museums does tend to take a cognitive focus. We try to present work in this book that goes beyond the cognitive but we are also limited by the research that has been carried out.

It is important to point out that whereas thinking of learning as memory for facts is perhaps conventional, it might not be the most useful way to capture the types of learning experiences occurring in museums. There are numerous reasons to reject mere factual learning as the standard upon which to judge museum learning. Thinking about learning as only a cognitive outcome will result in missing issues to do with conceptual development as opposed to 'information' as important elements of learning. But adding the affective and motoric types of learning to the mix will bolster arguments as to why a focus on facts as items to be learned will miss out on valuable opportunities in museums that would not count as learning facts. Moreover, whilst some theoretical perspectives about learning prioritise a notion of learning that exists within people's heads (e.g., constructivism, information processing), there are alternative views that would suggest learning and conceptual development are processes that occur in the interactional space in relationships between people (e.g., sociocultural theory). These latter types of perspectives tend to cut across cognitive and affective, or even

motor, learning. There is a great deal of evidence to suggest that factual (and conceptual) cognitive learning can be connected to affective and even bodily learning (Martin & Briggs, 1986). But even this type of finding suggests that cognitive learning is somehow more important than attitudinal or emotional learning. We feel that Falk and Dierking (1997) were right, twenty years ago, to have highlighted the need to go beyond thinking about learning as memory for facts and have attempted to address this in multiple ways throughout the book.

Learning can be defined as a relatively permanent change in thought or behaviour, which might include cognition, opinions, skills or mindset as indicated above. These changes could be in areas that are of less obvious relevance to learning in museums, like firing patterns in particular neurons in the brain. But they can also appear in more observable actions, such as answers on a 'test' of knowledge. And they might also be in less tangible areas such as a vague sense of belonging to a group or feelings of being drawn to certain forms of art but not others. Illeris (2007) has pointed out that learning can be viewed as an outcome: this change in thought or behaviour mentioned above. But he notes that one could also see learning in terms of a process or even an interaction. The process of learning could be closely tied to the outcomes. That is, certain mental and emotional mechanisms might be necessary to bring about the learning outcomes that are seen. On the other hand, learning as an interaction implies that it is not an individual process, but rather involves at least two actors. The exchange between these actors can lead to different outcomes or even processes. The way one chooses to think about learning (outcome, process, or interaction) could affect the choices that are made in considering theory and research as valuable, but also how to apply the ideas from theory and research in practical settings.

It is sometimes difficult to make sense of the myriad research outcomes about a given topic. One only has to consider the news reports about the so-called benefits to our health of fats versus carbohydrates versus protein versus sugar, among other potential nutrients, to see how research does not always provide easy to follow guidelines or practical advice to the everyday consumer. We aim in this book to try to unpick some of the reasons that research findings can be at odds with one another. We think that one important element of such differences can be due to differences in theoretical perspective. Theoretical perspectives about learning (or other types of theory) are not always compatible with one another. If one buys into a particular type of learning as more important (e.g., outcome or cognitive), and this is more consistent with a particular theoretical perspective about learning, there is a good chance that the approach to research will differ from the approach taken by a different

researcher with a different understanding of what learning should be seen as (e.g., interaction or affective). As covered in the next chapter on theory, sometimes theories can be built up in a way that reinforces biases about the fundamental constructs they cover, such as learning. These biases will undoubtedly influence the research that is based on these theories and any resulting guidance for practice. This may be one reason that findings from two different studies about the same topic can appear to come to varying conclusions. As such, consideration ought to be given to the theory that drove the research before trying to derive practical implications from studies.

To complicate matters, there are also disciplinary boundaries that can serve to both help and hinder understandings in the field of museum learning. For example, we draw from literature in psychology, sociology, history, philosophy and anthropology as 'primary' disciplines in this book. However, there are interdisciplinary fields that are also useful in the consideration of theories to do with learning, particularly as relevant to museums. These fields include education, women's studies, museum studies, cultural studies, tourism and leisure studies, and heritage studies, among others. Sometimes theories in two different disciplines can sound very similar to one another, and are developed in parallel to each other but only very rarely refer to each other in a cross-disciplinary way. For example, both the theory of Figured Worlds (Holland, Skinner, Lachiotte, & Cain, 2001) and the concept of 'scripts' (Schank & Abelson, 1977) relate to the ways that people come to understand expectations about how to act in particular situations. However, scripts tend to approach the idea from a very cognitive point of view, providing a way for people to act efficiently in their everyday lives; whereas Figured Worlds uses the idea about expectations as a fuzzier set of guidance, which helps people act in ways that are appropriate to their identities.

Some researchers coming from disparate fields tend to pick and choose aspects of psychological and learning science theories that suit them (or they have easy access to). This approach often results in reducing quite complex theories, constructs and principles to rather simplistic interpretations of what are, in effect, umbrella theories. One problem with this situation is that these researchers may only focus in on a small number of studies, representing particular interpretations of these theoretical perspectives whilst ignoring the complexities developed within the academic discipline by the original authors of the theories. As a result, this may lead to ignorance of what these disciplinary perspectives have to offer, which can mean that whole fields of study can miss out on meaningful dialogues. On the other hand, other researchers have made efforts to marry up different disciplinary perspectives and create more sophisticated

and overarching theoretical perspectives. Beyond the theoretical level, the interaction of different disciplinary perspectives can also be useful at a methodological level. Where we have encountered potential dialogues in and between disciplines and fields, we try to point them out for the reader to help make sense of the vast array of theoretical perspectives that exist.

We feel it is important to declare our own backgrounds here in order to honestly acknowledge any biases we have. We have attempted to be inclusive in this book. But inevitably we are unable to make space for everything. We are undoubtedly influenced by our own perspectives about what is important. Given our statements about theory forming a lens with which to view research and practice, disclosure of our perspectives seems essential. One of us is a developmental psychologist who researches cognitive development and language. Hohenstein's primary theoretical perspectives stem from Piagetian, social constructivist, information processing and sociocultural backgrounds. At the same time, her research has tended to utilise quantitative methods, both observational and experimental. This research has been conducted primarily in museums and other sites of non-formal learning, like the home. Moussouri's view of learning in museums has been influenced by social constructivist and sociocultural perspectives. Having completed her first degree in education, one of the first things she noticed when working in museums was how few of the learning theories developed with formal learning settings in mind can be applied in museum settings. This shaped her approach to research, which is driven by research questions related to the value and relevance of museums in people's lives and grounded in museum practice. Her research is exploratory and qualitative in nature.

Related to the above disclosures, we are both empirical social scientists. As such, we tend to rely on empirical, rather than theoretical, research in our presentations of theory and research in this book (see Chapter 3 for more information on empirical methods). This means that our background leads us to favour studies that involve collecting data from relevant individuals or sources as opposed to those that start with an intellectual question and present analyses of exhibitions and experiences solely from the theoretical perspective of the author. We are aware that work from heritage studies often uses this technique in academic writing. As a result, we tend to draw less from that field than perhaps we could have.

This book begins with a chapter that discusses the importance of theory for both research and practice. We present the ways that theory develops over time, and how it can be difficult to change a discipline's dogmatic reliance on particular theoretical perspectives. But we also highlight the mediational role theory plays in the influence of research on practice: if theory

has influenced research and research is used for evidence-based practice, then logically, theory also influences practice. At the same time, it can be difficult to make sense of the various theories about learning in museums. We emphasise the need to pay attention to what researchers mean when they align themselves with a particular theoretical perspective. Moreover, researchers might not even explicitly talk about theory in their studies, which can also introduce confusion to the issues of theory, research, and practice.

Following from this discussion of theory, Chapter 3 presents some very brief notes about methods and methodology. We think it is important to consider not just the theoretical perspectives about learning, but also the approaches that are taken to conducting empirical study. As such, we have attempted to outline some of the nuts and bolts to social science research, with a complete awareness of our inability (both due to space limitations and lack of expertise) to provide either a how-to manual for conducting research or a more thorough consideration of all of the available methods. We hope that this cursory coverage of methods and methodology will, if nothing else, help by indicating further references to follow for those who would like them.

Because we have tried in this book to ground the presentation of research and theory, we introduce our 'topic' chapters, 4–10, with a scenario that was contributed by practitioners from a number of museums around the world. The use of scenarios counterbalances the abstract nature of the theoretical discussions by grounding them in current museum practice and thinking. Hence, each topic chapter is a form of dialogue between theory, research and practice. The ensuing discussion presents our interpretations of how the practice-based scenarios relate to a variety of domain-specific theories. This is followed by the presentation of a number of either museum-based or museum-relevant empirical studies within the same domain.

We note here that the selection of topics is purposeful and yet may seem arbitrary. Each topic enabled us to look at a set of pertinent questions about learning in museums and can be approached in a cross-disciplinary way. We understand there will be overlap between topics at times; however, it seems important to separate the topics so that (a) readers can easily locate concepts they are interested in and (b) we can present the material in a more easily digestible amount of content. Attempts are made in the chapters to review learning research within each topic in a critical way, recognising that in a book of this size, it would be impossible to thoroughly cover all aspects of every topic.

Chapter 4 starts off this series of topic chapters by considering the making of meaning. This broad subject covers a number of perspectives about how different kinds of people (e.g.,

children, school groups, adults) have been shown to experience museum visits. A great number of theoretical perspectives are drawn upon here, including constructivism, sociocultural theory, information processing, interest, experiential learning, among others. The range of theories attempts to span cognitive and affective ways that people can make meaning in museums.

The following chapter focuses on narrative and language as tools for learning in museums. On the one hand, narrative is something that individuals use to help organise their identities, their understandings of world events and their relationships to other people. On the other hand, discourse is a bridge between people, which some theoretical perspectives (e.g., sociocultural theory, social constructivism) suggest is a key tool for learning. Chapter 5 draws together elements of narrative, discourse and communication to draw attention to the myriad research tools that can be utilised to understanding how language, storytelling and communication interact in museum learning situations.

It is often thought that one of the key attractions of museums is their ability to facilitate access to authentic objects and experiences. Chapter 6 considers how learners interpret the authenticity of what they are experiencing. We delineate the relationships between the historical, cultural and institutional contexts within which authenticity has been identified and studied and the way evidence about how people perceive authenticity has been collected and interpreted. Authenticity is not only a nebulous term but its meaning has been coloured by predominantly Western European views of the 'authentic'. This clearly has connections to learner motivations to see and be moved by 'authentic' objects or to have 'authentic experiences' in 'authentic settings'.

Chapter 7 connects learning experiences in museums to memory. We consider both personal and collective memories and their importance for setting out a learning agenda in museums. Whilst there are obvious implications from a learning agenda for personal memories, particularly as traditionally learning has been equated with memory for facts, the need to consider how a learner's previous experiences lead them to filter new experiences can be important for setting out exhibitions and activities in museums, too. Moreover, the ways that events are collectively remembered by communities will have implications for how museums approach topics they are exhibiting and organising activities around. As such, it will be important to consider not just how the majority culture views particular events, but also the views of minorities and marginalised groups.

Chapter 8 considers issues related to self and identity in museums. This chapter discusses the interrelation between the personal, social, cultural and cross-cultural dimensions of identity. We argue that theoretical and methodological approaches to

studying identity in museums need to address both personal and collective identities since they mediate how people make sense of, act and reflect on their experiences in museums.

We then turn to discuss the many ways that motivation can be explored in museum settings in Chapter 9. Motivation seems an obvious element to learning and yet is still so poorly understood. Multiple theoretical (e.g., flow, serious leisure, sociocultural theory) and methodological approaches (e.g., ethnography, quasi-experimental approaches) have been proposed to help illuminate the ways that motivation interacts with other elements of learning, including cognitive outcomes, attitudinal changes, identity formation, and engagement with experiences both inside and outside school. In this central chapter we present several different theoretical perspectives drawn from multiple disciplines (e.g., anthropology, sociology, psychology) in order to try to make sense of the many connections between motivation and museum learning.

Our final topic chapter, Chapter 10, addresses a variety of issues involving culture and power in museum settings. It looks at the power relationships that exist within cultures and the role these play in shaping human experience and behaviour. It examines how particular approaches to knowledge construction and learning that have been used in museums enact and reproduce power relations. This can determine whether people choose to visit, and the ways in which they engage with and respond to the museum content, with their group members and museum staff.

In concluding this book, we draw attention to ways that we see research and practice as possibly working together. Though many have tried to create collaborations between researchers and practitioners before us (some successful, others less so), we think it is important to keep trying to forge links between research and practice. Helping to highlight the major theoretical perspectives used in museum learning research may provide tools for both groups to find common language for setting up useful partnerships. We also return to the multiple subjects in our topic chapters, hoping to synthesise some messages from each. We recognise from the outset that these topics overlap a great deal. Whilst there have been multiple cross-references within the topic chapters, some ideas about the ways the topics interact with one another are presented in this final chapter.

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2 Theory and museum practice

'There is nothing so practical as a good theory'

(Lewin, 1952, p. 169)

What's in a theory?

One often hears that it is important to pay attention to theory when considering options for developing a suitable learning experience, in museums and elsewhere. But why? In this chapter, we explore what theories are, how they are useful for research and for practice, and what might be useful as well as problematic about reliance on theoretical knowledge in practice. Following this discussion, we turn to the way that theories about learning can be conceptualised. And finally, we provide an in-depth exploration of a single theory, constructivism, to highlight the ways that it has been interpreted and used differently by a variety of authors across learning disciplines.

There are a number of ways of thinking about what a theory is. The common, everyday definition of 'theory' might suppose that it is conjecture or speculation that could possibly explain some phenomenon of interest. For example, one might have a theory that cats are inherently independent creatures, which helps explain why the pet cat has not managed to learn to come when called in the evening, even after bribing it with cat treats. In social sciences and natural or physical sciences, a theory is much more elaborate, built upon a multitude of previous theory and research. One definition of 'theory' appearing in the Oxford English Dictionary suggests that a theory is:

a scheme or system of ideas or statements held as an explanation or account of a group of facts or phenomena; a hypothesis that has been confirmed or established by observation or experiment, and is propounded or accepted as accounting for the known facts; a statement of what are held to be the general laws, principles, or causes of something known or observed.

(OED online)

Some researchers suspect that it is part of human nature to create and revise theories about how the world works (Gopnik & Meltzoff, 1997). However, the use of theory in a systematic way is more closely tied to the development of scientific ideas (see Kuhn, 1996; Popper, 2002). In this sense, a scientific theory is thought to be a 'comprehensive explanation of some aspect of nature that is supported by a vast body of evidence' (Ayala et al., 2008, p. 11). Theories are supported by evidence that comes from a large body of research showing findings that support the concept being purported by the theory. The ideas that are put forward in a theory should generally be testable. If there is no way to falsify a theory, some would consider it to be unscientific (Popper, 2002). For example, Popper regarded Sigmund Freud's theories about psychological development as unfalsifiable because there was no possibility of testing them. As a result, he considered them to be merely metaphysical. In addition, theories should lead to predictions about the subject of the theory. An example of such a prediction can be found in germ theory and the idea that the introduction of certain micro-organisms to otherwise uncontaminated food or living organisms could account for the appearance of some diseases. The work of scientists such as Louis Pasteur led to the testing of these principles and refutation of previous theories about the spread of infection (Pasteur, 2014).

So in short, a theory helps to explain phenomena that occur in the natural world, relying upon a large body of evidence, and leading to testable predictions of future outcomes in the same area. To further complicate matters, one can also distinguish laws from theories by saying that laws describe occurrences in the natural world without providing a broader explanation for their existence. Newton's law of universal gravitation proposes that any two bodies exert a force against one another, which is related to the mass of each of them and the distance between them. Newton referred to this exertion as 'force'. The phenomenon that he described is generally thought to be true and is used in countless situations in which it is useful to calculate the size of a pull between objects. However, his ideas about why this phenomenon occurs have been replaced by Einstein's theory of general relativity as a better explanation of the phenomenon. So whilst the law continues to play a role in the description of gravity, the theory has changed over time (Freundlich, 1920). This is to say that theory is not the same as law. Moreover, law and theory both differ from a hypothesis, which is generally thought to be more akin to the predictions that can be generated from a theory (Committee on Defining and Advancing the Conceptual Basis of Biological Sciences in the 21st Century, 2007). Together, laws, theories and hypotheses help to generate research questions and studies that help to build new theories

or refine old ones in the interest of furthering understanding about the phenomena in question. Finally, it is also useful to be aware of models, which can be used to describe ways that phenomena or processes take place. A model can be used to develop theory; but it can also just show how other ideas can be perceived to fit together. For example, the contextual model of learning (Falk & Dierking, 2000) unites theories from a number of different perspectives to try to illuminate how they interact. But rather than develop new explanations for learning, it refers to previously developed explanations to apply them to the museum context.

As mentioned above, these ideas all come from work within the natural and physical sciences. How do they relate to what is done in social science and education? One might think that because the subject of study varies greatly between social and physical sciences, that the ways their study is governed by theory should also vary greatly. There are many who argue that the study of social sciences calls for different types of theories to the natural sciences (Turner, 2001). In other words, social sciences, according to such perspectives, are so different because of the complex nature of humanity and life that perhaps hypothesis testing should not be seen as an objective in social science. As such, perhaps theory itself would hold less sway over those involved in social science research. However, there are good reasons to doubt this claim. As noted by Parsons in addressing the Institute of the Society for Social Research in 1937, 'our study of fact, however little we may be aware of it, is always guided by the logical structure of a theoretical scheme, even if it is entirely implicit' (1938, p. 15). He went on to suggest that researchers only investigate the notions that they find interesting, rather than everything that is available to them, which is ultimately guided by some theoretical framework. Moreover, Suppes (1974) stated in his presidential address to the American Educational Research Association that 'a powerful theory changes our perspective on what is important and what is superficial' (p. 4). In other words, even in social science the theoretical framework one adopts will shape subsequent ideas about what matters in considerations of research and practice.

In light of these ideas about the nature of theory and how it can shape ideas in both the natural and social sciences, we set out below several of the ways in which theory can be useful in research and practice.

What are they good for?

Just because theories are 'out there' does not mean that everyone will think that it is important to find out about them. After all, if a person knows about the findings of research (which

may or may not be the case), why is it necessary to know about the theoretical perspectives that helped to shape those findings? Here we explore some of the reasons why theory is important both for research and for practice. These reasons include the way that theory helps researchers both prepare for their own studies and be aware of potentially opposing perspectives. But, in a similar way, theory can help provide a lens through which to build evidence-based links to practice. As such, theory informs the work of both those conducting research and those influencing practical situations.

Theory and research

When researchers set out to conduct a study, they will often carry with them a set of biases, either implicit or explicit, that drive the types of questions they will ask about the world. Knowing something about the theoretical perspectives about that topic will help them not only to understand previous research that has been conducted but also to formulate focused questions that can be addressed using pertinent research tools. On the other hand, if they are ignorant of the theoretical perspectives, they may try to conduct a study that has been done before or may lack the insight to narrow a topic sufficiently (Greenwald, Pratkanis, Leippe, & Baumgardner, 1986).

Theory helps researchers to communicate about the perspectives they take towards a topic. When researchers publish about the research they have carried out, the declaration of a theoretical position may alert others who read the research to the reasons they conducted the research in the way they did. Likewise, when researchers have background knowledge about the theoretical perspective, they are more easily able to identify the reasoning used in an article about current research. In contrast, if the reader is less aware of the differences in theoretical perspective, she may find it difficult to understand the rationale for conducting the study.

At the same time, understanding the theory used in carrying out one study enables researchers to build upon theory, adding pieces of evidence that create a bigger picture of how the world works. That is, when deciding upon which study to carry out, researchers will often consider how the results could help paint a more complete theoretical picture in addition to how the results might be useful in a practical sense. In this way, theory can advance through an accumulation of studies that support, shape and question it (Greenwald et al., 1986).

This process by which theory is used to help guide perspectives on explanations about occurrences in the world can be thought of as a lens that can help researchers to focus on problems in ways that illuminate understandings. At the same time, theory

can also be a set of blinkers that might prevent researchers from looking beyond the potential explanations allowed by the theoretical perspective they have adopted. In this way theory can be a restrictive force in the studies that are conducted. Kuhn, in his book about theoretical change, asserted that 'Further development, therefore, ordinarily calls for ... the development of esoteric vocabulary and skills ... leads ... to an immense restriction of the scientist's vision and to a considerable resistance to paradigm change' (1996, p. 64). This type of narrowing of focus can also create a tension between the findings that arise from research conducted through different theoretical paradigms.

Take as an example two researchers who are interested in child language development: one of them tends to think that children are born with an innate predisposition to learn language because of a structure in the mind or brain (nativism); the other tends to think that learning language is like learning any other material, but that language is a particularly useful thing for infants to know about (social constructivism). These two researchers are likely to approach the task of finding out how children learn about language in rather different ways. The one with a bias toward innate predisposition may focus on so-called universal tendencies that children display in the early stages of language learning. In contrast, the researcher who thinks learning language is no different from other learning may ask more questions about the linguistic environments infants are exposed to for clues about early learning. This theoretical habit formation can be seen in the practice of theory-confirming studies, which aim to test theories in such a way as to support or falsify them, as opposed to result-centred methods which set out to establish conditions under which findings are either obtained or are not (Greenwald et al., 1986). In fact, such biases correspond to the theoretical distinctions in how it is believed children learn their first language. The nativist position on language development suggests that children learn the same way regardless of the differences in environmental language (so long as the environment provides a sufficiently rich stimulus) (e.g., Pinker, 1994). On the other hand, the social constructivist position argues that children rely on the language they hear to the extent that they do not go beyond the examples they are given until they have gained enough experience to be relatively confident about creatively using language (Tomasello, 2003). In addition, the methods they use to pursue the research they carry out also quite often differ, and this usually leads to reinforcement of the differences between the theoretical perspectives.

The example about language development research shows how theory can act as a potential barrier to communication about research within the academic community. But one can imagine it might also create confusion and/or misunderstandings

outside academic circles. Despite there being partial truths in each side of the argument, the general public may wonder which side is 'correct', or how to use the findings that were seemingly generated at cross-purposes.

Theory and practice

There is a substantial body of literature now to suggest that people who work in learning settings, devising, facilitating or assessing, should use research-based evidence to enable them to better fulfil the needs of the learners as well as the institutions that employ them (Hammersley, 2001). This is true in museums as well as other educational establishments (Center for Advancement of Informal Science Education, 2015). Increasingly, fundraising organisations and advocacy groups seek assurances of evidence-based approaches to teaching and learning before providing the backing that educational institutions need. Of course, theory affects research that one could try to use in a particular museum setting by virtue of it having been used to devise the research itself. That is, when people make use of research-based evidence, they are necessarily using the theory that guided the research, at least indirectly.

In addition, it could be argued that practitioners are able to more directly employ theory in the work they do. In this way, they would not only be able to more easily understand the research they might read about, but they would also be able to start from the theoretical foundations about learning (in museums) and apply that knowledge more directly to the setting in which they are working. In turn, one could then conduct one's own studies within the museum setting using one or more theoretical perspectives as a basis for the research. Some writing dealing with whether practitioners can improve their practice through the introduction of theory comes from the work on the philosophy of work-based knowledge.

There is a philosophical argument, built upon the distinction between knowing *how* and knowing *that*, which questions the merits of the use of theory in order to improve practice. According to Ryle (1945), many academics had previously equated the understanding of action (knowing *that*) with the ability to carry that action out (knowing *how*). In this case it would only be necessary to acquire the knowledge associated with a task in order to perform the task itself. What Ryle asserted in his address was that ordinary people could easily conduct highly skilled work without the need to refer to a conscious set of knowledge. A corollary of this argument is that a person can have a complete understanding of the knowledge without being able to apply the knowledge in practice. Moreover, he suggested that in order to truly have a good understanding of a topic,

one must have had to make use of it in practice. Therefore, according to this idea, the best way to gain understanding is not through education of facts, but rather through hands-on experience. The claims laid out in this address were popularised in many writings, leading some to claim that practitioners do not need to know about theory in order to do their jobs well (Brown, Collins, & Duguid, 1989).

In a more recent rebuttal of this argument, Winch (2009) has provided an argument drawing upon formal logic to refute the idea that practitioners' performance will not be enhanced by a good understanding of knowledge about the topic relevant to their field. In his critique of Ryle's arguments, Winch draws upon the logic laid out in previous publications (e.g., Stanley & Williamson, 2001) to show that Ryle's (1945) ideas about knowledge and practice can be broken down into three claims: (1) If a person does something, they have knowledge about that thing; (2) if a person uses knowledge about a topic, they somehow affirm knowledge about that topic and (3) knowledge of how to do something is knowledge *that* for some idea about that thing (Winch, 2009, p. 89). Winch uses several examples of practice and judgement about practice to show that knowing *that* can be extremely useful in making decisions and evaluations about workplace situations. For instance, a surgeon who has been trained to operate with a specialism in a given aspect of anatomy will make use of theoretical knowledge about the biological constitution of a person's body when encountering new problems, rather than merely relying on a build-up of expertise through experience. The surgeon will undoubtedly gain valuable expertise through practice. But one would hope that as a patient, the knowledge *that* would be present in addition to the knowledge *how*. And Winch points out that whilst Ryle's (1949) point that learning *how* is not the same as learning *that*, this does not mean that learning *that* will not be useful for acquiring knowledge about *how* to perform in a given occupation.

In addition to the distinction between knowing *how* and knowing *that*, many have noted that thinking about one's activities is beneficial to practice. Perhaps the most well-known for this perspective is Schön (1983). Schön made popular the idea that one ought to be a 'Reflective Practitioner', though such ideas were proposed by Dewey much earlier (1938). Schön referred to a person's reflective practice as 'reflection in action', in which the person could think on their feet in order to make decisions about the best action to take in a given work situation. In contrast, one can also think about the reasons for acting in a particular way, the origins of those actions and the usefulness of them: 'reflection on action'. More recently, a distinction between 'reflectivity' and 'reflexivity' has been introduced with

respect to the practice (Chilvers, 2012). Whereas reflectivity refers to Schön's reflection on action, reflexivity tends to include a sense of being open to change in addition to thinking about the influences on one's actions. One of the elements that can be included in a reflective or reflexive experience is the ways that theory or research evidence can be brought to bear on the situation. For example, are there any studies that can shed light on the learning, affect or memory of the visitor in a given museum context? In this way, individuals might also alter the course of practice through reflection on theory rather than merely being affected by previous practice.

Here we have reviewed ways that theory can be helpful (or not) to practice, both from the perspective of how theory shapes research through design and interpretation and also the way that practice can benefit from reflection on theoretical and practical experiences. We turn briefly to consider the ways that theories are developed in order to shed further light on the types of theories that have been generated within the study of learning.

Where do they come from?

Theories in a given area are generated over the course of a relatively long period of time, through the accumulation of research and problem-solving on the part of many different people. In order to try to understand better the ways that things work in the natural and social world (i.e., to be able to explain and predict occurrences), research has often begun with a set of questions that can be addressed with a systematic study of some aspect of the world. When questions are first asked, they might be extremely broad because of a lack of background information to help narrow down the scope of the question (e.g., 'Why are we here?'). Once people begin to formulate some responses to the question, then these responses can be evaluated and re-evaluated in light of further evidence that becomes available. This recurs in an iterative pattern, usually for many years. When responses to a question start to create a pattern that can be systematised to provide a set of guiding principles around a topic, the beginnings of theories start to appear. This process stems from an inductive process for the development of theory: the use of empirical data to create generalisations (Eisenhardt, 1989; Glaser & Strauss, 1967; Alvesson & Kärremon, 2011).

It is useful in thinking about the way that theories are generated to remember that research findings are not infallible (see next chapter for more detail on research methods and methodology). In other words, the findings from any given study do not equate to 'fact'. And new methods and ways of testing ideas are constantly being invented. This means that new findings (and sometimes old findings) can call into question research

findings from previous studies. When findings have been replicated or confirmed multiple times, then people in the field are more likely to think about the findings as 'true'. However, it is, in part, the potential fragility of findings that makes the creation of new theory or editing of current theory possible. This does not mean that findings of all types are not valuable. Quite the contrary, findings are always valuable, especially when the research has been well conducted. However, even the highest quality research can be called into question with new methods or perspectives on the topic. This is one of the reasons why researchers continue to ask new questions, rather than just relying upon very old work: the findings and the problems that demand investigation provide new ways of looking at natural and social phenomena. To illustrate the ways that findings can be disregarded in favour of new research one might look to Piaget's stage model of development. Piaget, Inhelder and Szeminska (1960) investigated young children's ability to infer distance in a variety of judgements about direct and indirect distance and found that 4.5 year old children were unable to accurately respond to ideas about length because they have a fuzzy, or plastic, sense of how to estimate distance. In later studies, researchers such as Fabricius and Wellman (1993) devised methods of questioning four-year-olds' understandings of distance and showed that they had much greater understanding of length than they were previously given credit for (but see Lourenço & Machado, 1996, for support for Piaget, even in light of this kind of refutation). Despite the example of newer findings overturning older ones, it is more often the case that studies serve to add new information, often from a slightly different angle (e.g., bodily as opposed to verbal interaction; vom Lehn, 2006), rather than knock down the results reported in earlier research.

So theories get built up over time through the accumulation of evidence that is used to construct them. Once theories have been proposed and accepted as credible explanations of some phenomenon, they are, in fact, very difficult to change. As Thomas Kuhn has noted, revolution in scientific inquiry is relatively rare: 'In science ... novelty emerges only with difficulty, manifested by resistance, against a background provided by expectation. Initially, only the anticipated and usual are experienced even under circumstances where anomaly is later to be observed' (1996, p. 64). This is because theories gain momentum once researchers begin to use them. These theories then guide the new research that is conducted. And it is only when someone looks for new insights to explanation that new theoretical ideas are introduced. And even then, they normally take some time to become mainstream, assuming they are accepted at all.

That being said, there do seem to be a plethora of theories about learning and development, many of which are relevant to museum contexts. In what follows we outline some of the ways that theories have arisen as relevant to museum contexts, after which we consider the ways that one theory, Constructivism, can be interpreted in multiple ways.

Theories about learning

In order to consider how to design informal learning environments that facilitate learning effectively, it is necessary to consider what learning is and what makes learning happen. Hein (1998) has suggested that an educational paradigm requires a theory of knowledge, a theory of learning and a theory of teaching. A theory of knowledge can sometimes be referred to as an epistemology: this considers the status of knowledge in terms of its origins, its recognition and its importance. If a piece of information is not considered to be important, then there will not be much effort placed on passing it on to other people. Likewise, understanding where the information came from can help to demonstrate its importance (e.g., information that comes from highly respected sources is usually deemed more reliable than that which comes from less respected sources; Harris, 2012). Though we concern ourselves in some places with what counts as knowledge in this book (see Chapter 10, for example), we focus primarily on theories of learning and pedagogy.

Theories of learning take into consideration what types of changes take place in the minds, brains and bodies of the learners. These theories often focus on the relative role of the individual learner as compared with the people involved in the learning environment: Is learning something that is an active or a passive process? Learning theories also tend to examine processes and outcomes of learning experiences. Some time ago learning theory referred primarily to behaviourist ways of thinking about learning (e.g., stimulus-response or operant conditioning; e.g., Skinner, 1974). However, the term learning theory is used more widely now to refer to any theoretical perspective about how people learn. Another important point, which we have mentioned in the Introduction, is that though some theories may focus more closely on the cognitive (e.g., what might be tested in school as facts or ‘understanding’), many theories also consider as important the ways that affect and emotion figure into the changes associated with learning. As such, we should make sure to pay attention to both attitude or affect and more traditional views on learning as measured through changes in knowledge or comprehension.

Finally, theories of teaching make use of perspectives on learning to attempt to explain the ways that learning can be

facilitated most efficiently. These theories are highly applied, whereas theories of knowledge or learning might be fairly basic or academic. Without a theory of learning, it is unlikely that a theory of teaching could be developed. However, research results about learning do not automatically lead to applications for teaching. Research about pedagogy¹ should be conducted in order to determine what types of teaching experiences tend to lead to various learning outcomes. That is, just because one understands something about learning does not mean there is an intervention that can be applied to improve learning. That requires more empirical work. A great deal of the research we present in this book reports on studies about applications in practice. And some of that refers specifically to theories about learning; however, sometimes research reports do not explicitly state which theories they are based upon.

This book mainly examines different theories of learning (and some about teaching or knowledge) as identified in the research, relevant to a number of topics in research on museum learning experiences. As such, we try to focus on a variety of theories related to visitor engagement that seem important for learning in museums. We note, in an imperfect way, that these theories can often be thought of on two different spectra: social/individual and affective/cognitive. By social, we mean that learning is seen as something that is not done alone: various people, groups and the general community may be responsible for influencing the changes in any given person's learning profile. In contrast, when a theory is highly individual, it suggests that the focus is on that person's perspective in learning, whilst giving little or no acknowledgement of the learner's environment. At the same time, learning theories may tend to emphasise the affective elements of learning relative to the cognitive ones (we have not focused on theories of physical learning in this book). Figure 2.1 illustrates where we have placed many theories on these two continua. Bear in mind that we are not the final authorities on these theories and there are bound to be those who disagree with our conceptualisation of the placement of these theories, or indeed, the use of these two spectra. However, our purpose is to provide a way for people who are less familiar with the types of learning theories relevant to museums to make sense of the numerous theories that can be encountered. We also want to highlight here that there are far too many theories about learning to include all of them in this figure. We have tended to place the bigger theories and umbrella, or 'grand', theories on the figure whilst ignoring the theories that might be considered a branch of one of these larger theories. This is done merely for space limitations and ease of reading, not because of any preference for any one theory in particular.