

MUSEUMS AND LEARNING
- a research overview

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FOREWORD

In March of 2004 the National Museums of World Culture adopted a long-term strategy for the capacity building at the four museums of the government authority. It establishes three core areas of priority. Subject-specific capacity building regarding the collections is a central part, as is focus on the contemporary-oriented assignment that we have received from the government. Our ambition is furthermore to act innovatively by contributing to increased understanding and debate about the role of the museums and their importance as social institutions. The strategy furthermore emphasizes the significance of a problem-oriented way of working, where capacity building within the organization is more evidently linked to the mediation activity in exhibitions, seminars, lectures and journals.

A prerequisite for the success of the strategy is that our external cooperation with Swedish as well as international, universities and colleges is developed and made sustainable over time. This process is expressed in this research outline of “Museums and learning”. The background to the chosen topic of this report is a number of challenges and possibilities that the National Museums of World Culture will be facing, where free admission, new groups of visitors and new subject fields constitute a few examples. Linking our central needs and goals to a professional research environment, in this case the Stockholm Institute of Education, has been both fruitful and inspiring. It shows that a closer connection between museums and universities is desirable from all aspects.

Over time, museum pedagogics has in reality come to deal with different ways of responding to the desire of deeper studies within certain areas, expressed by compulsory- and upper secondary schools. Apart from the collections, the museums’ unicity consist of a combination of scientific credibility and a broad public activity. As a result, the pedagogics that is applied within the *entire* mediation activity is determinant for the success of our mission as an institution of knowledge. Through this report the National Museums of World Culture has received a foundation for future efforts and priorities in the area.

The work has been conducted by Fil Mag Eva Insulander and professor Staffan Selander at the institution for DidaktikDesign at the Stockholm Institute of Learning and has been financed by the Swedish National Council for Cultural Affairs and the National Museums of World Culture.

Göteborg, February 2005
Karl Magnusson,
International cooperation
National Museums of World Culture

1. INTRODUCTION

The museums' role in society has undergone a radical transformation over the past few years. From having been places mostly appealing to an exclusive, already dedicated audience, the museums have been challenged with cultural policy-demands on accessibility and openness. Lately the pedagogical role of the museum has been given increased attention as well. Focus on questions about visitors and the surrounding world are visible in several different ways; through the ruling document of the museums, through increased research in the area, and also through a greater interest for these subjects in conferences, seminars and attention in trade journals. (Sandell 2003). A general interest concerning questions regarding learning and education may also be derived from what is often referred to as the knowledge society, where commitments to education are expected to strengthen both economics and democracy (Kim & Olstedt 2003). Research motivated by cultural policy has however held a traditionally weak position in our country, and has in principle lacked grants for research (Alzén & Hillström 1999). While Swedish research in learning at museums has been virtually nonexistent, the area has grown increasingly strong internationally (Ljung 2004). Several universities and independent institutes conduct a great deal of research on the side of educational activities. Such creation of centres is found among other places in England, USA and Canada.

The background to this study is an assignment from the National Museums of World Culture to carry out a survey of the research status concerning learning at museums. An important objective of the authority is to meet the demands on education and access that have been formulated in the central goal- and budget documents controlling the activity of the museums. For example, the museums' budget document for 2004 contains the concrete objectives of increasing accessibility to the exhibitions and reaching out to more and new visitors, among other things through developing and testing new forms of public activity, and developing the pedagogical activity in direct contact with schools, universities and colleges (Ku2003/2590). The National Museums of World Culture furthermore intends to initiate and participate in research in order to attain increased knowledge, and participate in the social debate within the authority's area of activity, including the pedagogical aspects as well. These goals are also supported by the national cultural policy, which strives to promote the ambition to achieve education (prop. 1996/97:3, bet. 1996/97:KrU1, rskr. 1996/97:129).

This survey describes a few central aspects of how research has treated questions on learning in general, and more specifically learning at museums. Since museums and learning is still an unexplored field of research in Sweden, it is of utmost importance to gain an overview of the international research situation. Such a survey makes it possible for the National Museums of World Culture, but also for the research society, to define the needs and interests that ought to be met through a future research agenda. In addition, this knowledge overview is intended for others that are interested in questions about visitors, learning and access: museum employees, students and teachers. Our objective is that it may function as a point of departure for discussions about continued ventures on a subject in the making.

Purpose and central questions

This study aims at mapping Swedish and international research with bearing on learning at museums. This implies the compilation and organization of research into comprehensive areas. The purpose is furthermore to define previous knowledge-gaps, which is the starting point for a section on the future, containing suggestions for future research efforts. As the foundation of this assessment and as background for readers outside of the pedagogical field, a short summary will be provided of the main tracks within contemporary pedagogical research on learning.

The questions that have served as a point of departure for this overview concern learning, new technology and the functionality of museums. Are there specific aspects to take into consideration regarding learning at the museum? What are the social functions of the museum concerning information and education, apart from such institutions such as libraries, schools, media and the Internet? What impact does increased emphasis on education have on the identity and self-image of the museums? When surveying this field of research, the following questions have served as guidance:

What has been investigated?

Which were the central questions?

What were the results?

Within which disciplines has research been conducted?

In which ways has research been conducted?

Which theoretical perspectives have guided the research?

Disposition and delimitations

A survey of international research involves an extensive field of study, which requires delimitations and a more detailed division into areas and categories. Before the project was initiated, there was a lack of insight into the span of the vast amount of material actually available. Consequently, the timeframe has limited the amount of material surveyed, why it is more appropriate to talk about *examples* of different types of research. Mapping *all* that has been written in the field would be impossible! It should therefore be added that unpublished research, such as dissertations, has been difficult to obtain. The assignment contained the ambition to survey the research front in Sweden and in English-speaking areas. I have therefore chosen to include research produced during the past decade, meaning that relevant work from 1995 and onward is included. Ongoing research is included to a certain extent as well.

For delimitation reasons I have furthermore chosen to focus the text on research that departs from universities and colleges, and to a certain extent also research institutes and private organizations. Much of what has been performed is however applied research, and may be difficult to limit only to academic institutions. It is often a matter of cooperation between research groups and museums, where museum staff has been active in studies as well. It has been difficult to make a clear definition of what counts as research. I have made the choice not to include student thesis on bachelor or master-level. The museums' own research is also not included in the selection of the survey. The search methods used are different databases, as Libris and Academic Search Elite. I have searched the Internet using different keywords, and also contacted representatives for relevant special libraries and research institutions. Lists of publications of different research groups' homepages have been guiding as well.

The area of museums and learning/museum education includes questions on learning, the usability of the museums and the impact of the new technology. Outside of this area, in the borderland between capability of the institutions and the interest of the user, there are questions about the use of history, and how educators use the exhibitions of the museum. These questions will not be touched upon in this survey, however they do deserve attention in a different context.¹ I have also made the assessment that research treating the true experience of the individual's exposure to art (for example at the museum) fall outside of the focus of this survey.²

The structure of the survey is based on a certain way of viewing museums and museum pedagogics. Many correctly describe museums as a special meeting place, where collecting, preserving, mediating and researching tasks merge. The museums also make possible special meetings between subject content and users that would be impossible in a different context. Thus is the museum's area of knowledge, the different university disciplines (ethnology, art history, history, archaeology, etc) and the way in which this content is treated, specific for the museum as an institution. The topics represented in the collections are not identical with the scientific disciplines. The connection to the actual research front is often lacking, or applicable to only a few employees.³ The different topics are furthermore often given a historical setting with the collecting function. The museum topics may thus in a way be compared to the subject didactics that is also founded on the communication of the topic on a comprehensive and summarizing level. I would here like to emphasize the fact that the mission of the museums includes communication with the users. The museum is often referred to as a source of knowledge, an institution that embodies genuine knowledge through its' collections, and as the proficiency of employees, departing from the material culture. This proficiency is communicated in the exhibitions and through different types of program activities. The museum may be viewed as a meeting place where using and learning are in focus, not primarily the university subject.⁴ In a wider sense, this also becomes a point of departure for a definition of what learning in museums actually consists of.

Departing only from the topic areas of the museum reduces and limits the possibilities of the museum as a learning environment. This overview has therefore been structured according to the *learning processes* investigated in the research, and furthermore from the different perspectives that have been used to investigate learning; the learning of children and youth, the family learning and adult learning/learning for life. In addition, research concerning the museums in relation to identity and social capital is discussed. I will also touch upon research in relation to the impact of new technology on learning.

It would be appropriate to mention how I myself have perceived the area "learning in museums". The area has come to include research founded on museums with historical collections of exhibits (historical, cultural historical and natural historical museums) art

¹ See Aronson & Andersson (2004), who have analyzed the use of history in school demonstrations, and Castle (2002), who has studied museum educators' creation of meaning within history as a subject.

² On e example is a sociological study by Maaria Linko (2002), that originating from the contemporary consumption society, investigates the art museum-visitor's strive for the subjective, genuine experience. It is this experience, and not the strive for a cultural capital, that drives people to art exhibitions and museums, Castle argues.

³ There are exceptions, for example the Swedish Museum of Natural History conducts very advanced research within its field of subject. The research school of Nordiska Museet represents a clear cooperation between museum and university. The PhD-students are connected to and graduating from universities, while the representatives in the control group and the supervisors are connected to different university faculties.

⁴ Parts of this argumentation are also found with Palmqvist & Bohman, 2003.

museums and museums of natural science and technical centres (science centres) and other research treating the areas specified in the purpose. The term "museum" thus includes both institutions with collections of exhibits, and locations without their own collections or permanent exhibitions. These include visitor sites with ancient remains or ancient historical infrastructure. However, I have made the judgement that zoos, amusement parks and aquariums fall outside of the term "museum". I am aware of the fact that the term "visitor" has been questioned in several contexts and replaced by "user" or "audience". In this paper I have however chosen to keep the term "visitor", as it is established and used in for example visitor studies.

Theories on learning

There are several different perspectives on learning, and in relation to learning at museums it might here be interesting to present three different perspectives. Behaviourism has since the 1960s, under the influence of B.F. Skinner, claimed that learning is a change of the external behaviour of the student.⁵ The learner becomes a receptor of knowledge and learns through breaking down the entity into small steps whereby rewards become important in order to achieve good results. Here, the approach to learning is assumed to be connected to how exhibitions where teaching can be expected to occur are created in practice. Examples of exhibitions that are based on this view of learning are exhibitions where objects are classified chronologically (and sometimes also according to typical series), like in an archive. One such example is the now closed exhibition on prehistory at the Museum of National Antiquities in Stockholm.

Behaviourism was to be questioned by spokesmen for constructivism, founded on a rationalist tradition. Constructivism, with Piaget as its front figure, has been prominent since the 1970s. Learning comes from within the individual; the student actively constructs his knowledge according to individual maturity and ability. The constructivist perspective is still prominent within Swedish as well as international school research. Exhibitions based on this perspective on learning emphasize individual ability and activity. They depart from stations or experiments that for example illustrate different scientific principles. At the Tom Tit's Experiments in Södertälje, the visitors themselves construct their understanding of surface tension on water or of electromagnetism, without any greater amount of information or instructions to help them understand.

The third tradition, that has become increasingly influential to contemporary Swedish research, is the sociocultural perspective on learning. Within this perspective, language and communication are given a central role, since we are believed to learn different ways of communicating and thinking through the meeting with others. Vygotsky (1978) talks of mediation, where language categories and physical tools help us interpret and understand the world. Learning is thus not absorbing general skills, but something applicable to a specific context. The student's creation of meaning is discussed along with the fact that learning is situated, taking place under certain conditions and in defined environments. (Säljö 2003). The sociocultural view on learning has been brought up in international contexts by particularly James Wertsch, who speaks of learning in terms of *mastery* and *appropriation*. When the individual is given access to new sociocultural tools, acting as well as thinking may be transformed. At first, the understanding of the new tool is superficial; one has obtained a

⁵ For an introduction to theoretical perspectives on pedagogics, I recommend Dysthe, 2003, or *Pedagogisk Uppslagsbok* (Pedagogical dictionary) 1996. Researchers as Skinner and Piaget are public property within pedagogics and often do not receive specific references.

certain level of *mastery*. One may speak of something and be knowledgeable of it on a practical level, without actual understanding on an inner intellectual level. One has yet to reach *appropriation*, which means making something one's own (Wertsch 1998, Geijer 2003). One example of an exhibition that emphasizes communication with others and social relationships is the Africa exhibition "Horizons" at the new Museum of World Culture in Göteborg. In this exhibition the museum invites different groups of visitors to a dialogue and cooperation around the theme of the display.

The view on learning has thus changed dramatically during the 20th century. The three perspectives described above have been introduced in research in such a way that they seem obvious. It is important to point out that each theory contributes to a certain view on learning. Claiming that one theory provides the *correct* understanding is not possible, instead it contributes to a certain perspective on learning. By choosing a perspective, we will be guided in "what" and "how" we see. (Selander 2003).

Research and learning

Today we talk about learning in many different contexts; both in everyday use and within research. It has been about children's learning in preschool and school, or about adult learning in higher education and in line of work. We also talk about life long learning and about informal learning. These different directions have generated their own research. I will touch upon a selection of the school research that concentrates on learning, and especially research with a point of departure in Swedish conditions. For comparative reason, a few of the perspectives established within international research will be discussed.

In 1997 the HSFR published an assessment of pedagogical research in Sweden, *An Evaluation of Swedish Research in Education* (Rosengren & Öhngren 1997). It describes the development of pedagogical research. Naturally, since 1997 certain research perspectives have been strengthened and developed further, while others have been criticized and possibly received less importance. It is apparent that pedagogical research by tradition has received its theoretical foundation within educational psychology. Until the 1970s, questions about memory, motivation and intelligence were in focus. The ambition was to achieve a better understanding of how students learn, in order to shape education so that the students obtain better results. Previously, the studies were often experimental, and frequently treated the *effects* of different methods of education on the performance of the students.

Today the majority of the research is based on qualitative methods of investigation, where ethnographically inspired methods⁶, classroom observations and interviews for gathering data are used. From a historical perspective the discipline has evolved from having been marked by behaviourist ways of thinking, to the cognitive psychology introduced by Piaget and his contemporaries in the 1970's. The student was considered an active participant in the process of education, and the individual activity was very important for learning. Studies have focused on how students have coped with different tasks in the classrooms, sometimes also tasks connected to a specific subject-content. Around the 1990s, the view on the students' role changed according to theories on social and cultural creation of knowledge. The perspective covers a number of different directions, however with that in common that knowledge is

⁶ Ethnography here means that the researcher follows his object of study during a certain period of time, resulting in treating data as descriptions. This way of using the concept should not be connected to the collections of the museum of ethnography or with ethnographic studies of foreign cultures. Ethnography today is a common method within the social sciences.

constructed by the student in a specific social and cultural situation. Such research is founded on Vygotsky's work (1978), which has later been interpreted by Wertsch (1998) and in Sweden by Säljö (2000).

The following areas of research are identified as central in 1997: The students' perception of subject-content, learning in classrooms and natural environments, and the students' perception of his own learning. Regarding the student's perception about for example foundational scientific terminology, the phenomenography in Ference Marton's version has been important. This methodological perspective claims to represent the student's viewpoint in a way as authentic as possible, without forcing statements into already existing, theoretically engineered terminology. Departing from identified categories of description, the relationship between the student's different perceptions has been investigated. Research in the area has showed that student's learning is not merely dependent on the will and ambitions of the student, but also on the content and character of the task, and on the learning context within which the task has been presented.

Both Marton and Säljö have used the phenomenography further, in order to investigate the student's perception of the individual learning, with the purpose of understanding differences in study-success. The results have shown that some students view learning as principally reproductive, while others call attention to development of the personal understanding. Marton focused primarily on descriptions of categories that lay the foundation for colliding views about either scientific subjects or everyday phenomena. In different classroom studies Säljö has investigated how students interpret the language and instructions of the teacher. These studies have shown that even apparently simple problems are dependent upon the specific social and cultural setting, and understanding is depending on whether the student masters the language-game of the school. (Rosengren & Öhngren 1997, Martin & Booth 1997). When it comes to socially directed learning-research we may principally differ between three different approaches with slightly different perspectives and emphasis. The perspectives that are most often raised are the *Sociocultural theory*, represented by researchers as Roger Säljö and James Wertsch, *activity-theory* represented among others by Olge Dysthe and Yrjö Engström, as well as *multimodality*, primarily developed by Gunther Kress.

The *sociocultural theory* in Säljö's and Wertsch's version places emphasis on the historic/social aspect and the social interaction between individuals. Human knowledge is the result of insights and patterns of action that have been constructed in society over a long period of time. Knowledge is thus not biologically defined, but occurs in interaction with others. Learning means that the individual is inculturated in different discourse societies where terminology, thought and patterns of action are made "ones own". In this process, mediating tools become central; learning occurs with the help of mental, physical or semiotic tools. Language is deemed the most important of these tools (Säljö 2000, Wertsch 1998).

Activity-theory has been developed by Leontjev through a further development of Vygotsky's ideas. It is within activities; i.e. systems that produce events and actions during an extensive timeframe, that learning occurs. This perspective considers both the individual and the social aspects of activity. In a model, Engström has illustrated the context of learning or the systems of activity, that raise the relationship between the learning individual, the object of action, and the mediating object. The model also considers the norms guiding the actions, along with the relationship between the parties involved (Dysthe 2003, Engström 1987).

A *multimodal perspective* results in communication being understood and analyzed according to the multiplicity of different modalities and ways of communication, all contributing to the individual's creation of meaning. The concept of text has here been expanded to include not only the written word, but for example illustrations, typography and layout as well. One example could be an exhibition, where meaning may be created in the three-dimensional space with light and audio settings, or through sequencing of what is viewed as already known, and what is presented as new. Within the multimodal perspective learning is no longer viewed as primarily connected to spoken and written language. The language is only one of several modalities through which a subject-content may be treated. Kress and others place the multimodal approach within social semiotics, according to how the individual both interprets symbols and creates meaning in their context. Discussing the creation of meaning raises the importance of constructing new meanings of the encountered symbols. The symbols are recreated and given new meaning, depending on the individual's preunderstanding and interests. Kress and others have, among other things, investigated how students use different resources to create meaning and construct their own version of the content and concepts of education. In this study, the resources offered by the teacher in the classroom are used, but also other resources that the student have come in contact with during previous lessons, in media or in situations outside of school. Researchers here analyze students' texts as semiotic objects, constituting the concrete result of the learning process. (Kress 2001, 2003).

Another tradition that today has gained increased importance also outside of the humanities is the hermeneutics, both as methodology and as existential philosophy. Within social science research, and thus also within pedagogical and didactic research, focus is placed on understanding and interpretation. One example is Per-Johan Ödman (1995) who conducted a historic study of underlying structures in the living conditions of Swedes during 600 years, and Anders Gustavsson (1985) who has written about the attitude to mentally challenged children. Selander and Ödman (2005) claim that hermeneutics may contribute by emphasizing the variable and interpretational character of knowledge, where tradition may be questioned and where additional perspectives are allowed to come into view. They describe how hermeneutics move between text and existence; i.e. on the subject of interpretations of texts but also questions regarding interpretation of existence. Along this movement there are different aspects of hermeneutics. *Preunderstanding* is central in the interpretation of texts. It means that the individual always asks questions about a text according to her previous experience and knowledge. When hermeneutics is about exploring *existential* questions, focus is placed on the individual's deeper experience, insight and understanding of her way of existing in the world. Gadamer speaks about *horizons of meaning*, and refers to a scope of importance that ought to occur in the meeting between the text and the preunderstanding of the interpreter. This meeting should take place as unprejudiced as possible, the interpreter should not strive to understand the text-producers intentions, nor attempt to interpret the text entirely according to previous experiences. Instead these two horizons are allowed to merge. The opposite of this insight is the *hermeneutics of suspicion*, suggesting keeping a critical distance in the interpretation, for example to phenomena such as the holocaust.

The guidelines for Swedish research have been illustrated above. In an international perspective there are additional approaches to learning. One important tradition emphasizes the different learning approaches of students, where three principles guide people's way of communicating and learning; the mental, the emotional and the physical approach, combined in different profiles (Seagal & Horne in Selander 2003) The research is based upon Sandra Seagals studies of learning that have been conducted in different cultures. They have resulted in the educational programme Human Dynamics that has been used for example in schools

and in the economy. In works about multiple intelligences Howard Gardner has focused on children's creativity within the framework of a long-term research program called *Project Zero*. Gardner presupposes that the students' intelligences (verbal, musical, logical-mathematical, spatial, physical, interpersonal and intrapersonal) should function as a point of departure for education and evaluation.

Closely related to the term learning is also the concept of *Bildung*, which has its place within the mission of the museum. Bernt Gustavsson claims that the term is defined through the contradictions it holds; at the same time as *Bildung* is a free, constantly evolving process that should not be restrained by models, it is often controlled by clearly established goals. Furthermore it is emphasized that popular educational ambition to find a whole is disturbed by a more widespread specialization. And even though the idea of education is in itself democratic there are elitist and unequal features. The idea of education does however not allow that activity is characterized by previously entirely defined programs, curricula or courses of study (Gustavsson 1992). In *Bildning i vår tid* (*Bildung in our time*), education is discussed with modern hermeneutics and Gadamer as a point of departure. (Gustavsson 1997). Here, knowledge is intimately linked to the cultural heritage and the preunderstanding of the individual; there is a dialogical relationship between the familiar and the unfamiliar. During a meeting, the individual is open for different interpretations and creates understanding through acting and reflecting.

The idea of *Bildung* is founded on Aristotle's concept *fronesis*, one of three forms of knowledge. The others are *episteme*, that is scientific knowledge, and *techne* that stands for practice, productive knowledge. *Fronesis* is the practical wisdom that also has an ethical and democratic dimension (Gustavsson 2000). Within the museums social debate has begun to gain ground, making way for ethical questions that may be highlighted from a historic perspective. Other similarities between museums and general education are found in the forms of seeking knowledge; adult education/*Bildung* in Folk high school originates primarily from forms of education that are characterized by dialogue and self studies; in a similar way, the museums' exhibitions may offer free forms of deeper studies. Free admission to the national museums also brings about the fact that with an increasing number of visitors, new forms of experiencing and learning in the exhibitions must be developed. In this case, *Bildung* takes place when the visitors bring their own preunderstanding and meet new knowledge in a social and historic perspective on the museum.

Previous literature reviews and overviews

Literature reviews of museums and learning have been published in England, USA and Australia in the past few years. Research Centre for Museums and Galleries (RCMG), Leicester, published a bibliographic overview in 2002, covering research between 1990-1999. The overview shows how the area of research has evolved. During the 70s and 80s museum-pedagogical research primarily treated North American, positivist and quantitative studies. These were often supported by learning models from the behaviourist psychology and by sociological models from theories of mass communication. The assumption was that if media of communication was optimally developed, learning would occur. This research departed from a previously established hypothesis and was conducted within the area of *visitor studies*.

Later many researchers began representing a constructivist perspective according to Piaget, which eventually also led to more qualitative studies of visitors (primarily in England) and their creation of meaning. Other evident features in recent museum research are the attention

paid to the fact that many groups in society are historically disadvantaged by different social structures. This has caused critical theorizing to become increasingly common within museum-pedagogical research. From the end of the 90s the constructivist perspective has been challenged by sociocultural theory. Several indicators point towards the fact that American research is “lagging behind” British research in that respect. Other traditions and methods have been tested in new contexts as well, i.e. the hermeneutic tradition of interpretation. In the overview, research is presented according to type of museum, and it is established that a large part of research has been originating from learning in special exhibitions, and that primarily students’ or families’ experiences have been studied. The overview finally emphasizes the need to concentrate on research that departs from arrangements and programs at museums, apart from research departing from learning with the help of exhibits and collections. Studies of adults’, youth’s and children’s learning are also desirable (Hooper-Greenhill 1999, 2002).

The journal *Science Education* published an issue on research on museums and learning in the summer of 2004. The editors are Lynn Dierking, Kirsten Ellenbogen and John Falk, active at the Institute of Learning Innovation in Annapolis, USA. This theme issue was a part of a mission by the National Science foundation with the purpose of reflection over previous research commitments and draw the guidelines for the development of praxis, evaluation and future research. The different articles in the journal consist of selected contributions to a closed conference around the common theme; “What do we know about learning at museums after a decade of research?”. In the introduction, three characteristic aspects on learning are presented, that should be seized in order to investigate the importance of museums in peoples lives: Learning has a personal, a contextual and a timely aspect, and all three must be considered if development is to take place.

The articles included in the journal represent areas of research such as families’ learning and learning in the interface between school and museum. The contributions mutually state that the past ten years of research has resulted in a shift of perspectives through a sociocultural point of reference. The new theoretical perspective has brought about a new understanding for how visitors create meaning from their experiences at the museums. One particular area for learning-research is thus “family learning”, that in studies at museums holds a clearly sociocultural perspective. In later studies it has been shown that parents often take on a teaching role at the visits. Other results show that museum visits suggest a possibility for families to be together, and that they are important for the visitor’s creation of identity. Another perspective is research on school-visits to museums. Here attention is paid to the students’ perception of the museum and in school. Research has shown that students act and are received differently than children visiting together with their families. Research has also proven that informal learning at science centres has been able to strengthen the students’ understanding of scientific concepts, and has also increased their interest for natural science.

This overview also shows how methods of gathering data have changed from treating primarily interviews and surveys, to presenting creative models involving the use of new technology. John Falk claims that the strength of existing research is that many of the factors that seem to affect learning have already been described and investigated. There is however no collected picture of how they interact. He therefore states that future research activity should depart from the perception that all factors affecting learning are important and not, as until now, depart from just one of them.

Regarding pedagogics at art museums, there is a representative overview with an international perspective from 2003 (Xanthoudaki, Tickle & Sekules 2003). It describes the 1990s as a decade where many art museums carried out qualitative efforts focusing on the pedagogical activity, resulting in increased professionalism as well as the availability of new technological resources. It is claimed that the efforts came about as a result of the political debate about access and increased participation, however rarely resulting in research. The authors want practical research, where also the educators themselves would participate. Such praxis-based research methodology has had great impact within pedagogical school research, and is deemed beneficial for museum-pedagogics as well. A few comprehensive areas are mentioned, that ought to receive particular attention in new research. The authors discuss the needs and interests with different types of museum visitors on one hand, and on the other hand about the individual visitor's personal aesthetic experience and creation of meaning. The overview defines four comprehensive areas of research; museums and lifelong learning, museums and support of formal education, museums and the individual's creation of meaning, museums and the relationship to the surrounding society.

A Nordic perspective to art-education research is provided by Helen Illeris' mapping, created on assignment of the Nordic akvarellmuseums (Illeris 2004). The purpose of the mapping is to discuss the preconditions and put together questions for a research effort within art pedagogics. The overview reviews a selection of Nordic publications (from dissertations to non-scientific articles and bachelors and masters thesis) and compares them to a few central English-speaking pieces. The main picture presented by Illeris is that existing research lacks systematics, is fragmental and dependent upon the interests and actions of individual people. The works analyzed belong to several academic disciplines, and receive their terminology from sociology, anthropology, psychology and philosophy, but are also based on theories from pedagogics and museology. I here give an orientation of two Nordic pieces of work treated by Illeris, that are of importance in my overview. Dag Solhjell has developed a theory about the praxis of art-mediation, containing all forms of praxis that gives the audience an opportunity to see art. The reasoning is based on the concepts of Bourdieus, where art-mediation and production of art is analyzed as a cultural and social activity. Merete Froyland departs from Gardner's theory on "multiple intelligences" in a scientific article, and discusses how exhibitions may be designed to satisfy different aspects of learning. The result is a model for practical actions.

2. MAPPING OF RESEARCH ON MUSEUM EDUCATION

Institutions conducting museum-pedagogical research

In Sweden research activity within the area museums and learning is very limited. In Umeå there is presently the only museology-education with doctoral studies in the country. According to conversations with Kerstin Smeds, professor in Museology at Umeå university, none of the current doctoral candidates in museology has focused on learning (discussion 040914). However, there is an interest for questions regarding the museum's identity and mission in the beginning of the 21st century, which is treated for example at a conference about museum-criticism in March 2005. (www.umu.se/kultmed/utbildning/museologi/index.html 050223).

At Tema Q (Theme Culture and Society), Linköping University, research is conducted on the use of culture and history, led by professor Peter Aronsson. Focus and perspectives are

described On Tema Q's homepage, and the activity also includes questions on museums and learning. Previously studies have been conducted around pedagogical questions and the usability of museums, and there was a conference about questions of accessibility December of 2004 (http://www.isak.liu.se/tema_q/startsidea_041117, e-mail 041114)

It should also be mentioned that Nordiska Museets forskarskola (the research school of the Nordic Museum), is striving to raise the competence level of 11 museum employees who plan disputation in 2007. The different dissertation-projects concern the museums' own areas of knowledge and originate primarily from the own collections.

(http://www.nordiskamuseet.se/publication_050124). The school of research is therefore not considered directly relevant for this overview. At Uppsala University up to 60 credits of museology is available, and Museion at Göteborg University offers a master's education in 'International Museum Studies'. The program runs over two years and contains three main themes; communication, intercultural perspectives and new technologies. The Stockholm Institute of Learning offers classes in museum pedagogics up to 40 credits. In this context it may also be mentioned Visions for Museums, a research environment at the Interactive Institute in Stockholm working mainly with developing concepts for the use of digital media for communication at museums, and offering a 3-credit course at the dramatic institute, "exhibition visitors & digital media".

The national heritage board, The Museum of National Antiquities and rådet for museivetenskaplig forskning have initiated a scientific institute of cultural heritage, a five-year feasibility activity. Commencing during 2005, the institute will conduct activities focusing on studies of the role and impact of cultural heritage on society. This intends to initiate multidisciplinary, applied research in the form of delimited projects connected to sector as well as society. Furthermore there are attempts to conduct investigations and assignment-activities, but also conduct external activities such as publications, seminars and conferences. The institute aims at connecting research and practical activities at the museums to the benefit of researchers that are to gain increased insight in the praxis of the cultural heritage area, and for civil servants within the sector who will gain knowledge about new research.

The English research within the area museum studies is well established, with a dynamic centre at the *Research Centre for Museums and Galleries* (RCMG) at the university of Leicester. Eilean Hooper-Greenhill is a professor in museum studies, author of, for the area, central works and the editor of several anthologies. In *The educational role of the museum* (1994), she claims that the British research has reached further than the American, since the American research still departs from a traditional pedagogics of transmission. Instead, Hooper-Greenhill represents a constructivist theory on learning, but also departs from a hermeneutic perspective. Another researcher at the RCMG is Richard Sandell, who has developed research about the social role of the museum (www.le.ac.uk/museumsstudies/rcmg/rcmg.htm 050223).

The Work, Interaction & Technology Research Group, Kinds College is an interdisciplinary research group that has specialized in studies of interaction from video-recorded material. Special attention is given the way in which objects, artefacts, tools and technology interact in action and cooperation in for example a museum environment. The results of such studies are the foundation of the development of design and new technology. This overview refers to studies by among others Christian Heath and Dirk vom Lehn (www.klc.ac.uk/depsta/pse/mancen/witrg/ 050223).

There is extensive American research on museums and learning. Here there is a long tradition of cooperation between museums and universities regarding the study, evaluation and development of museum-pedagogical projects. Investigations of the habits of visitors within the area “visitor studies” contributed to an early awareness of the citizen perspective on museums (Illeris 2004). *The Program Evaluation and Research Group (PERG)*, Lesley College has conducted evaluations, courses and research for museums, schools and other institutions since 1976. A profound qualitative method of evaluation is frequently used. George Hein is one of the most well known, and has published a great amount of books and articles on the subject museums and learning (<http://lesley.edu/perg.htm> 041117).

The Institute for Learning Innovation in Annapolis is a productive research and development organization that is behind much of the past years publications in the field. The organisation first and foremost commits to questions about “free-choice learning”, i.e. in museums. Well-known researchers are John F. Falk and Lynn C. Dierking, who have published several books on learning in museums, along with Kirsten Ellenbogen who researches Family learning (www.ilinet.org 050223).

Le Group de Recherche sur L'Education et les Musées (GREM), university of Quebec, Montreal, Canada, conduct research on museum pedagogics in cooperation with museums and schools in order to develop and evaluate models for learning that are specifically applicable to museums. Furthermore, the interaction between different parts of the pedagogical situation at the museum is being studied; the subject (visitor), object (issue), agent (human and material resources) and context (outer and inner environment). Active researchers are among others Michel Allard and Colette Dufresne-Tassé (<http://www.unites.uqam.ca> 041117).

In Australia research regarding museums and learning/visitors is relatively extensive, primarily as a result of individual researchers activities and interests. However, there is a special interest group at the Museums of Australia (the member organization of the museums) called the *Evaluation & Visitor Research Special Interest Group (EVRSIG)*. The group was founded in 1996 and consist of museum employees focusing specifically on the visitor's role in the museum society. EVRSIG organises workshops, conferences, educations and run projects. They have initiated research on the utilization of audience and visitor-studies within the sector of cultural heritage, conducted by Eva Reusser. Through interviews with representatives of different institutions and analysis of the ruling documents and publications of the institutions, she maps how these studies are integrated into the organizations' work and how they affect praxis. The term “research” here represents the evaluation of exhibitions or program activities, market research of potential visitors, and studies of existing visitor's demographic and social profiles (Reussner 2003, <http://amol.org.au/evrsig> 050203).

Central questions within museum pedagogical research

Apart from the empirically founded research that is reviewed in this survey, there is also a large amount of scientific works written in a more reasoning manner. These have contributed to shaping and structuring praxis and research within the field *museum studies*, called museology in Swedish. Here perspectives are presented regarding questions on learning, on the usability of museums and on identity.

There are several examples where *learning* is emphasized and where museum pedagogics is highlighted as a central function for the modern museum. Museum pedagogics is thus not limited only to exhibitions and programs for children and youth, but implies a broader perspective including all the questions found in the interface between the museum and the user. Lisa Roberts states that the museum-educationalists today play an important part in the different phases of exhibition-work as well (Roberts 1997). *From knowledge to narrative* treats epistemological questions in relation to the change that over the past 30 years have caused issues of education to receive a more central function at the museums. Roberts discusses how these changes challenge old values and practices, and thereby also challenges existing perceptions on the concept of education.

Roberts discusses this issue from four different perspectives. The first is “education as entertainment”, that historically problemizing the relationship between traditional learning and entertainment. The second perspective is called “education as empowerment” and treats the change that has implied that not only the museum but also the visitor has the right to interpret exhibits and exhibitions. The third perspective, “education as experience” treats the issue of how the visitor’s experience has changed as a result of the development of museum pedagogics. Finally Roberts discusses ethical problems concerning matters of interpretation under the perspective “education as ethics”. She argues that learning in museums shall be conducted from interpretation of narratives, or stories, instead of just explaining what different objects are. One important task for the museum-educationalists thus becomes interpreting these explanations and negotiating between the meaning brought forward by the museum and the one created by the visitor. Roberts reasoning is based on an ethnographically inspired study of an exhibition process with different professional categories involved. Roberts has observed and participated in the process, and analyzed the completed exhibition in a literature-critical analysis.

Other researchers emphasize the issue whether there are specific aspects to consider in regards to *learning at the museum*. George Hein respective John Falk and Lynn Dierking have developed models for how this learning occurs. George Hein is behind the well-known publication *Learning in the Museum* (Hein 1998). This work contains an overview of research methods and approaches used in studies of museums and learning. His main contribution consists of a discussion on learning theory in relation to knowledge, arguing in favour of a *constructivist* approach to learning at museums. He also presents a model for how this learning should be viewed and means that visitors learn the most when knowledge is constructed mentally, in exhibitions that are accessible, both physically, socially and intellectually. The needs and motivation of the visitor thus guide the structure, and Hein further states that one ought to take the different learning patterns and preunderstanding of the visitor into consideration in the exhibition-process as well.

Falk & Dierking have in several pieces of work developed among other things a model for *learning* at museums (Falk & Dierking 2000). To them, learning is primarily contextual; they claim that one may not consider learning without doing so in relation to a specific place or situation. Their model is based on three different parts; The personal context, the sociocultural context and the physical context. These three contexts are overlapping and coexistent to learning, and contain factors such as previous knowledge, interests, options and communication in groups. Falk & Dierking claim that the model illustrates the complexity of the learning process and makes it possible to begin analyzing it. Characteristic for the learning taking place at museums is its’ voluntary character, referred to as *free choice learning*.

The authors find this term suitable as it captures the underlying motivation and structure in learning in a better way than the term *informal learning*, described as non-linear and personally motivated.

Much of the contextual model is in my perception based on activity-theories. These are based on the anthropologists Lave & Wengers concept of *situated learning*, where they state that learning is a result of the activity, context and culture in which learning takes place. (Lave & Wenger 1991). Social interaction with others is essential, where the learner learns by the already initiated. One aspect emphasized by Lave & Wegners theory however concludes that learning is often unintentional, which may be compared to the voluntary learning discussed by Falk & Dierking. The criticism that has been directed towards Lave & Wengers theory however means that learning in the social praxis basically excludes the individual-based learning. As a consequence of the criticism, Lave & Wenger have let the concept receive a partially different meaning, now emphasizing the construction and transformation of knowledge (Gustavsson 2000).

Falk & Dierking have included the personal context in their model, that also treats the cognitive aspects of learning. In their method for gathering data, *Personal Meaning Mapping* (PMM) they measure how unique learning situations affect the individuals creation of meaning and understanding. This method of investigation takes into consideration different individuals' previous knowledge, and documents changes in their learning. Researchers have for example been able to measure the conceptual understanding of visitors by counting the amount of visitor categories there are before and after the visit (Adams, Falk & Dierking 2003).

The question of the increased impact of pedagogical issues include the awareness about and the discussion of theories on learning. Palmyre Pierroux, active at InterMedia, the University in Oslo, discusses linguistic terms and the use of theories within art education (Pierroux 2004). She describes how a paradigm shift is about to take place, where previous focus on individual meetings with authentic objects is replaced by a sociocultural perspective, emphasizing the public's activities, artefacts and the language as a mediator in the process of creating meaning. Art pedagogics has rested primarily on two philosophical theories, Pierroux argues. These are cognitivism and phenomenology, as it is being used in constructivist studies. Both traditions focus on the individual experience through mental activity. Sociocultural theory making instead introduces the thought that learning is an activity mediated by cultural artefacts and languages, subject to the variability of social and historic processes. Pierroux states that art theory and sociocultural theory are joined within three areas; both consider languages and interpretation to be open concepts, that are developed through use in social contexts. Within both areas, artwork and the meaning applied to them are considered dynamic, and culturally and historically specific. Within both traditions there is also a view where discourse is essential for the creation of meaning.

Questions on the *changed social role and identity of the museum* is central to many researchers and curators. The role of the museums in the research society has initially been discussed within the frame of museum analysis, where Göran Rosander through interviews and surveys have investigated what attitude the representatives of the museums take on their research. The question is asked whether there are research areas within the museum where Sweden may be considered prominent. Areas emphasized are studies of artefacts and research on the physical environment. The unmotivated answer states that museum-pedagogics is considered a very well developed as field of research, especially art-pedagogics. The answer

may possibly refer to assignment-activities or documentation, or maybe rather development work concerning the own collections. Research on the material surroundings and its situation in a social context may separate museum research from the research conducted within academic institutions (Rosander 1994)

The social roles of the museums is also discussed by Lennart Palmqvist and Stefan Bohman. Their anthology *Museer och kulturarv* (Museums and cultural heritage) discusses the traditional tasks of the museums, the collecting, preserving, displaying and researching as an important unit where all parts must be developed to the same extent. It is stated that the unique feature of the museums is versatility. Added to this, there is a comprehensive mission concerning education, which separates the museums from other cultural institutions; that is giving the visitor new perspectives on time in which they live. Through displaying different interpretations of the past, the visitor may see other possibilities than those available today. (Palmqvist & Bohman 2003)

In the anthology *Museums and framtidstro* (Museums and belief in the future) a number of researchers and curators investigate the self-image of museums with examples from the national museum project *Framtidstro* (belief in the future) (Palmqvist & Beckman 2003). The point of departure is the difficulties in identity expressed by museum today. The authors reflect upon discrepancies regarding primarily the purpose and activity goals of the museums of cultural history. The reasons for this are sought in the competition posed by the entertainment/experience industry, but it is also stated that scientific, critical studies of the museum have contributed to an increased insecurity within museums.

Svante Beckman and Magdalena Hillström identify four competing ideal images of museums called the treasury, the archive, the Folk high school and the theatre. What many experience as the core of museum activity, the objects, is given different meaning and value through the ideal. The view on visitors and their roles is also divided within the different ideals. One example of the treasury is the traditional art-museum. There, the objects themselves are valuable, and their authenticity is emphasized. The ignorant visitor is tolerated under the condition that the objects are safely guarded from touch. The archive, with museums of natural history as an example, is guided by science. Here the objects themselves have no value, they are instead objects of study providing information through documenting different contexts and parts of reality. The visitor may be a scientist using the collections for his own purposes, but the public is also invited to study the permanent exhibitions. The ideal of the folk high school is found in for example science centres having an expressively educational goal. Here the objects receive value by illustrating a given content of knowledge. The visitor is a citizen who may use the museum as a part of the general strive for knowledge. The theatre ideal has much in common with the modern experience industry. Here the objects are used mainly as properties, and their value is primarily found in their ability to create atmosphere or commitment. The visitor in such a museum consumes the experience offered.

The museum of cultural history is described as the museums most multifaceted and most difficult to tie to any one particular ideal. The four ideals may be placed within the frame of two competing points of view; one consist of the contrasts culture of knowledge- culture of experience, and the other consists of collection orientation- visitor orientation. The authors here conclude that the museums draw closer to visitor orientation, since the collection-activities in the public museums have received lessened significance. Assisted by experiences and preserving-methods, the museums seek to fulfil the strive of knowledge that today has gained increased importance.

Lennart Palmqvist's contribution in the same volume treats the changed exhibition-praxis of the 20th century. The traditional, linear-constructed exhibition focusing on scientific features and objectivity has been replaced by two competing trends. One focuses on the experience and entertainment of the visitor. The other has developed the exhibition-media to an art-form of its own, there staging is as important as the (art-) objects displayed. In both trends the visitor is placed in the centre though a narrative presentation. Palmqvist however notes a danger in that the knowledge-seeking visitor is left without the exhibition-producers knowledge of the exhibits and the area of knowledge that constitutes the foundation of the exhibition. Focus on communication with the visitor may also result in that the visitor has a difficult time finding the meaning, unless the idea of the exhibition is very clear.

Questions of the *usability of the museums* are discussed by Eilean Hooper-Greenhill. In *Museums and the Interpretation of Visual Culture* she pleads for a "post-museum", that stands out as a critical standpoint for the museum as a place for meaning making, where the visitor is engaged in the museum process as well (Hooper-Greenhill 2000). Museum education has thus received increased importance as a central part of the museums identity and activity. Focus of the book is matters of interpretation, discussed from a hermeneutic perspective. One important purpose is problemizing the relationship between observer and the observed object, conducted through a cultural theoretical perspective and discussed from the concept of visual culture. Questions asked include: How are exhibits interpreted by the visitor and how are these interpretations guided by the pedagogical efforts of the museum? How are exhibits used in museums to create knowledge? And how may the museum visitors' relationship to this knowledge be understood? One important point with the "post-museum" is not to expand collecting, but to focus more on the use of the already existing collections. Hooper-Greenhill advocates that the museum not only pay attention to the material, visible culture, but also to the part that is less obvious. She views the exhibition as one of many forms of communication, a core around which other activities may be attached both before the period of the exhibition and after its closing.

Questions regarding learning, education, and the usability and identity of the museums are also discussed in the empirical studies reviewed for this research survey. These questions do however not constitute the foundation of the disposition below, they have mainly been of assistance in the selection. Instead, the question of what has been investigated constitutes the foundation for the introduction in five comprehensive areas below; the learning of children and youth, the learning of families, the learning of adults, museums, identity and social capital, and new technology and its impact on learning. These areas are presented externally, regarding questions of research, methods, theoretical perspectives, results and the disciplines within which research have been conducted.

The learning of children and youth

In several studies of the learning of children and youth, subject-content is in focus. Studies on how children learn natural science under certain circumstances dominate, and I would here like to present a study conducted by Anne Cox-Petersen, David Marsch, James Kisiel and Leah Maelber (2003) in the USA. They are interested in how natural science is mediated to students and what they learn during school demonstrations at a museum of natural history. The purpose is furthermore to investigate how the content and structure of the demonstration respond to the national ruling documents for formal education on formal learning in natural science and literature respectively. According to the ruling document, education in subjects of natural science should depart from student activity, containing dialogue and cooperation with others. Education should moreover originate in themes, united concepts and place emphasis on depth and breadth. The researchers depart from a contextual perspective on learning (compare Falk & Dierking 2000), and also add a social constructivist view. Approximately 30 visiting school groups aged 8-14 were observed, and interviews were conducted with teachers and selected students. The demonstrations were teacher-centred and similar to lectures where the museum-teacher first introduced facts and later asked closed or controlled questions about the content. This way the students were not given any opportunity to cooperate, solve problems or make their own decisions. The language was often too complicated for the students, and the museum-teacher was often bad at adjusting the education to the individuals, or connecting to the previous experience and knowledge of the students. The study measured the learning of the student with point of departure in their preunderstanding of the terminology associated with the exhibition, which thus displayed bad results. In conclusion it may be stated that the demonstrations were not consequent with neither ruling document nor newer research on informal learning.

Another example is a Swedish study that departs from the content of subject as it is presented and perceived at science centres. Vaike Fors, phd-student in pedagogics at the Luleå technical university, works with a dissertation on youth learning at Teknikens Hus in Luleå since 2002 (Fors 2004) Focus is placed on youth reproduction of the cultural praxis (the science centre-movement's mutual approach to science/technology and communication/learning) that is materialized through exhibitions. Fors uses visual ethnography, as it is introduced by Pink, and has let five fifteen-year-olds film their mutual experiences at the centre. After the visit they have commented on their films and enter deeply into them, under supervision by the researcher. The analysis departs in sociocultural theory building and focuses on the youths' construction of identity and their learning processes, as they are developed in terms of *mastery* and *appropriation*. The central questions of the study are; which are the different science centre-based praxis that are expressed by the youth? How do the youth use film to represent themselves and their self-image when they show and tell about their encounter with the exhibitions at teknikens hus? In this state no definite results may be presented. Fors plans dissertation in the beginning of 2006.

David Andersson (1999), Dep. of Curriculum studies at the university of British Columbia in Canada and focuses on natural science as well. In his dissertation he investigates how the content receives different meaning at science centres and in the following classroom activities. He particularly investigates the students' knowledge building around the terms magnetism and electricity. The theoretical frame of reference is based on a constructivist foundation. The dissertation has three subordinate goals: developing a set of principles for classroom activities that were considered to promote the learning of the students, to describe and interpret the preunderstanding of the students before and after the visit and after the

classroom activities, and describing and interpreting the way in which the students constructed their preunderstanding before and after visit and classroom activities. 12 students aged 7 participated in the study. The results showed that the students' preunderstanding to the terminology in certain cases were similar to the corresponding scientific explanation, and sometimes expressed a personal interpretation and understanding. The author furthermore claims that the results show that knowledge is formed in a unique way by the individual, that knowledge development is gradual, that changes in understanding may be interpreted in the light of previous knowledge, and that knowledge develops unevenly.

Another direction is presented by Andrea Wetzl-Fairchild, who instead focuses on the inner life of children, and their aesthetic experiences when encountering art at museums (Wetzl-Fairchild 1995). She poses the questions: What happens in a situation when a visitor claims to be having an esthetic experience? How do the different factors correlate in influencing the experience? Wetzl-Fairchild is art historian and active at the department for art education at Concordia University. The study is qualitative, and has gathered data from 12 video-recorded interviews with children aged 8,10 and 12. The children got to see three examples of artwork, painted with different visual systems of representation; from realist to abstract art, and the researcher then asked questions about their experience. The transcribed answers were analysed according to different themes or areas, depending on if they related to the artwork, to the artwork itself and to the own subjective experience. In her study she departs from Gardner's theory on participation in art, Freud's psychoanalytical theories and Piaget's cognitive development strategies. Here, the aesthetic response or experience is something that increases with age and level of development. Regarding the results she was not able to prove any definite development schedule with the interviewees as she had initially intended. However, certain subjects could be related to the age of the children, such as questions of moral issues and answers relating to the origin of the painting. One result is that the museum-teacher was able to facilitate the communication between the piece of art and the observer. The museum teacher could, by asking questions, suggest different positions from which the observer was able to observe the piece of art. This was assumed to increase the visitor's aesthetic experience.

Family learning

The learning of families is the focus of several studies recently presented. It is most common that the researchers base their analysis on a conversation that has taken place during the families' visits to museums. However, there are also examples where families have been accompanied for a longer period of time, in order to investigate which role the museum plays in the everyday life of the family. Kirsten Ellenbogen, active at the institute for learning innovation in America has written a dissertation with the title *From Dioramas to the Dinner Table. An Ethnographic Case Study of the Role of Science Museums in Family Life* (2003). Here she has accompanied 4 families during 18 months at occasions when they have visited museums and other sites, or gathered for family activities in the home. All four families were accustomed to visiting museums often and stated before the study that they visited museum at least six times per year. The purpose of the study was to investigate how families use museums in order to better understand the museum's importance for learning and family life. The research questions of the study were: Which role does the museums of natural science/science centres play in the life of families? How does the family decide what counts as learning and natural science at home and in the museum? How may the family experience natural science at home and in the museums? Ellenbogen departs from a sociocultural

perspective on learning, combined with a discourse analysis. Data was gathered through participating observation in different environments and also consisted of notes, tape and video-recordings and transcriptions. The results demonstrate how participation in different activities of natural science not only shapes an understanding of the core of natural science, but that the family interaction with natural science also shapes the identity of the family.

In some studies the researchers focus on the interaction between children and parents, where it is investigated how the parents mediate the children's knowledge and facilitate their learning. Kevin Crowleys and Melanie Jacobs investigate how areas of expert knowledge, *islands of expertise*, are shaped with children. The study regards subjects that are of interest to children (often way before they come in contact with them as school subjects) and within which they develop a relatively deep, informal knowledge. Examples of such subjects may be dinosaurs, knights or space. Knowledge is developed in social processes, over time and as an integrated part of the family activities. In one study the goal was to quantitatively describe the learning in conversations held when parents and children together studied fossils from dinosaurs. After the exploring activity the researchers tested how well the children were able to identify the different objects, and in the analysis connected the results to the patterns of conversation that had been identified. The results show that higher levels of mediating activity with the parents resulted in higher ability with the children to identify fossils. The most important mediation was naming and explanations connected to previous experiences and situations.

In a different study, also directed towards mediations, Kevin Crowleys and Maureen Callanan investigate the interaction between children and adults at science centres (Crowley & Callanan 2002). Both are development psychologists departing from theories on how the processing of information occurs, but also support on sociocultural theories on learning. In their research the interaction between children and adults was videotaped and analysed, in order to gain understanding of how parents contribute to shaping children's so called "literacy" or understanding for science, and furthermore how museums through their exhibitions may facilitate such processes. The results have shown that children accompanied by adults stay longer at specific situations and spend more time at experiencing the content of these. One has also found that the explanations of parents help children to create interpretations of what they see. It was possible to identify three different types of explanations; those focusing on functions and mechanics at the current station, explanations connecting the exhibition object with real phenomena and finally the explanation making connections between formal scientific principles. In the cases where the parents explained a feature in the exhibition, the children were more prone to talk about their experiences and what they saw. The parents' participation thus deepened the engagement of the children. In other contexts researchers have also departed from research-results on family interaction to develop stations in exhibitions and objects at science centres. By adding questions or activities, one was able to increase or optimize the learning further. Researchers claim that learning becomes evident in the family behaviour in the following cases: when someone asks a question, answers a question, comments or explains the exhibit, reads quietly or reads out loud. (Borun et al. 1996, 1997).

Theano Moussouri has taken interest in families' agendas and wishes at the visit to the museums (1997) The study departs from a sociocultural perspective and the results show that the expectations shifted depending on age and role in the family, as well as the parents level of education, how accustomed they were to the museum, and also depended on the type of museum visited. The plans for the visit were accompanied by constant negotiation between the family members, but were also affected by the offers made by the museum. Families

having visited the museum before had more definite plans than first-time visitors. The children were more focused on seeing special exhibits and “doing things” in the exhibitions together with other family members, while the parents mainly focused on their own experience but also on wanting the children to learn something about a certain topic. They appreciated features that invited to interaction with the children and where they were encouraged to think creatively. Moussouri identifies five factors that together determine families’ planning and visits: family profile, sociocultural patterns, the personal context of the visit, the social context of the visit and the exhibitions of the museum.

Regarding the families reasons to visit the museums, six different categories could be identified. Families visit museums because it was related to the *location*; i.e. the museum was associated with the city or the region, and was a given site when the family had guests from out of town. Families visit museums for an *educational purpose*, and for their aesthetic, informal or cultural content. Families visit museums because they fit into the *lifecycle*, meaning that a visit to (certain) museums is something connected to a certain age. Visits to museums may also be about *social activities*, something to do together on the weekend as a family outing. Finally there were reasons of *entertainment*; the families visit museums to do something fun on their time off.

Adult learning

Adult learning primarily refers to studies of adult visitors’ learning. The field is expanded slightly to include also museum-professional’s view on learning, as it is presented in a study on the design process of a large-scale exhibition project at an art museum. In her ethnographically inspired study (2002), Karen Knutson shows that different people that are included in the workgroup for an exhibition have different attitude to visitors and learning. Knutson means that the decisions made by the involved actors during the process, reflect perceptions of the meaning of education and knowledge. She also problemizes the view on learning at art museums, since they, in opposition to for example science centres, do not have education as a primary goal. Even though questions on learning and access are prioritized at the art museums, these compete with demands that the exhibition also contributes to the development of knowledge as a university discipline. Often the art exhibitions are directed towards an already initiated, well-educated audience. Knutson has during a one-year-period participated in work meetings and interviewed the key people participating in the exhibition process: the producer, the educator, the architect, the manager of the exhibition, of lighting, editing and information. The result showed that the curator has a leading work position and thereby also the most influence on the exhibition process. The others in the exhibition team held a more supportive role. The different people included in the work had different views on the visitor; from an undefined “physical mass”, to individuals with separate interests and approaches to learning. However, the view of the curator had the greatest impact on the completed exhibition; she compared the visitor’s needs and behaviour to those of a shopping customer, by working with colour in the exhibition she wanted to “help” the visitor make her choices.

In several studies about the visitor’s interpretation and creation of meaning, the researchers depart from the visitor’s identity and preunderstanding. Joyce Fienberg & Gaea Leinhardt (2002) focus on how identity is reflected in conversation in small groups visiting an exhibition at an historical museums together. They refer to *conversational elaboration* as a measure of learning, assuming that it is primarily the identity of the visitor, but also the

organisation of the learning environment and the explanations that the visitor engages herself in, that constitute factors affecting the complexity of the conversation. In the study, 10 groups were accompanied and their conversation recorded with the purpose of investigating how identity relates to the content of the conversation. The following questions were asked: How does the visitor create meaning? What is the structure of the visitor conversations? How does one talk to one another? The conversations are analysed both with regards to structure and content. The results show that most conversations contained an identification of objects or phenomena in the exhibition, and that about half of the conversations contained an evaluating comment of some kind. More than half of the conversations elaborated on the content presented by the museum in the exhibition. It was also proven that conversations were highly influenced by the identity of the visitor. Those who possessed knowledge about the exhibitions theme also expanded the museum's proposals, and explained things to the others in the group to a larger extent.

Visitor's interpretation-strategies at art museums are the focus of two studies conducted by RCMG (research centre for museums and galleries); *Making Meaning in Art Museums 1 and 2* (Hooper-Greenhill & Moussouri 2001, Hooper-Greenhill, Moussouri, Hawthorne & Riley 2001). Both studies focus on how visitors speak about their experience of the art and of the museum itself, and analyze further how to create meaning with different strategies of interpretation. Further, they intended to investigate how the museum's information in form of texts on signs helped the visitor in the process of interpretation. One purpose was also to investigate if such strategies may be collected into patterns. The two studies departed from an ethnographically inspired method, where randomly selected unaccompanied visitors were accompanied on their tour through an exhibition and encouraged to "think out loud". They steered their own way through the exhibition and the accompanying researcher asked no further questions than to clarify already made statements. The conversation where they talked about what they saw, thought and felt was recorded. After the visit the visitors filled out two different surveys containing demographic data and their previous knowledge in the area. Notes were also taken. The data was transcribed and analysed in a program for qualitative analysis. The analysis was based on theme and content. The theoretical framework of the study assumes a constructivist perspective. A hermeneutic interpretation has been used as well.

In study 1, visitors of middleclass and relatively low level of formal education participated. Most of them were accustomed museum visitors, even though they lacked formal education in the field of art. The informants used conventional terminology in their interpretations, even though they sometimes had to search for the right expression when making their descriptions. Information, such as signs, was frequently used. In study 2 visitors that belonged to the upper middleclass participated, a large part of them were academically trained and committed to art-related activities. 1/3 was formally trained in an art related subject. Most of them focused on visual qualities in the pieces of art and the social value of art. One used terminology such as abstract and figurative art, discussed the sociocultural context of the art and the artistic process. Some, but far from all, used conventional terminology used for picture analysis. The visitors were clearer in their ideas than those that participated in study 1, and they were able to demonstrate a larger understanding for the pieces of art. Important in both studies was that the visitors were happy consult from the information provided by the museum when making their interpretations. Several expressed a wish to receive even more assistance than was actually provided.

Some studies strive to measure learning in different ways, and aim to make objective judgements of the visitor's knowledge before and after visits to the museums. In one example from Canada the results are used to develop pedagogical models that may constitute the foundation of planning program activities. Michel Allard & Marie-Claude Larouche (1998) have tried such a model for the GREM (Group de Recherche sur l'Education et les Musées) by investigating adult students learning at a site called Cartier house. Their model is based on the thought that museum pedagogics *per se* consists of a museological (interaction between visitors and displayed exhibits), a pedagogical (relationship to the content of knowledge) and a social dimension (characteristics related to the social group of the visitor). The study investigates how adult immigrants attending a language education responded to one of the programs at the site. The study was based on a number of different methods for gathering data. Cognitive tests were conducted with each student one week before and one week after the visit. Furthermore a random selection of visitors was interviewed with the point of departure in open questions. The museum-educators filled out the questionnaire with open questions and the teachers for the different groups got to fill out surveys that documented how satisfied they were with the visit. The results proved that the visitors made significant progress regarding specific knowledge about Canada's history. Their time perception was however uncertain, and they rarely used descriptions or comparisons in their answers on the larger historical context. It was unusual that the visitors classified or made any decisions on their own according to what they had experienced at the site. It was more common that they retold anecdotes, than that they referred to the more detailed message demonstrated during the visit.

Another example of studies aiming to systematically investigate the visitors leaning is a Dutch study from 2003. Folkert Haanstra is professor at the Amsterdam School of Arts with a background in psychology and art pedagogics. His study concerns ethnographic and historical museums where he has investigated learning from qualitative and quantitative methods. The purpose of the study is to compare and capture the learning experiences that individual visitors make in connection with exhibitions and pedagogical programs at three Dutch museums. The museums had different ways of presenting their collections; from traditional exhibitions with only text based information, to thematic exhibitions with models, along with interactive installations and audiovisual media. Different methods for gathering data were used in the study; questionnaires with closed questions, "semantic differentia" measuring attitude and connotations around contrasting concepts, along with learner report letting the visitor himself formulate the profit of the visit. The results showed among other things that one of the museums with a more modern approach, received the highest assessment on the three dimensions. Visitors' experiences were analyzed according to Falk & Dierkings model of learning, where the personal, physical and social context interact (Haanstra 2003).

Museums, identity and social capital

Who has access to the world of the museums and who is excluded? What is the importance of the museums in society and to the individual? Studies treating this kind of questions often belong to a sociological tradition, which is reflected in the theoretical foundation of the studies. Richard Sandell, University of Leicester, is however active within museum studies, focusing on the theme *social inclusion/exclusion*. In *Social inclusion, the museum and the dynamics of sectoral change* (2003) he discusses how the social responsibility of museums demand a thorough change of activities and goals. The article is based on empirical research around processes of transformation within the museum sector, where he has interviewed

museum-directors about the view on *social inclusion* and on its relevance for the museums. The term *social exclusion* represents a process of social dissolution, a decay of the ties between individual, society and state. To the individual it is about standing outside of the social, economic, political or cultural systems that are determinant for her socialization in society.

With his research, Sandell wants to illustrate that museums and other cultural institutions have the possibility of strengthening individuals and societies and thereby contribute to the elimination of social inequality. Sandell suggests using terms and models from organisational theory, such terms used in studies of organization development and strategy building. An understanding of how processes of change within the organisation work would facilitate the process of change, Sandell states. The study also shows that a change of attitude regarding access is required with the employees. There is also a great need to recruit staff with completing capacity. The study moreover shows that the museums must be democratized and let the users participate in the decision process.

For several years researchers have taken interest in how museums through their regional status are of importance to the identity of the individual. Max Ross has for example investigated how interpretations of the surrounding world may be connected to museum visits, especially in relation to questions concerning class, free time and location (Fyfe & Ross 1996). The study is qualitative and has been conducted as interviews with 15 households in a few larger communities in mid-England. The informers were interviewed on their social background, spare time, lifestyle and relationship to the society in which they live, in order to investigate how identity and structure are mediated through experiences at the museum. The study is sociological and uses primarily Bourdieu's concept *habitus* in its analysis. The results of the study show that smaller, local museums may function as links between identity and structure. The museum is given a different meaning depending on the social status of the citizens. The results also show that the citizens picture a place and identity through the vocabulary used by the museums.

Another study investigates the importance of location on identity, and departs in a comparison between two different sites in northwestern England. Gaynor Bagnall describes how both of the regional museums become arenas of *performance*, which is seen as important social practices for the visitors (Bagnall 2003). The first museum is located in the centre of Manchester, in the first urban cultural heritage park of the country. The establishment of this museum has been part of the economic recovery of the city, which has also given the museum a natural status in the eyes of the inhabitants. The other museum uses tourism effectively in order to change the status and reputation of the area. The researcher has intended to capture patterns of consumption in the different museums, through conducting detailed interviews with visitors at the museums. He has furthermore completed the qualitative methods with archive studies and studies of available documentation (guides, catalogues, questionnaires).

The results have shown that the visitors are not passive consumers at the different locations, but competent and reflecting *performers*. The researcher claims that the relationship between the visitor and the site are based on feelings and imagination as much as thought and reflection. This emotional relationship is created by the physical in the consumer process on site. In the analysis Bagnall departs from Abercrombie & Longhurst's "The spectacle performance paradigm" (Abercrombie & Longhurst 1998). This claims that today's society is characterized by performance, and that people themselves perform in front of an audience at

the same time as they are part of several different audiences; they are both cultural consumers and producers. In this audience activity feeling and imagination are the main components. Their “The spectacle performance paradigm” or SPP, aims to challenge the most common perception of the audience as a simple mass, the spread out, everyday bound audience, typical for our contemporary society. Bagnall also speaks of cultural *literacy*, which gives the visitor a number of different resources from which they may perform. The visitor creates meaning by a physical, emotional and intellectual mapping of his consumption. Such mind maps let the visitor tie their experiences to personal and cultural memories.

Another example treating location in relation to museums is a study about the lifestyle of the English middleclass, made by the sociologists Longhurst, Bagnall and Savages (2004). The purpose is to understand the meaning of social and cultural practices in their context, which is done by relating the stories of the interviewees to the places where they live, work and spend their free time. They depart from communications theory and use Abercrombie & Longhursts term “diffused audiences” meaning that the audience is treated in an everyday context (Abercrombie & Longhurst 1998). People from four different cultural environments have been interviewed, and their every day life in the area of Manchester in North western England have been studied. Semi structured questions focus on daily routines, without direct questions about museums. When discussing the feeling of belonging to a place and being a parent, stories of museums were most prominent. Going to the museum proved to be a picture of good parenting for the interviewees. Even if the informers did not visit museums in the holidays as they claimed, there was an image of that one ought to. The analysis also showed that visiting museums is not directly about cultural capital. Many instead describe the museum visits according to the role of the consumer; the museums are thus identified as some of the different consumer-surfaces of the city. The museum is a part of the city’s show or performance.

New technology and its impact on learning

The new technology has an obvious position within many different situations at the museums today. There are several prominent studies investigating how technology affects the museum as an institution, but also how technology becomes important to the users and their learning. Research has for example been able to show that network technology, and particularly the Internet, has brought about changed communication strategies at the museums. This means an increased cooperation between professional categories that previously did not have much exchange, new work descriptions and services, new sources of financing and clearer profiling towards, and knowledge about, different target groups. This has also contributed to a greater focus on the visitor/user, in both museum research and praxis. Palmyre Pierroux (1998) has in an art-historical study investigated how network technology is used by art museums to present and communicate information about art. The purpose is to treat how network technology has affected the communication strategies related to the interpretation and education oriented activities of the art museums.

Pierroux’s research is based primarily on data gathered at the conference *Museum and the Web 1997*, on surveys from close to 50 art museums and on interviews with curators and museum directors on museums in the United States and Europe, and on a number of visits to different museums websites during a period of two years. The development of museum websites has since the beginning of the 1990s shifted from homepages with marketing and information purpose to containing databases for research purpose and more extensive ‘e-

learning centres'. The latter often contain an orientation over the collections, educational material for the school, multimedia in order to expand the art experience, educational programs through distance learning where videoconferences are used in the communication between museum staff and classrooms. The author also investigates how IT has been incorporated in the architecture and in the exhibition work at several of the newer art museums. Pierroux draws the conclusion that IT has not only affected the museums, but that the museums also participate in, and contribute to, the cultural and technological changes.

Regarding the question of how the new technology affects the museum visit and the communication between visitors, there are examples showing that existing technology does not support the cooperation to the expected extent, and that many applications are directed towards only one visitor at the time. At the King's college in London, vom Lehm, Heath & Hindmarsch (2002) have focused on videotaping and analysing social interaction at different museums and galleries from a sociocultural perspective. The interaction at interactive, computer-based applications (for example different touch screen-units) have been studied in particular. Instead of investigating what the visitors learn from the exhibition and exhibits, they are interested in how to organize the actions and activities through which visitors learn. The purpose is to develop a way of designing and developing exhibits to increase the possibility of participation and cooperation. The method is based primarily on ethnomethodology and conversation analysis, which contains detailed transcription and analysis of the visitor's speech mimic and pattern of movement. Attention is also paid to how the actions of the visitor are shaped and coordinated with one another; not only to those in the same company, but also to others in the same room.

Research on the importance of technology to the museum visitors is also central in studies aiming to developing technology that supports learning. Research about design of artefacts for the purpose of communication and learning often depart from learning theories and from ideas on how learning and communication may be optimized. The purpose is then to develop artefacts that depart from the social context and give the visitor the possibility of cooperating with other visitors. Slavko Milekic, at the University of the Arts in Philadelphia, USA, has cooperated primarily with art museums, for which he has designed and tested different digital media productions with the purpose of expanding the art experience for children. Milekic claims that development of media technology must be based on the human needs and the prerequisites of the public, and not as frequently, from technology that might be mastered by a dedicated smaller group. The point of departure for his research is the sociopsychological research. He introduces the term *digital environments*, in order to emphasize the creative thinking and movement away from traditional computers. Such digital environments are socially oriented and make interaction possible through a number of different tools. They also make handling of several users at the same time possible, and have the capacity to interpret the users presence, purpose and emotions.

One example of productions is *KiddyFace*, consisting of a "touch-screen" that is sensitive to intuitive and direct actions. It is placed on the floor or building in a comfortable piece of furniture in horizontal position, which makes it a surface available to several children at the same time. The software is designed so that the children may solve different assignments easier if they work together. Distinctive for *KiddyFace* is a mechanics based on that different objects are "thrown off" and replaced by others. The effect is created when the child touches an object on the screen, pulls it rapidly across the screen and then lets it go. In other digital media productions Milekic has investigated the eyes and movement of the gaze through so called *eye and gaze-tracking technologies*. Converted into digital media the technology makes

possible for example interaction with (representation of) art without touch; the movement of the eye and its speed marks the intention of the viewer and the viewer may then study artefacts and paintings in detail and from different perspectives. (Milekic 2000, 2003).

Another example of research with a point of departure in socially directed learning-theory is Reed Stevens work with an application called *Video Traces*, that is a computer system making it possible to visibly and verbally react to and comment on selected sequences of a video-film or digital photographs. (Stevens, R., Cherry, G. & Fournier, J. 2002) The technology means that the video sequence may be recorded, saved and organized, in order to later function as the foundation of communication between different people. The design originates in a sociocultural perspective on learning, where learning takes place in cooperation with others, and particularly in contexts where there is a certain asymmetry between the learners. Therefore “traces” or *video traces* in the application that may be shown and discussed in a group, optionally function as opening lines in a conversation with visitors coming to the museum at a later occasion.

The use of *Video Traces* has been studied in a science centre through an arrangement with a digital video camera connected to a computer, mounted in connection to specific exhibits. At the arrangement, there was a researcher available to instruct the visitor on how the application worked and what the visitor could use it for. The results showed that the visitor used *video traces* to illustrate their ideas, explanations, questions and perceptions of the scientific phenomenon illustrated by the exhibit in question. Traces were made both by single visitors and groups. It could be concluded that visitors who are otherwise used to being consumers, were now able to contribute with their own representations of their experience. By leaving traces they were also able to interact with others and with the content of the exhibition.

Visions for Museums at the Interactive Institute in Stockholm is a research and development centre that among other things work in an interdisciplinary manner, creating ideas and concepts for the use of digital technology in museum contexts. The main purpose of previous creations has been to contribute to the stimulation and renewal of the meeting between visitors and the content of the museums. The prototypes that have been developed are often collaborations between the museums, the developers of technology, reference groups and other research activity. One example is *Access in Mind*, that is an audiovisual installation shaped as a ball-shaped chair, intended for exhibitions of contemporary art. In a multi-sensory way the visitors are stimulated to relate their previous experiences and emotions to contemporary art. The target group is youth, which by using the installation receive new, verbal tools to talk about and experience art. Through a sociocultural perspective smaller studies have investigated how visitors experienced the installation and if it worked according to its purpose. The methods have been predominantly quantitative and showed that the installation appeals to younger visitors and that it gives them tools to word their opinions and feelings about the art that they experience. (Gottlieb & Henniingsson 2004).

An ongoing project called “Virtual exhibits on demand” led by J.C, Nordbotten at the information and media science at the university in Bergen, has resulted in an investigation of existing *e-learning centres* in museums (Nordbotten 2004). The main project aims at developing methods and tools to search for information in multiple, multimedia databases, that may be used by teachers and students in their own work. The investigation focuses on the development of terminology for the structure/construction of museums *e-learning centres* (Websites that intend to provide students and the public seeking information with educational material), including an analysis of the foundational approach to learning. These architectural constructions are classified according to degree of user control.

Nordbotten identifies three different types of *e-learning centres*: *The virtual exhibition*, that provides information about a thematic area determined by the museum. The themes are presented as a hyperlinked story, navigated by the user. Its construction is similar to a textbook, aiming to spread information according to a model of mediation pedagogics. *The interactive site* that except for the hyperlinked story also offers educational activities to support learning. These are based on a conviction that learning is optimized through activity, *hands-on*, or *learning by doing*, of a content determined/guided by the museum. The third and final type is *information gathering: objective 'On-demand' exhibits*, that by access to different databases support the gathering of information for the user about a subject chosen by the user. This type provides the greatest user control. Existing systems are however not flexible and extensive enough, which the main project intends to improve.

3. CONCLUSION

Based on the content in chapter 2, I wish to conclude the basic features of contemporary research within the area of museums and learning. In the introduction, central questions of the survey were introduced and they will be answered here. Regarding the focus of research, some central areas have been defined; The learning of children and youth, the learning of families, the learning of adults, museums in relation to identity and social capital, along with new technology and its impact on learning.

The overview has specifically treated questions of *learning* at museums, and accordingly whether there are special aspects to consider regarding learning at museums. The question of learning is treated in most works and studies surveyed here. Especially prominent is the emphasis on the fact that learning is viewed as a central function of the modern museums, and that learning is in focus in most context regarding the meeting between the museums and the visitor (Roberts 1997). Several scientists claim to hold the definition of learning at museums. Hein (1998) here states that a constructivist approach emphasizes the individual aspects of the experience and the learning of the visitor, while Falk & Dierking (2000) suggest a contextual model departing in personal sociocultural and physical aspects of a situation. It is also obvious that the sociocultural theories are used with increased frequency in order to gain perspective on learning at museums. Several studies treat how the area of content is given a certain meaning in a museum context. (Cox-Petersen, Marsch, Kisiel & Melber 2003, Fors 2004). I would like to emphasize the question of learning in the concluding chapter about future research activity as well.

It is prominent that social perspectives on learning have received increase important also regarding *new technology*. Research aiming to develop artefacts where learning may be optimized, often depart from sociocultural learning theories (Stevens, Cherry, Fournier 2002, Gottlieb & Henningson 2004), but there are also examples where it has been combined with different traditions, such as social psychology (Milekic 2000, 2003). The new technology has also been important to the institutions themselves; the communication strategies have changed as a result of the introduction of network technology, resulting in an increased cooperation between different professional categories and increased focus on communication between visitors (Pierroux 1998). There is also research demonstrating the opposite; that the new technology not at all supports cooperation to the extent expected (von Lehn, Heath & Hindmarsch 2002).

A central area for the survey is the *usability of the museums*; Which role may the museum play in society regarding information and education, next to institutions such as libraries,

schools and media? On this issue, there are museum researchers who highlight the educational mission of the museums, stating that the unique feature of museums is their direction towards providing new perspectives on our contemporary society (Palmqvist & Bohman), but that the audience orientation also constitutes the risk of excessive emphasis on experience and entertainment. (Palmqvist & Beckman). Research shows primarily that the visitor has become increasingly engaged in the museum process and in the interpretation of exhibitions (Jooper-Greenhill 2000) and that the museums have a social responsibility to grant all groups in society access to the world of the museums. (Sandell 2003) Some studies also indicate that primarily the regional museums may be of importance to the self-image of the individual, and where museums constitute an arena where people may both act and be an audience in a way that is typical for the contemporary society (Fyfe & Ross 1996, Bagnall 2003, Bagnall & Savages 2004).

Research about museums and learning is conducted within a number of different *disciplines*, not only within *museum studies /museums education* or museology/ museums science. In this overview most of the studies have been conducted within pedagogics, but many are found within sociology. Other disciplines are art science, ethnology, art pedagogics, information and media science, computer science, and the didactics and psychology of the natural sciences.

Quantitative as well as qualitative *methods* have been used in the studies, often combined. An increasing number of researchers however emphasize the importance of qualitative methods, where interviews are the most common method of documentation. Also ethnographically inspired studies are common, sometimes with video recordings and conversation as the foundation of analysis. Visual ethnography, ethnography or participating observation are frequent terms. To a limited extent researchers also chose to depart from surveys or text studies. Cognitive tests constituted the foundation of the research results only in a few cases. To the extent the studies have been conducted on specific types of museums, it may be stated that art museums and science centres have been the most common fields of study. It has also been common to conduct studies at museums of cultural history. More rarely has interest been taken in museums of natural history. There are however several examples of investigations regarding museums in general, or comparing several types of museums.

Which questions have been in focus? Studies of the museums and learning touch upon a number of different questions, included in the different areas identified in the study of chapter 2. Several studies focus on the learning of children and youth, where it is asked how aesthetic experience and also the creation of knowledge may be described. Certain studies have focused on how the thematic content is created and mediated at museums. In which ways can specific subjects be experienced in the museum/ at home/ at school? It has been asked how the cultural practices of the museums are made visible in the visitor's own movies, and how these movies are used in creation of identity. The studies departing in family learning ask questions of the family purposes and goals at a visitor, and also what role a museum visit plays in the life of the family. Attention has also been given to how the interaction between parents and children promote learning and sometimes also result in areas of expert knowledge with children. Regarding adult visitors, the studies referred to in this paper mostly concern the effects of the museum visits regarding learning, but there are also examples of studies that rather speak of visitor experiences and creation of meaning than different strategies of interpretation, and how this is structured in conversation. Studies focusing on the importance and usability of museums ask questions of how museums may be more accessible to a broader audience. A central question concerns the new technology and its importance in the communication between visitors. In relation to this, it is also asked how technology has affected

communication within the institutions. Here are also examples of studies investigating how theories on learning may constitute the foundation of the development of artefacts for interaction in a museum setting.

What are the results? The studies reviewed above have shown results spanning over several different areas. Research demonstrates that visitor's experiences and learning in museums is affected by their identity and preunderstanding; visitors who have knowledge of the exhibitions topic or framework tend to interact more with the content and with other people in their surroundings (Fienberg & Leinhardt 2002, Crowley & Jacobs 2002, Crowley & Callanan 1998). The social role of learning has also been emphasized; where for example the parents or museum-teachers play an important role for the experience and learning of children. (Weltzl-Fairchild 1995). Thus visitors in different groups (families, school classes etc) construct the common thematic content of the museums. Participation in different museum-related activities contributes to the shaping of families as well as teenagers identity and self-realization (Fors 2004, Ellenbogen 2003). Research has also shown that museums may constitute arenas of performance (Bagnall 2003, Longurst, Bagnall & Savage 2004, Fyfe & Ross 1996). There are finally studies showing that the exhibitions and demonstrations of museums are far from the school's ruling document for subjects of teaching, and also far from the content of university subjects. The results point to the need of museums to increase visitors' influences and activity according to the newer research results. Regarding the new technology and its impact, new communication strategies for the museums and increased cooperation between professions, along with greater focus on visitors/users have been demonstraed. Studies have also shown that technology to a greater extent makes interaction between visitors possible and that it stimulates high level thoughts and problem solving on in a new way (Pierroux 1998, Young, Huang & Jang 2000, vom Lehn, Heath & Hindmarsch 2002, Milekic 2002, 2003)

What theoretical perspectives have guided the research? The shift of perspectives described by several people in other surveys may be noted also in this material. A major part of the researchers claim to depart from a sociocultural perspective, emphasizing visitor activity and highlighting artefacts and languages as mediating tools in the process of creating meaning. The visitors' learning is discussed in terms of mastery and appropriation and focus is placed on construction of identity (Pierroux 2004, Fors 2004, Crowley & Callanan 1998, Ellenbogen 2003, among others) Within this perspective an activity-theoretical approach becomes evident, where actions and activities are highlighted as fundamental for learning (vom Lehn, Heath & Hindmarsch 2002) Several studies also have an constructivist approach referring to Piaget and cognitive development levels. Here, the learning of the individual is in focus, and it is spoken of user activity and control (Nordbotten 2004, Weltzl-Fairschild 1995, Anderson 1999 among others) Several of the sociologically directed studies depart from a critical theory, proven by the interest for contemporary consumption society, literacy and questions of power (Bagnall 2003, Fyfe & Ross 1996, Linko 2003 among others) More rarely there are references to the testing of cognitive skills, (Allard & Larouche 1998) and only to a limited extent of hermeneutic interpretation and creation of meaning through preunderstanding (Hooper-Greenhill & Moussouri 2001, 2002).

4. DISCUSSION AND SUGGESTIONS FO FUTURE RESEARCH INITIATIVES

This concluding chapter contains an initial discussion of a more general question: *Are there special aspects to consider regarding learning in museums?* The overview indicates a need to define the term learning according to the existing preconditions for the museum (even though there are several examples, where it is spoken of the constructivist or the contextual learning). How may learning at the museum be characterized? In several contexts there is a perception of that the prerequisites for learning at the museums are different from the learning that takes place for educational purposes. It is stated that learning is voluntary and informal, and that this separates the subject from the institutionalized pedagogics. This is to a greater extent applicable to the visitors coming to museums on their own initiative. Michel Allard, Professor at UQAM in Canada is one of those claiming that museum pedagogics is a different kind of pedagogics than that being practiced at schools (mail contact 2004-11-24). One concept that may be of importance to the learning occurring at the museum and in other informal environments is *serendipity*. The word contains the capacity to, well prepared, find the unexpected, for example in how coincidences or even mistakes may be of importance to significant scientific discoveries. A process of serendipity often departs from an idea of the character of the results. Along the journey, previous knowledge correlates with unplanned events, which guides the person towards the solution of the problem. Discoveries or learning may be said to be a result of both previous knowledge and insight, but also through an openness to follow impulses and include the unexpected in the process. It is thus not all about luck, the one making the discoveries must be curious, attentive and well prepared to find them (Liedman 2001, Kjölberg 2003).

At the same time I would like to emphasize that there are many common features between this “voluntary “ learning and the learning that takes place in organized forms within the school. The pedagogical activity at museums directed towards schools, i.e. demonstrations and other program activities, should after all be guided by the museum teachers’ perceptions of good education. There are most likely more or less cognisant theories constituting the foundation of how to organize learning. The similarities that may be observed between the exhibitions and the construction of the *textbook* may also be emphasized. In both of them, the curators/authors are supposed to chose what is to be presented from a certain material and how to present it. When the visitor comes to the museum, a certain selection has thus already been made, and from this selection the visitor may then choose what he wants to see. The student does not have the same freedom, as he has to read all the text included in a certain chapter of a textbook (Selander 2003). In similar ways, we may reason regarding the visitor who participates in program activities at the museum: here there is often a museum-teacher who chooses the content and the way to present it. Both cases are directed towards an unknown reader/user, whose previous knowledge and interests are not known, but who through the text/exhibition is expected to become interested and develop his understanding.

One may therefore claim that the museum has features similar to the school’s way of organizing learning; the content of knowledge is structured according to a certain principle, but with the difference that the museum rarely follows up and controls the knowledge of the learner. Learning at museums could therefore be characterized as a kind of semi form moving

in the interface between the formal and the informal learning. Maria Ferlin(2004) and Ann-Marie Pendrill among others (2003) have suggested that the that the subject-related learning occurring on a more informal basis could be called *extramural learning*. Pendrill means that extramural learning contains different types of activities that can be connected to the education of natural science outside of regular institutions of education, while Ferlin speaks of extramural learning as activities of different kinds that have learning as their goal and that occur outside of the school. Activities sorted under this term are science centres, and also amusement parks where different scientific principles may be investigated and experienced. Staffan Selander (2003) points out that such environments are no more “natural” learning environments than the school, even though new forms of activity may be mentioned, and knowledge is represented in a different way. Even extramural learning environments have been arranged and adjusted to the prerequisites for learning. Furthermore, it may be added that objects found at the science centres have not been developed to solve social needs or problems, but are specifically constructed for the learning of the visitor (Walton in Fors 2004). Selander also raises the question whether the extramural learning could be applicable to activities on other subjects. Such activities could very well be the different programs offered at museum; drawing and building a model of a house in the museum of architecture, going to a children’s demonstration of the modern museum and then paint your own picture, or seeing an exhibition about the ancient times and then try to dig out a reconstructed grave.

Suggesting a few areas that would be crucial to develop further hereby concludes the overview.

1. *The identity and limitations of the museum.* Museums today have a whole new social role, where special emphasis is placed on the educational mission and access. How are the museums today defined and how are the limits drawn; according to the exhibits, the ideas or the location? Added to this are the museums view on their visitors and their will to cooperate with other social institutions. Which is their role in relation to the universities? Which role may the museums have in society regarding information and education? One museum that may function as a point of departure to such a discussion is the web-based *Science Museum* online in Taiwan. *Tsing-Hua Science* museum does not have a physical room available, but is completely virtually based, which makes the museum relatively unique in its kind. The operation and management of the museum is expected to be very different from the traditional way of working with physical museums (Young, Huang & Jang 2000). Since the definitions of what a museum is are so diverse, there are consequences for how to study learning.
2. *Museums as collective memory.* Several new museums (such as the Apartheid museum in Johannesburg or the Jewish museum in Berlin) are examples of the will to create places of reconciliation and meeting around mutual memories. The museum is, on the side of mass media, also a forum for contemporary debate, which we have seen in the development of the historical museum in Stockholm, with the ambition to highlight vital questions and also take an active stand. The new role of the museum seems to mean the creation of a forum for public grief, which may be noted in the handling of memories from the Estonia disaster. Here there is also a political trace, where the museum treats contemporary issues. It would be essential to conduct a study reflecting upon what this memory consists of, and how it is created and presented in a museum setting. How do individuals and groups use it? James Wertsch treats the question of collective remembering from a sociocultural perspective (2002). In his definition of *collective remembrance*, or memory, he lifts three aspects of the concept. The first is that this remembrance is something active, it is mediated in action, through texts. The

term could in a wider sense include learning material, media or other narratives that present a version of events in the past. These narratives thus mediate between the event and the world's understanding of it. The other aspect presented is that the process is something social, that the mediating texts belong to a social context and history. The third point made by Wertsch is that the collective memory is dynamic and variable. The narrative texts offered by society are draft material and organized according to individual visions of the past. They are cultural tools and in the meeting with the acting subject they form the collective memory that often excludes other optional interpretations. In that way the language is "transparent", since individuals and groups look through texts and experience its content as a truth. The relatively newly opened constitution museum in Philadelphia is an example of how the *social memory* works. Here democracy is presented as an entirely American conquest, without regard to other historical references.

3. *Development of methods for studies of learning in museums.* Early studies of learning at museums originated to a great extent from an experimental investigation design, which for example measured the knowledge of visitors before and after a visit. The studies were however limited in several ways; it was difficult to confirm the results through control groups and since the methods were strongly controlled and one had to decide what variables to test beforehand, it meant that unexpected results were missed. Lately more qualitative research methods have been developed, adjusted to the museum environment. Such studies contain observations of the learning, interviews and analysis of artefacts (drawings, photos etc.) that the learners have produced in connection to the visit. (Rennie, Feher, Dierking & Falk 2003). Several areas are however still relatively untried. Video documentation for example seems as a method that could be developed further in the museum setting, with particular interest for the visitors' interaction and creation of meaning.
4. *Study of communication in exhibitions.* The missions and assignments of the museums have changed over time. It may be asked how the goal-orientation has affected the intention of the museum, and how free admission affects the museums and their visitors? The new critical museology has also changed the museums in a way that most likely benefits the visitors. How can the museums develop opportunities to variation for the visitors, so that the exhibition may provide something to several target groups? A study of communication at the museum may for example lift the multimodality of the exhibition through focus on different resources containing meaning. Also hermeneutic interpretation may contribute with perspectives on the meeting between exhibitions and visitor, regarding the visitor's creation of meaning. One reference is found in Bengt Lundberg and Per-Uno Ågren, who study the *intention* behind four Swedish exhibitions and how they are perceived by the audience; i.e. *intention*; the factors affecting the visualizing of the images of history illustrated in the exhibitions and *reception*; the statements and behaviours used by visitors to express their understanding. The authors state among other things that the visitors do not at all perceive the exhibition according to the intention of the creator. (Lundberg & Ågren 1999)

5. *Metastudy of the view on learning in studies of museums and learning.* Which theories on learning are the foundation of international studies of museums and learning? In order to create a foundation for continued research on the subject, it would be of vital importance to expand this overview. Non-English literature should be reviewed as well, in order to produce a more extensive picture of the research. An example of such research is studies made by researchers from French, German and Spanish-speaking countries. An even wider approach could include the development of a theoretical model for the learning that occurs at the museum.

5. REFERENCES

- Abercombie, N. & Longhurst, B. (1998) *Audiences*. London: Sage.
- Adams, M., Falk, J. & Dierking, L. (2003) "Things change. Museums, Learning and Research". I: (Eds.) Xanthoudaki, M, Tickle, L & Sekules, V, *Researching Visual Arts Education in Museums and Galleries. An International Reader*. Dordrecht, Kluwer Academic Publishers.
- Allard, M. & Larouche, M-C. (1998) *Experimental modelling of museum education in a context of cultural diversity*. ICOM/CECA Conference 1998, Melbourne, Australia.
- Alzén, A. & Hillström, M. (red.)(1999) *Kulturarvet, museerna och forskningen*. Rapport från en konferens 13-14 november 1997. Riksbankens jubileumsfond. Hedemora:Gidlund.
- Anderson, D. (1999) The development of science concepts emergent from science museum and post-visit activity experiences: Students' construction of knowledge. Unpublished doctoral dissertation., Queensland University of Technology, Brisbane, Australia.
- Andersson, J. & Aronsson, P. (2004) *10 000 år – på 90 minuter. Pedagogisk verksamhet i forntidens utställning*. Tema Q, Linköpings Universitet (otryckt).
- Bagnall, G. (2003) "Performance and performativity at heritage sites". I: *Museum and society*, 1(2) 87-103.
- Borun, M., Chambers, M.B., Cleghorn, A. (1996) "Families are learning in science museums". I: *Curator*, 39(2), 124-138.
- Borun, M., Chambers, M.B., Dritsas, J. & Johnson, J.I. (1997) "Enhancing family learning through exhibits". I: *Curator*, 40(4), 279-295.
- Castle, C. (2002) "Teaching History in Museums". *Ontario History*/Vol XCIV, Number 1/Spring 2002.
- Cox-Petersen, A., Marsch, D., Kisiel, J. Melber, L. (2003) Investigation of Guided School Tours, Student Learning and Science Reform Recommendations at a Museum of Natural History. *Journal of Research in Science Teaching* 2:200-218.
- Crowley, K. & Callanan, M.A. (1998) Identifying and supporting shared scientific reasoning in parent-child interactions. *Journal of Museum Education* 23; 12-17.
- Crowley, K. & Jacobs (2002) "Building Islands of Expertise in Everyday Family Activity" I: Leinhardt, G., Crowley, K., & Knutson, K. (eds.)(2002) *Learning Conversations in Museums*. Mahwah, NJ, London: Lawrence Erlbaum Associates, Publishers.
- Dierking, L., Ellenbogen, K. & Falk, J. (2004) *In Principle, In Practice: Perspectives on a Decade of Museum Learning Research (1994-2004)*. I: *Science Education*, July 2004, vol 88, Suppl 1.
- Dysthe, O. (red.) (2003) *Dialog, samspel och lärande*. Oslo: Abstrakt forlag as.

Ellenbogen, K. (2003) *From Dioramas to the Dinner Table: An Ethnographic Case Study of The Role of Science Museums in Family Life*. Dissertation, Graduate School of Vanderbilt University.

Engeström, Y. (1987) *Learning by expanding*. Helsingfors: Orienta Konsultit Oy.

Falk, J. & Dierking, L. (2000) *Learning from Museums*. Visitor Experiences and the making of Meaning. Walnut Creek, CA.: AltaMira Press.

Fienberg, J. & Leinhardt, G. (2002) "Looking Through the Glass: Reflections of Identity in Conversations at a History Museum." I: Leinhardt, G., Crowley, K., & Knutson, K. (eds.)(2002) *Learning Conversations in Museums*. Mahwah, NJ, London: Lawrence Erlbaum Associates, Publishers.

Fors, V. (2004) *Science centre exhibits – from a teenager's point of view*. Paper for TERC 2004, The 3rd Biennial Interantional Conference on Technology Education Research, Gold Coast, Australia 9-11 December 2004.

Frøyland, M. (2003) "Multipla erfaringer i multiple settinger – MEMUS, et teoretisk rammeverk om museumsformidling". I: *Nordisk Museologi* 2/2003.

Fyfe, G. & Ross, M. (1996) "Decoding the visitor's gaze: rethinking museum visiting", i: *Theorizing Museums. Representing Identity and Diversity in a Changing world*. Macdonald, S & Fyfe, G (Eds.). London: Blackwell publishing.

Fyfe, G. & Macdonald, S. (ed.) *Theorizing museums. Representing identity and diversity in a changing world*. Oxford: Blackwell publishers.

Geijer, L. (2003) *Samtal för samverkan. En studie av transprofessionell kommunikation och kompetensutveckling om läs- och skrivsvårigheter/dyslexi*. Stockholm: HLS Förlag.

Gottlieb, H. & Henningsson, P. (2004) *Digitala medier för besökare på museer*. Dramatiska Institutet. Skriftserie nr 1/2004.

Gustavsson, A. (1985) *Samhällsideal och föräldraansvar. En explorativ studie av vad det innebär att ha ett förståndshandikappat barn*. Diss. Stockholms Universitet.

Gustavsson, B. (1992) *Folkbildningens idéhistoria*. Borgholm: Bildningsförlaget.

Gustavsson, B. (2000) *Kunskapsfilosofi. Tre kunskapsformer i historisk belysning*. Stockholm: Wahlström & Widstrand.

Haanstra, F. (2003) "Visitors' Learning Experiences in Dutch Museums" i: Xanthoudaki, M, Tickle, L & Sekules, V (2003) *Researching Visual Arts Education in Museums and Galleries. An international Reader*. Dordrecht: Kluwer Academic Publishers.

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

Hooper-Greenhill, E. (ed.) (1995) *Museum, Media, Message*. London:Routledge.

- Hooper-Greenhill, E. (ed.) (1999) *The educational role of the museum*. London: Routledge, second edition.
- Hooper-Greenhill, E. (2000) *Museums and the Interpretation of Visual Culture*. London: Routledge.
- Hooper-Greenhill, E. & Moussouri, T., Hawthorne, E. & Riley, R. (2001) Making Meaning in Art Museums 1. Visitors' Interpretive Strategies at Wolverhampton Art Gallery. RCMG.
- Hooper-Greenhill, E. & Moussouri, T. (2001) Making Meaning in Museums and Galleries. Visitors' Interpretive Strategies at Wolverhampton Art Gallery. RCMG.
- Hooper-Greenhill, E. & Moussouri, T. (2002) *Researching learning in Museums and Galleries 1990-1999: A Bibliographic Review*. <http://www.le.ac.uk/museumstudies/rcmg>.
- Illeris, H. (2004) Konstpædagogisk forskning og formidling i Norden 1995-2004. Rapport udarbejdet for Nordisk Akvarellmuseum i forbindelse med projektet Konstpædagogik i Norden. Nordiska Akvarellmuseet.
- Kim, L. & Olstedt, E. (2003) *Forskning om lärande i högre utbildning*. En översikt. Swedish Institute for Studies in Education and Research (SISTER), Vetenskapsrådet.
- Kjölberg, J. (2003) "Serendipity in Technology and Education". I: *Technology as a challenge for schools curricula*. Stockholm Library of Curriculum Studies, vol 11. Stockholm: HLS förlag.
- Knutson, K. (2002) "Creating a Space for Learning: Curators, Educators and the Implied Audience. I: Leinhardt, G., Crowley, K., & Knutson, K. (eds.)(2002) *Learning Conversations in Museums*. Mahwah, NJ, London: Lawrence Erlbaum Associates, Publishers.
- Kress, G. (2003) *Literacy in the new media age*. London: Routledge.
- Kress, G., Jewitt, C., Ogborn, J. & Tsatsarelis, C. (2001) *Multimodal Teaching and Learning. The Rhetorics of the Science Classroom*. London, New York: Continuum.
- Lave, J. & Wenger, E. (1991) *Situated Learning: Legitimate Peripheral Participation*. Cambridge, UK: Cambridge University Press.
- Leinhardt, G., Crowley, K., & Knutson, K. (eds.)(2002) *Learning Conversations in Museums*. Mahwah, NJ, London: Lawrence Erlbaum Associates, Publishers.
- Leinhardt, G., Knutson, K. & Crowley, K. (2003) *Museum learning collaborative redux*. Journal of Museum Education, 28(1), s. 23-31.
- Liedman, S-E. (2001) *Ett oändligt äventyr. Om människans kunskaper*. Falun: Albert Bonniers förslag.
- Linko, M. (2003) "The Longing for Authentic Experiences. The subjective Meaning of Visual Art for Museum Audience and Amateur Artists." I: Xanthoudaki, M, Tickle, L & Sekules, V

(2003) *Researching Visual Arts Education in Museums and Galleries. An international Reader*. Dordrecht: Kluwer Academic Publishers.

Ljung, B. (2004) *Museipedagogik i Sverige- Pedagogiska perspektiv*. Lic-uppsats. Lärarhögskolan i Stockholm.

Longhurst, B., Bagnall, G. & Savage, M. (2004) "Audiences, museums and the English middle class", I: *Museum and Society*, Jul 2004. 2 (2) 104-124.

Lundberg, B. & Ågren, P-U. (1999) *Historiebilder. Om intention och reception i museer*. Museologi, Inst. För kultur och medier, Umeå universitet, Västerbottens museum.

Moussouri, T. (1997) *Family agendas and family learning in hands-on museums*. Unpublished dissertation. University of Leicester, England.

Marton, F. & Booth, S. (1997) *Learning and awareness*. Mahwah, N.J.: Erlbaum Associates.

Milekic, S. (2000) "Designing digital environments for Art Education/Exploration". I. *Journal of American Society for Information Science*, 51(1);49-56, 2000.

Milekic, S. (2000) *Designing Digital Environments for Art Education/Exploration*. Journal of American Society for Information Science, 51 (1) 49-56 2000.

Milekic, S. (2003) "The More You Look the More You Get: Intention-based Interface using Gaze-tracking". I: *Museums & Web '03: Selected papers' proceedings from an international conference*.

Nordbotten, J.C. (2004). "From Information Dissemination to Informationgathering. Using virtual exhibits and content databases in e-learning centers. Skall publiceras i: Subramaniam, R. (red) *E-learning and Virtual Science Centers*.

Palmqvist, L. & Beckman, S. (red.) (2003) *Museer och Framtidstro*. Smedjebacken: Carlssons Bokförlag.

Palmqvist, L. & Bohman, S. (red.) (2003) rev.uppl. *Museer och kulturarv*. Bjärnum: Carlssons Bokförlag.

Pedagogisk uppslagsbok. Från a till ö utan pekpinna. (1996) Värnamo: Lärarförbundets förlag, Informationsförlaget

Pendrill, A-M., Andersson, R., Bagge, S., Dimenäs, J., Sjöholm, E. (2002) *Extramuralt lärande – med Liseberg som observatorium*. Bidrag till NoT seminarier 2001-2002 för lärarutbildare inom NO.

Pierroux, P. (1998) *Art in networks. Information and communication technology in art museums*. The department of art history. University of Oslo.

Pierroux, P. (2004) *Communicationg Art in Museums*. Journal of Museum Education, vol. 28, no 1, s. 3-7.

- Rennie, L. & Williams, G. (2002) Science centres and scientific literacy: Promoting a relationship with science. *Science education*, 86, 706-726.
- Rennie, L., Feher, E., Dierking, L. & Falk, J. (2003) *Toward an Agenda for Advancing Research on Science Learning in Out-of-School Settings*. *Journal of Research in Science Teaching*, 2: 112-120.
- Reussner, E.M. (2003) *Audience Research in the Australian Cultural Heritage Sector*. Museums Australia. Evaluation and Visitor Research Special Interest Group (EVRSIG). <http://amol.org.au/evrsig/>
- Roberts, L. C. (1997) *From Knowledge to Narrative. Educators and the Changing Museum*. Washington, London: Smithsonian Institution Press.
- Rosander, G. (1994) ”Från datafångst till forskning.” I: *Minne och bildning. Museernas uppdrag och organisation*. Bilagedel SOU 1994:51.
- Rosengren, K-E. & Öhngren, B. (ed.) (1997), *An Evaluation of Swedish Research in Education*. Uppsala, HSFR.
- Sandell, R. (2003) Social inclusion, the museum and the dynamics of sectoral change. *Museum and society* 1(1): 45-62.
- Seagal, S. & Horne, D. (1997) *Boken om human dynamics. Ett nytt redskap för att förstå människor och ta till vara utvecklingspotentialen i våra organisationer*. Stockholm: Runa förlag.
- Selander, S. (2003) ”Pedagogiska texter och andra artefakter för kunskap och kommunikation. En översikt över läromedel – perspektiv och forskning.” I: *Läromedel – specifikt*. SOU 2003:15.
- Selander, S & Ödman, P-J. (red.) (2005) *Text & Existens. Hermeneutik möter samhällsvetenskap*. Göteborg: Daidalos.
- Solhjell, D. (2001) *Formidler of formidlet. En teori om konstformidlingens praxis*. Oslo: Universitetsforlaget.
- Stevens, R., Cherry, G. & Fournier, J. (2002) *Video Traces: Rich media Annotations for Teaching and Learning*. Paper at Computer supported Collaborative learning 2002 Conference in Boulder, CO, January 2002.
- Säljö. R. (2000) *Lärande i praktiken. Ett sociokultutrelt perspektiv*. Stockholm: Prisma.
- Säljö, R. (2003) ”Föreställningar om lärande och tidsandan”, I: (red.) Selander, S: *Kobran, nallen och majjen. Tradition och förnyelse i svensk skola och skolforskning*. Kalmar; Liber.
- Young, S., Huang, Y. & Jang, J. (2000) *Pioneering a web-based science museum in Taiwan: Design and implementation of Lifelong Distance Learning of Science Education*. *Educational technology, Research and development*: vol. 48, Iss 1; s 112.

Vom Lehn, D., Heath, C. & Hindmarsh, J. (2002) *Video based field studies in museums and galleries*. Visitor Studies Today! Fall/Winter 2002: pp.15-23.

Vygotsky, L. (1978) *Mind in Society. The development of Higher Psychological Processes*. London: Harvard University Press.

Weltzl-Fairchild, A. (1995) "The museum as medium in the aesthetic response of schoolchildren". I: Hooper-Greenhill, E (ed.) (1995) *Museum, Media, Message*. London:Routledge.

Wertsch, J. (1998) *Mind as action*. New York; Oxford Univ. Press.

Wertsch, J. (2002) *Voices of Collective Remembering*. Cambridge University Press.

Xanthoudaki, M., Tickle, L. & Sekules, V. (2003) *Researching Visual Arts Education in Museums and Galleries. An international Reader*. Dordrecht: Kluwer Academic Publishers.

Ödman, P-J. (1997) *Kontrasternas spel – en svensk mentalitets- och pedagogikhistoria*. Stockholm: Nordstedts.

www.umu.se/kultmed/utbildning/museologi/index.html 050223

http://www.isak.liu.se/tema_q/startside 041117

<http://www.nordiskamuseet.se/publication> 050124

www.le.ac.uk/museumsstudies/rcmg/rcmg.htm 050223

www.klc.ac.uk/depsta/pse/mancen/witrg/ 050223

<http://lesley.edu/perg.htm> 041117

www.ilinet.org

<http://www.unites.uqam.ca> 041117

<http://amol.org.au/evrsig> 050203