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Do Not Take From This Room

**HOW MUSEUM EDUCATORS BUILD AND CARRY OUT THEIR
PROFESSION: AN EXAMINATION OF SITUATED LEARNING WITHIN
PRACTICE**

A DISSERTATION

submitted by

ELSA B. BAILEY

In partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

Lesley University
May 19
2003

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ABSTRACT

This study explores the ways and means that museum educators build their expertise to practice museum education. A qualitative methodology was utilized in this examination, incorporating aspects of grounded theory and phenomenological research. Fifteen museum educators in science-related museums in the Commonwealth of Massachusetts, who work extensively with teachers, were selected as respondents. Two one-hour individual interviews were conducted with each museum educator. The interviews were transcribed and analyzed to determine how these museum teacher educators perceive their professional role, and what things they associate with their professional growth. Findings from this study show evidence that museum educators build their expertise to a great extent within the context of their practice. According to this study, critical elements contributing to this situated learning process are: self-direction in learning; high motivation to participate in and learn museum work; job-embedded experiential professional learning; apprenticeship, mentoring, and peer learning opportunities; a community and culture that values and supports the social, contextual, and collegial aspects of learning; organizational structures and leadership that support professional growth and are attuned to its experiential and sociocultural aspects; an interrelated network of communities of practice that provide support for and access to resources.

Preface: Acknowledgments

Museums have always been joyful places for me. They have shaped my passions, spurred my curiosity, and inspired modifications in my career path. I have always been drawn to education, and museums provide an ideal and creative setting to practice the art of education.

I credit my wonderful parents for my love of museums, education, arts, and ideas. Both committed educators themselves, they introduced me to the rich resources our world has to offer, thus nurturing my interests. They were wise in the ways that children learn, and applied their knowledge to facilitate my own development. I still vividly recall how at the age of ten I was guided through the Louvre with the cleverly devised challenge of searching for images of animals and children. I was totally engaged and eager for more such experiences. So, thank you dear parents for giving me the key to all the world's wonders.

Initially, I became an educator in schools. I find it curious that with all my initial exposure to museums, I did not initially pursue a career in the museum world. I attribute this to a lack of awareness of the range of professional opportunities it offered. But when at mid-career I discovered museum education work, that seed planted years before finally took root. I became increasingly drawn into the profession. In my seventh year of museum education work, I determined to get a credential that would in my own eyes legitimize my museum career. I decided to pursue doctoral studies focusing on how museums support teachers in schools.

The work that museums do with schools is only first being investigated through research. The doctoral program at Lesley permitted me to venture in new directions for museum studies.

I would like to thank a number of people for helping me to reach my goal. First and foremost are the three extraordinary members of my committee:

Dr. George E. Hein is a brilliant educator, scientist, museum expert, and a man who combines his content expertise with unique insight and understanding of what it means to be human. His skills as a teacher, evaluator, and guide are superb, and I am continually grateful to have Dr. Hein as my senior advisor and mentor.

Dr. Joseph Petner is a consummate educator who has great knowledge and sensitivity about teaching and learning. These gifts are evidenced in the classes he teaches and the public elementary school he leads. I have benefited considerably by his skill in zeroing in on the heart and soul of the matter. Additionally, I am most thankful for the warmth Dr. Petner has brought to my doctoral experience.

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These three men have been wise and insightful facilitators who have always supported, enriched, and sustained me through my doctoral studies.

Additional supporters include the extraordinary cohorts at Lesley, some very fine professors who have inspired and spurred me on with special mention to Frank Davis and Bridget McCallum. Jo Ann Gammel, Administrator of the Ph.D. Program in Educational Studies, has facilitated my doctoral experience at every turn, and I thank her for always being there for me.

I would also like to thank my darling daughter, Nicole, for her unswerving faith and support as her mother took "the road not taken." Additional thanks to her, along with her dear husband Marc, for twice gifting me with the great joy of grandmotherhood as I traveled down this doctoral path.

My mother continues to be one of my main inspirations, models, and cheerleader through this scholarly challenge. I am exceedingly grateful to her for her constant expressions of pride and confidence in my ability to achieve my goal.

And last but not least, I wish to extend thanks to Sue Cohen and my colleagues at the Lesley Program Evaluation and Research Group (PERG), who have supported my doctoral work while helping to enhance my professional skills in program and exhibit evaluation. My evaluation experience has powerfully augmented my abilities as an educator.

HOW MUSEUM EDUCATORS BUILD AND CARRY OUT THEIR PROFESSION: AN EXAMINATION OF SITUATED LEARNING WITHIN PRACTICE

A DISSERTATION

Submitted by ELSA B. BAILEY

**In partial fulfillment of the requirements for the degree of Doctor of
Philosophy**

**LESLEY UNIVERSITY
MAY 19, 2003**

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Section One – The Study’s Purpose and Methodology

PURPOSE OF THE RESEARCH

Although there is extensive evidence in the literature of research on professional development of teachers in the formal education community, there is much less research examining the professional growth of educators in the museum community in general, and science museum teacher educators in particular (Bailey, 2001a, 2002). My conversations with members of the museum education profession over the years have made me aware of the eclectic experience and variety of pathways these individuals have traveled in their journeys toward becoming museum educators.

I have wondered how science museum educators, and teacher educators in particular, learn to do the work they do without a standard path toward the practice of museum education. In reflecting on my own experience of learning to become a teacher educator in a science museum, I was struck by the experiential nature of the way I learned to do my job. I was curious if this was a unique situation, or if it was similar to what others in my position had experienced. For example, a considerable part of my work as a teacher educator involved collaborating with the formal education community. I felt I was working in familiar territory on those occasions, as I had been a teacher in schools and had some prior experiential understanding of the culture of schools. However, I had less experience in the culture of museums, the culture of science, and working with adult learners, and therefore felt less comfortable with these areas. Thus, I was motivated to spend considerable time and effort in learning about these things during my tenure as a museum educator, along with the need to keep up with the constant changes in the fields of both informal and formal education.

In reflecting on my efforts, for the most part I was not able to identify a systematic process to my learning. It appeared to me to have come in bits and pieces, in haphazard fashion, and sometimes seemingly through serendipitous and/or propitious circumstance. I wondered if this learning process was unique, or whether it was one that others shared. Also, I wondered if the people in my role who had more formal science background, but less experience with schools, were going through a parallel process.

I believed that embarking on this research effort, aside from satisfying my own curiosity about the professional learning process, could contribute to a fieldwide awareness of how museum educators build their expertise. I hope that such an understanding will:

- Inform organizational thinking in museums

- Facilitate the design of staff professional development activities in museums
- Guide museum educators in their personal quest for professional growth
- Assist support organizations for museums in planning their professional development programs
- Offer those who collaborate with museums deeper insight into the museum culture.

Although my primary focus in this research was to learn more about on-the-job professional development in museums, I hope that this study may be relevant to others interested in looking at how people build their understanding of their work within the context of their jobs. The literature that looks at understanding practice, cognition and communication in work settings, and situated learning (Chaiklin & Lave, 1993; Engestrom & Middleton, 1998; Lave & Wenger, 1991) has informed my own research looking at learning within the practice of museum education.

Finally, another purpose for this study was to draw some connections between the professional development of museum teacher educators and the professional development of teachers in schools. This goal has a dual rationale. First, is to draw on the extensive research literature on professional development of teachers to inform professional development of museum educators. Consideration of the research and theory surrounding teacher professional development permits an examination and comparison of how educators learn in these two different communities. Second, because the group of museum educators interviewed are all teacher educators, many are familiar with the current theories concerning professional development for teachers. Therefore, this knowledge and exposure to ideas surrounding teacher professional development may be linked to and affect their own professional learning process.

THE PILOT STUDY

INTRODUCTION

A pilot study was conducted in the spring of 2000. The pilot study respondents were selected from a pool of national colleagues, but I had never worked with any of them, and one was a new acquaintance. These colleagues had all been in the field for at least ten years, worked in informal science institutions, and worked intensely with teachers for at least five years. Four respondents were women, and one was a man. They came from across the United States – the West, the Midwest, and the East Coast.

METHODOLOGY USED IN PILOT STUDY

Interview arrangements were made either face-to-face or via telephone. A protocol was developed and e-mailed to the pilot study respondents at least two weeks before the actual interview. Two interviews were conducted face-to-face and three via telephone. All interviews were audiotaped on two tape recorders. I personally transcribed, word for word, each of the taped interviews.

The interview data was analyzed to determine the categories that emerged from museum educators' reflections on how they learn to do their professional work. The goal of this analysis process was to identify appropriate and inappropriate questions and methods; to consider issues related to the reliability and validity of the study; to permit this researcher to gain interview experience for this research interest; and to become aware of unanticipated outcomes that might inform the design of the dissertation study.

FINDINGS FROM PILOT STUDY

Eleven categories, some with subcategories, were identified from the pilot interviews:

1. Formal education
 - 1.1 Formal degrees
 - 1.2 Embellishment around formal schooling history
2. Personal life events linked to their "story"
3. Attitudinal factors
 - 3.1 Influences
 - 3.2 Driving forces
 - 3.3 Belief systems
 - 3.4 Self Image
4. Job history
 - 4.1 Jobs held prior to museum work
 - 4.2 Events, activities, and influences leading toward museum work
5. Significant events that presented themselves affecting their professional work
6. Activities at museum
 - 6.1 General activities

6.2 Activities specifically involving teachers and schools

7. Institutional factors, beliefs, conditions
8. Learning and conditions contributing to learning on the job and developing as a professional
 - 8.1 General, informal, and situated learning
 - 8.2 Structured, formalized professional development activities
9. Relationships (often professionally linked) with individuals, groups, and organizations
10. Forces from the field and beyond the field
11. What keeps them at the museum (Bailey, 2001b).

Consistent with the methodology of grounded theory, throughout the pilot study data collection phase and the subsequent analysis, theories in connection with what I was observing began to emerge. Initially, I had hypothesized that teacher educator professional growth was primarily a result of collaboration with the formal school community; but as the pilot study evolved, I became increasingly conscious of the social and contextual nature of the professional growth that my pilot respondents shared. I began to read further in the literature to find other research and theories that appeared to relate to what I was observing (Chaiklin & Lave, 1993; Kolb, 1984; Lave & Wenger, 1991; Merriam & Cafferella, 1999). I found research and theory concerning concepts of: *experiential learning*; *adult learning*; *situated learning*, *communities of practice*, and related ideas of sociocultural influence to be consistent with what I noted about how museum teacher educators build their professional expertise in a job-embedded context. Collaboration with teachers is just one of the influences upon museum teacher educators' professional growth (Bailey, 2001b).

Findings from the pilot study appeared to indicate that museum teacher educators (and many others as well) seek out communities of practice to support their work. They gather the resources they need – people, ideas, literature, and experiences – as their work requires. Different individuals go about this in different ways, depending on their personal style, the situations they choose, or those situations in which they find themselves. Some institutions' organizational structures may support this gathering process more than others' structures.

THE RESEARCH STUDY

METHODOLOGY USED

The methodology utilized for the dissertation incorporated aspects of two qualitative research traditions: grounded theory and phenomenological. Following phenomenological traditions, respondents were selected who fit the criteria that matched the phenomenon being examined. Following grounded theory practices, respondent interview data was gathered in the field over a period of time. Data analysis was initiated after the first few interviews, and, although the protocols used remained the same, conjectures that were emerging through data analysis informed subsequent interviews. For example, questions that were raised by data were examined in subsequent interviews, and new ideas were pursued through the interviews that followed.

Respondent Selection

The question investigated was: How do science museum teacher educators build their professional expertise within the context of their practice? Thus, the respondent selection criteria included:

- The respondent works professionally in the role of museum educator
- A regular part of the respondent's role is to do extensive work with the formal education community, particularly teachers
- The respondents have done this kind of work for at least five years.

Respondents were all within one state, the Commonwealth of Massachusetts, to have a relative consistency among factors such as certification requirements, formal school curriculum framework content, policies, and issues.

In order to identify potential interview candidates, a survey of available institutions was conducted, and leaders working with such professionals were asked to identify people from their experience that matched the respondent criteria. Additionally, this researcher attended a regional conference (in two successive years) for informal science educators in order to access the widest pool of candidates possible from around the Commonwealth. At these conferences, potential respondents were identified through conversations and referrals. The final fifteen respondents did indeed match the criteria and were as representative as possible. The respondent group included men and women; a wide range of science institution types; a range of years of experience beyond the required five years; and a geographic spread of institutional affiliation across the Commonwealth.

All but three of the respondents work in private nonprofit institutions. Of the three respondents not currently working in nonprofit institutions, two are in a university connected museum, and the other is in a state government museum. This distribution roughly matches the nation's distribution of museum educators (Piasecki, 2002).

Table 1: Comparison of sample to national distribution of museum educators

	Sample	National
Nonprofit	80%	65%
University	13%	10.4%
Government	7%	23.6%

The museum educators interviewed have a range of formal education backgrounds. Eight respondents out of the fifteen reported majoring in science in college and/or graduate school, all in life sciences with specializations in areas such as biology, biochemistry, vertebrate and invertebrate zoology, botany, and anthropology. The other seven respondents had majors in fields of general education, visual arts, performing arts, English, and social science. A number of those interviewed hold master's degrees, and a few hold doctoral degrees or are doctoral candidates. No one interviewed had a museum studies or museum education degree.

To respect respondents' confidentiality, all are identified by three-letter pseudonyms. This system permits the reader to associate the respondent information and quotes with a consistent personality.

Data Collection Process

Using the findings from the pilot study to guide and inform, a new protocol for the dissertation interviews was developed. A few weeks before the interview, each respondent received a copy of this protocol, the research release form, and a cover letter explaining the interview process and procedures. Interview appointments and arrangements were organized via telephone and e-mail. Each of the respondents was interviewed twice over a period of about five months. The first interview was conducted in the field at the institution where the respondent worked. Each interview was recorded on two voice recorders. Most interviews were ninety minutes in length. The tape of each interview was transcribed word for word by an outside professional transcriber. All respondents were sent a copy of the transcribed interview and asked to read it for accuracy and to reflect upon its contents. A second interview was scheduled and conducted via telephone. This interview was also voice recorded and data was

simultaneously collected through computer-keyed notes taken as the respondent spoke. These notes were augmented immediately after the interview was concluded, and the tape recordings were used to clarify and enhance the notes taken during the interview.

Analysis Process

The transcribed interviews were reviewed in a multistep process that involved both reading and listening to the tapes. Notes were taken summarizing the data, both in the margins of the transcribed documents and on additional paper. Each tape was replayed a number of times, and each of the transcriptions was read over at least three times. Coding or categorizing of the data was initiated after this summary process and was done directly from the raw data.

As in any attempt to understand aspects of human behavior, the examination of the learning process is a complex activity. If one is to accept theories of continuity of experience and the sociocultural nature of learning, then it is truly artificial to examine the learning process in any other way but to look at it in terms of the whole experience. However, for the purposes of analysis of the phenomenon of learning within practice, it is useful to sort respondent discussion into categories through which this phenomenon can be viewed (Dewey, 1938 /1998; Rogoff, 1997; Vygotsky, 1978).

The categories emerged with differences in properties and character. Some were more global in nature, some less so. For example, as data were analyzed, respondents' discussion about different areas of their experience seemed to capture examples of the general nature of what drives their learning. Thus, although the topics discussed cover a broad range, it seemed logical to look at them through the "lens" of motivation to learn. Coding this kind of data led to the identification of a category, "Motivation to Learn." Another similarly global category was "Learning About One's Audience." At the other end of the spectrum were categories that were more focused and specific in terms of respondent discussion. Some of the categories coded by using a more specific focus are "Learning Through Reading and Other Media Resources" and "Learning Through Trial and Error." The nature of other categories falls somewhere in between global and focused. During the analysis process, data was often coded across a number of categories. In presenting specific findings, quotes were selected to illustrate particular categories, but these quotes could, in many cases, easily serve to illustrate other categories. The organization and presentation in the chapter "Findings" reflects these categories of analysis.

It is important to note that these categories are not discrete and distinct. Each category overlaps and interweaves with many of the others. Separating them blurs the complete picture, yet looking at the various components provides a particular perspective from which to view the whole. Although the totality of the phenomenon of learning within practice is a highly interdisciplinary and interrelated activity, viewing it through these categories offers a variety of lenses through which to examine the learning process.

Categories were generated through data. One of the guiding premises for category identification was the intensity and character of its presentation in data. The study design is intended to represent the learning process through the voices of those who lived it. The way respondents shape their discussion provides some evidence toward the organization of respondent thinking. Thus, this organization has been taken into account during data analysis as clues toward what respondents consider important; the things they link to and associate with; and the mental frameworks into which they fit ideas.

Section Two – The Literature Reviews

OVERVIEW OF LITERATURE REVIEWS

This section consists of three literature reviews that informed the research process and question.

The first is a review of the literature for the two methodologies from which this research design is drawn: grounded theory and phenomenological study.

Second is a review of the literature exploring the sociocultural influences on the learning process. Included are ideas of situated learning and cognition; learning at work; and communities of practice. This literature hold great relevance for the research question. These ideas are presented here to provide a groundwork for the research findings.

Third is a review of the literature relating to the professional development of museum educators. This is presented to offer a look at the thinking, attitudes, practices, and current theories surrounding the professional growth of museum education personnel.

Literature Review #1: Qualitative Methodology

INTRODUCTION

This literature review explores qualitative research methods and provides a general overview of the field of qualitative research. It also examines in greater depth two particular qualitative research traditions – grounded theory and phenomenology – that were used in this study.

DEFINING QUALITATIVE RESEARCH

Denzin and Lincoln (2000) offer a generic definition of qualitative research:

Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that the qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them.

(Denzin & Lincoln, 2000, p. 3)

The province of qualitative research is the world of lived experience, where individual belief and action intersect with culture. Qualitative research stresses the socially constructed nature of reality, the relationship between the researcher and the topic of inquiry, and the situational aspects surrounding the focus of study (Denzin & Lincoln, 2000).

REASONS FOR UTILIZING A QUALITATIVE APPROACH

Seidman explains that the adequacy of a research method depends on the purpose of the research and the questions being asked (Seidman, 1991).

A quantitative approach has the advantage of measuring the reactions of a large number of people and cases to a limited set of questions. This approach lends itself to statistical analysis of data. Findings from quantitative studies may be broad and generalizable (Patton, 1990).

In contrast, qualitative methods elicit an enormous amount of information with much detail, yet dealing with a smaller number of people (Patton, 1990). A critical part of the qualitative researcher's approach is embedding the constraints and context of everyday living surrounding a focus of study. Researchers therefore may be required to focus on a smaller sample due to the logistical realities of such direct attention to each sample member (Denzin & Lincoln, 2000). The utilization of a qualitative approach limits generalizability but provides more in-depth understanding of how the focus of study is being experienced (Patton, 1990).

According to Creswell (1998) a set of philosophical core assumptions of how we understand knowledge guide's qualitative study, including "knowledge is within the meanings people make of it; knowledge is gained through people talking about their meanings; knowledge is laced with personal biases and values; and knowledge is written in a personal, up-close way; and knowledge evolves, emerges, and is inextricably tied to the context in which it is studied" (Creswell, 1998, p. 19). Creswell further states that beyond holding these core assumptions, researchers "may overlay a framework with a distinct ideological stance . . . [and] a perspective that aims at creating change or action" (Creswell, 1998, p. 19).

Qualitative studies explore the process of experiences. Qualitative researchers seek answers to questions such as how social experience is created and given meaning. This approach contrasts with quantitative studies that traditionally seek to determine causal relationships between variables (Denzin & Lincoln, 2000). Researchers ask *why* questions and seek to answer them with comparison of groups and indicators (Creswell, 1998). According to Flick, the "quantitative approach has been used for purposes of isolating causes and effects . . . operationalizing theoretical relations . . . [and] measuring and . . . quantifying phenomena . . . allowing the generalization of findings" (Denzin & Lincoln, 2000, p. 9; Flick, 1998, p. 3).

Qualitative studies stem from asking *how* or *what* questions that require observation of context and listening to those who are involved in the experience (Creswell, 1998). Qualitative research seeks to capture the individual's point of view through in-depth interviews and observation. The qualitative researcher seeks to secure "rich" or "thick" descriptions of the social world that contain details and specifics unique to each aspect studied. In order to share their findings, researchers use genres such as ethnographic

prose, quotations, narrative, images, and other materials that support these in-depth descriptions (Denzin & Lincoln, 2000).

A characteristic of qualitative research is the acceptance of postmodern sensibilities, a belief that there are multiple ways to tell stories about society and that one way is no better or worse than the other, just different (Denzin & Lincoln, 2000).

Qualitative research is a process in which three fields of activity interface. One is the researcher him/herself with his/her backlog of experience, values, beliefs, and ways of knowing. Another is the framework within which the study is undertaken, including the researcher's interpretive community and the subsequent questions it generates. And third is the methodology the researcher chooses to use to explore the questions under examination (Denzin & Lincoln, 2000).

Qualitative research approaches share certain characteristics. Qualitative researchers first pose a problem or a research issue for which they seek answers. They then identify and choose one or more of the traditions of qualitative inquiry in order to carry out their research. In their search for answers to questions, qualitative researchers use open-ended questions without assuming a stance of expert. These questions may change during the research process, reflecting increased understanding on the part of the researcher.

Qualitative researchers consider ethical issues such as disclosure and confidentiality. Depending on the qualitative tradition they adopt, researchers may use multiple forms of data collection and analysis. Researchers shape their narrative from the data, telling a story, allowing the voices of participants to carry that story. Qualitative researchers often share their experiences in conducting the research (Creswell, 1998).

Each qualitative researcher makes a variety of decisions about his/her research, including ones relating to research design and the analytic process he/she will utilize. One decision is to determine the *conceptual framework*, or system of concepts, theories, assumption, and anticipations, that support the research. The conceptual framework explains the main things to be studied: what are the key factors, concepts, or variables, and the presumed relationships among them (Maxwell, 1996). Another critical decision is to decide on the level of complexity appropriate to the study. Key to this decision is knowledge of the audience for the study. Such knowledge will inform the researcher in making an appropriate choice of level and style of presentation for this audience (Charmaz, 2000).

SOME ISSUES IN QUALITATIVE RESEARCH

SUBJECTIVITY AND VALIDITY

One of the criticisms aimed at the qualitative research approach is that it is a highly subjective form of research. This characterization contrasts sharply with the logical-positivist scientific paradigm, where subjectivity is the very antithesis of scientific inquiry (Patton, 1990). Alan Peshkin (1992) voices his attitude toward subjectivity within his research. "My subjectivity . . . is a strength on which I build. It makes me who I am as a person *and* as a researcher, equipping me with the perspectives and insights that shape all that I do as researcher, from the selection of topic clear through to the emphases I make in my writing. Seen as virtuous, subjectivity is something to capitalize on rather than exorcise" (Glesne & Peshkin, 1992, p. 104).

Maxwell quotes Anselm Strauss, who wrote "mine your experience, there is potential gold there!" (Maxwell, 1996; Strauss, 1987, p. 11). Maxwell explains that experiential knowledge is a major source of insights, hypotheses, and validity checks. He quotes Reason, who discusses *critical subjectivity*. He believes that the researcher needs to balance the process of drawing from experience with the capability of recognizing new perspectives. Reason cautions that we should not "suppress our primary experience; nor do we allow ourselves to be swept away and overwhelmed by it; rather we raise it to consciousness and use it as part of the inquiry process" (Maxwell, 1996; Reason, 1988, p. 12).

Denzin and Lincoln (2000) posit that objective reality can never be captured. They explain that we can know a thing only through its representations. One can view the process of *triangulation*, or use of multiple methods, as an alternative to validation. The use of triangulation reflects qualitative researchers' attempt to secure an in-depth understanding of the question under study. Denzin and Lincoln compare this technique to looking at a crystalline form or montage of the topic of inquiry. In order to comprehend the topic through multiple realities, one explores competing visions of this context, as one immerses herself in the ideas. The metaphor of a three-dimensional crystal is also put forth by Valarie J. Janesick. She prefers the image of the crystal to the two dimensional triangle presented by the term *triangulation*, as she feels it recognizes the many facets of any given approach to the social world and addresses the idea of an approach that changes and grows (Janesick, 2000).

Consideration of concepts such as validity, generalizability, and reliability remain problematic for both qualitative and quantitative research. In the case of qualitative

research, researchers have come to a resolution for aligning traditional evaluation criteria with new methodologies, and new ways to approach qualitative work have emerged from the field. Some take on a more action-based participatory role. Instead of large generalizations, more local small-scale theories are applied to specific and unique situations (Denzin & Lincoln, 2000).

FIELD WORK TO WRITING

The phase Denzin and Lincoln (2000) dubbed “crisis of representation” brought to light the issue in anthropology of the progression from gathering data in the field to analysis and final public presentation of ethnographic or narrative experience (Brady, 2000; Clough, 1992; Ellis & Bochner, 2000; Richardson, 2000). Fieldwork and writing blur into one another, as the field-worker’s texts flow from the field experience, going through several stages of analysis and synthesis prior to the creation of the final public presentation of the research text (Denzin & Lincoln, 2000).

ACCESS AND ATTITUDINAL CONSIDERATIONS

Lofland & Lofland (1995) advocate gaining access through contacts or referrals of other participants. Researchers should seek to obtain recommendations from those who know others who met the criteria for study. “Wherever possible, you should try to use and/or build upon *preexisting relations of trust* to remove barriers to entrance” (Lofland & Lofland, 1995, p. 38).

Researchers should develop a careful explanation or account of the proposed research, one that is brief and to the point. It should answer the question “Why should I let you interview me?” Such an explanation should be simple and nontechnical, not deceitful, and appropriate to the audience (Lofland & Lofland, 1995).

Lofland and Lofland (1995) recommend following courteous practice. The researcher should write or phone or both to set up interviews; inform interested parties; and help make their identity known to others associated with the research context.

Lofland and Lofland (1995) recommend adopting a “learner” role or attitude but at the same time appearing competent to do the research. They cite George Moyser and his advice that the researcher must be able to quickly appreciate relevant procedures, symbols, terminology, events, dates, and personalities pertinent to the discussion,

especially when this body of knowledge is particular to the culture being studied. This ability will enable the researcher both to develop a serious relationship and rapport and also to be attuned to data that are pertinent and that might otherwise not be recognized or noted (Moyser, 1988).

MULTIPLE TRADITIONS OF QUALITATIVE RESEARCH

Today qualitative methods cut across many fields, disciplines, and subjects, each having roots in the specialized fields from which they emerged (Creswell, 1998; Denzin & Lincoln, 2000). Researchers have endeavored to break apart qualitative research into sets of differing perspectives and traditions. Although there is overlap, the sets are presented with somewhat different terminology and composition. For example, Patton (1990) discusses the following theoretical traditions and orientations, and their strengths and limitations: ethnography, phenomenology, heuristic inquiry, ethnomethodology, symbolic interactionism, systems theory, chaos theory, hermeneutics, and orientational qualitative inquiry. He applauds the diversity as a good indicator of the “complexity of the human phenomena and the challenges involved in conducting research” (Patton, 1990, p. 89).

Moustakas (1994) discusses five qualitative traditions: ethnography, grounded theory, hermeneutics, empirical phenomenological research, and heuristic research. Creswell (1998) distinguishes five qualitative traditions: biography, phenomenology, grounded theory, ethnography, and case study.

The two approaches I have blended in this study are grounded theory and phenomenology.

GROUNDING THEORY

BACKGROUND AND OVERVIEW OF GROUNDING THEORY

Glaser and Strauss first articulated grounding theory methods in 1967 (Glaser & Strauss, 1967). They held that theories should be “grounded” in the data from the field with emphasis on the actions, interactions, and social processes of people. The two researchers had many years of rich collaboration, but later diverged in their beliefs about aspects of grounding theory methodologies and ideologies (Creswell, 1998).

Grounded theory methods constitute a set of guidelines that structure the collection and analysis of data in order to construct theoretical frameworks in which to present the data. These include concurrent collection and analysis of data; a two-step coding process for that data; comparative methods; memo writing to aid construction of conceptual analysis; sampling to refine emerging theoretical ideas; and integration of the theoretical framework. Many qualitative researchers have used and cited these guidelines to legitimize their research methods (Charmaz, 2000).

Generating theory stems from examining relationships among concepts. The theory development from this examination is articulated toward the end of the study, often in the form of a narrative statement and/or a visual picture of the proposition (Strauss & Corbin, 1990).

GROUNDING THEORY STRATEGIES

Strauss and Corbin (1990) suggest conducting twenty to thirty interviews based on visits “to the field” in order to saturate the information base of categories to be found. Categories are defined as a unit of information comprised of events, happenings, and instances. Documents pertinent to the study focus are collected and analyzed. As the data collection process is implemented, the researcher is undertaking analysis. According to Creswell (1998), there is essentially a zig-zag process as the research travels back and forth from the field to collect information about new categories that appear within the data collected up to that point. The categories are saturated when no new ones appear in the data. The researcher must be sensitive to recognizing and conceptualizing theories. Emerging theory points to the next steps (Creswell, 1998; Glaser & Strauss, 1967).

Theoretical sampling is utilized to choose further data sources. The criteria under which they are chosen are purpose and relevance. The researcher chooses any groups that will assist in generating rich data about the categories and will help toward making connections among categories (Creswell, 1998; Glaser & Strauss, 1967). This process of using collected data and comparing it to new categories that have emerged is called a *constant comparative* method (Creswell, 1998).

Several kinds of coding can be used in grounded theory research. They include open coding, axial coding, and selective coding categories (Creswell, 1998).

In the process of *open coding*, the researcher forms categories of information from codes that initially emerge from the data. These categories are broken down into subcategories

known as *properties*. The researcher then seeks to *dimensionalize* the data on a continuum to demonstrate the range that properties encompass (Creswell, 1998). Dimensionalizing data is encouraged by Strauss and Corbin (1990). They promote dividing the *properties* found within categories into dimensions that fall on a continuum.

Axial coding, a process presented by Strauss and Corbin, occurs after *open coding*. It is aimed at making connections between categories and subcategories (Charmaz, 2000; Strauss & Corbin, 1990). The researcher identifies a *central phenomenon* (a category central to the phenomenon), examines *causal conditions* (influences to the phenomenon), specifies *strategies* (actions resulting from phenomenon), identifies the *context* and *intervening conditions* (conditions surrounding the phenomenon), and outlines the *consequences* (the strategy outcomes) for this phenomenon. These procedures are intended to make emerging theories more precise (Charmaz, 2000; Creswell, 1998).

In *selective coding*, the researcher highlights a story line and writes a narrative that integrates the categories in the axial coding model. Hypotheses or *conditional propositions* are put forth in this phase (Creswell, 1998). *Selective coding* uses initial codes with frequent occurrence that is more directed and conceptual than line-by-line coding. This more directed form of coding tends to be conceptual in nature. Such codes account for the greatest quantity of data and categorize them with greater definitiveness (Charmaz, 2000).

Categories for synthesizing and explaining data emerge from focused codes, and in turn categories give form to the development of analytical frameworks. Categories can represent a collapsing of several codes. When described in narrative form, categories can become the analysis of a concept (Charmaz, 2000).

In the last phase, although a phase not frequently found in grounded theory studies, the researcher may develop and portray a *conditional matrix* that clarifies the conditions influencing the central phenomenon, such as the social, historical, and economic conditions (Creswell, 1998). *Conditional matrix* is an analytic diagram introduced by Strauss and Corbin (1990) where circles lie within circles. The outer rings represent conditions most distant from the action, and the inner rings those that are the closest. They suggest that the creation of such a matrix can tighten the researcher's explanations and predictions about the phenomenon under study (Charmaz, 2000; Strauss & Corbin, 1990).

The resulting outcome of this systematic coding process is a substantive-level theory written by the researcher. It is legitimate to end the study at this point, because generation of a theory is an acceptable outcome of the study. The study may be subjected

to further empirical testing, as the categories have arisen from specific field-based data (Creswell, 1998).

DATA HANDLING IN GROUNDED THEORY

Glaser advises that data should not be forced into preconceived categories through artificial questions. Researchers may need to follow hunches and ask specific questions appropriate to their study's focus (Glaser, 1992).

A distinguishing characteristic of grounded theory is the emphasis on inductive strategies of theory development. This characteristic contrasts with theory generated through logical deduction from before-the-fact assumptions. Data are grounded in the empirical world (Glaser & Strauss, 1967; Patton, 1990). Sensitizing concepts (the background ideas that inform the overall research problem) become only points of departure for the study of data (Charmaz, 2000).

Making comparisons is a major technique in grounded theory. Grounded theory methods compare between and among different people's perspectives; data collected at different times; different incidents; differences within categories; and differences between categories (Charmaz, 2000).

MEMO WRITING

In grounded theory, memo writing is intermediate to coding and writing the first draft of the research analysis. This writing stimulates thinking about researcher observations, process, and code assumptions, and helps give codes substance and structure. It assists researchers in linking interpretation to empirical reality. Raw data are incorporated in memos to keep this connection. Memos track developing analysis as researchers struggle with ideas, set their course, refine categories, define categorical relationships, and gain confidence in their data analysis process. The final narrative draws on memo reflections mirroring many of the ideas and insights included during the memoing process (Charmaz, 2000).

THEORETICAL SAMPLING

Gaps in collected data come to light as categories are refined and constructs developed. The researcher then selectively searches for data sources that will shed light on specific

issues. This sampling's purpose is to refine ideas. Sampling can focus on people, events, places, or documents. This process is pivotal to developing formal theory as it allows comparison and brings to light the more subtle properties in the data. Grounded theory holds the idea that one-shot interviewing in a single data-collection phase can not produce a solid grounded theory. Researchers must return to the field to gain more insights. Charmaz (2000) disagrees with Strauss and Corbin, who in a personal communication to her in 1993, advised beginning theoretical sampling early in the study. She cautions against doing this, because she believes it may bring premature closure to the analysis.

Saturation of categories is a complex issue, as the clarity of when the point is reached where the researcher feels satisfied that all categories have been uncovered is highly individual in nature (Charmaz, 2000).

Some critics of grounded theory imply that the approach to data it sets forth glosses over meaning in stories and might limit understanding in its goal for analysis rather than gain a full and true portrait of the experience. According to Glaser and Strauss (1967), breaking up the data helps researchers to not get lost in anecdotal data; reduces the data volume; and creates a data organizing strategy (Charmaz, 2000).

CONSTRUCTIVIST GROUNDED THEORY

Charmaz (2000) addresses critics of grounded theory, who feel that it is either too contaminated by researcher perspective in analysis, or not open enough, as it is constrained by its determination toward validity and generalizability. Charmaz believes that embracing a more reflexive and contextual form of grounded theory resolves many of the issues raised by critics of the approach. She feels this new way of thinking about grounded theory fits into the broader traditions of fieldwork and qualitative analysis. It provides an option for researchers who want to preserve realism through empirical inquiry but at the same time want to become increasingly interpretive. Charmaz defines this new approach to grounded theory as *constructivist grounded theory*. She contrasts this with *objectivist grounded theory*.

Constructivist grounded theory remains aware of the fact that the viewer creates the data and analysis of those viewed through interaction. Causality is suggested and not considered complete. The theory seeks conditional statements on how those who are studied view reality, but they are not considered generalizable. Instead, they provide concepts that other researchers can carry into other research problems (Charmaz, 2000).

Objectivist grounded theory adheres to traditional positivist canons of science that assume that by adhering to set methods, there will be revealed a true, and ultimately, verifiable theory relating to the studied phenomenon (Glaser & Strauss, 1967; Strauss & Corbin, 1990). These theories provide not only understanding but prediction. Objectivist grounded theory accepts positivist assumptions of a definable describable world that has explanation. Objectivist grounded theorists often assume that the meanings and terminology they hold for an idea are the same meanings that are held by the respondents in their study. Objectivist grounded theorists offer didactic guidelines that are prescriptive rather than emergent. Charmaz (2000) feels that Strauss and Corbin's (1990) work has moved toward providing much more elaborate and immutable rules and is much less flexible than the original Glaser and Strauss (1967) strategies.

Charmaz suggests the way to bridge the differences from objectivist Grounded theory to the more constructivist grounded theory is to approach studies with the goal of seeking meanings – both those of the researcher and those of the respondents (Charmaz, 2000).

Meanings vary as the breadth or range of situations whence they arose varies. In the broad picture, they may be considered world views, ideologies, or philosophies. They may take the form of rules of behavior, such as those associated with particular cultures. They may take the form of definitions, or *mental models* that individuals attach to particular ideas or concepts. The internal application of meaning to an idea can be highly individualized. Mental models – mental representations of phenomena, simple ideas, or complex theories – determine not only how people make sense of their world, but additionally how they take action (Lofland & Lofland, 1995; Senge, 1990/1994).

Lofland and Lofland (1995) suggest taking a “reality constructionist” stance in order to more easily recognize and analyze meanings. This stance presumes that meaning is the quality that people attach to ideas. These qualities are fragile, and people will defend their meanings when they are challenged. Meanings can be self-serving, and they are open to change as society and human context stimulate their change.

A constructivist approach to grounded theory incorporates building a relationship with respondents that permits them to present their stories in their terms. Asking respondents to expand on their use of a term allows for a clarification of the meaning they ascribe to the term. The assumption of the researcher is therefore reshaped by learning how the respondent applies the terminology within his/her lifespace and experience (Charmaz, 2000).

In contrast, objectivist grounded theory may remain outside of the experience, focusing instead on rich descriptions and conditional statements. Charmaz believes that the

procedural complexity inherent in objectivist grounded theory fosters externality at the expense of experience (Charmaz, 2000).

Writing constructivist grounded theory involves evoking experiential feeling through the narrative. Writing a story in the appropriate tone and rhythm is a goal. Theory should become embedded in narrative, making it more accessible but sometimes less identifiable as *the theory*. Experience is not always linear or framed with clear boundaries.

Researchers choose the logical presentation that will present their theory with the most strength (Charmaz, 2000).

PHENOMENOLOGICAL RESEARCH METHODS

BACKGROUND AND OVERVIEW OF PHENOMENOLOGICAL APPROACH

Phenomenologists investigate the structures of consciousness in people's experience, exploring the meanings people assign to their lived experiences (Creswell, 1998; Polkinghorne, 1989).

The philosophical groundings of phenomenology arose through the work of philosopher Edmund Husserl (1859-1938). Primary influences on Husserl's work (Husserl, 1931, 1970; Husserl, 1977) were the ideas of Kant, Descartes, and Brentano. Rene Descartes (1596-1650) emphasized the separation of mind and body in order to examine objects of empirical investigations. He recognized the concept of subjectivity, as he acknowledged that the reality of external perceptions came through representations in the mind (Descartes, 1977; Moustakas, 1994). Moustakas presents Kant's ideas about how the knowledge of the objects resides in the subjective sources of the self. Immanuel Kant (1724-1804) cites three sources for this conclusion: sense (phenomena empirically given in perception), imagination (required to synthesize knowledge), and apperception (one's consciousness of things' identity) (Kant, 1966; Moustakas, 1994). Descartes's highlighting of knowledge coming from self-evidence and Kant's beliefs in regard to intuitive and a priori sources of knowledge and judgment were main contributions to the development of a human science. They made specific the point that anything that is within us exists and is unquestionable evidence (Bridgewater & Sherwood, 1950; Moustakas, 1994).

Franz Brentano (1838-1917) stated that "experience alone is my teacher" (Brentano, 1973, p. xv). Schutz (1973), quoting A. N. Whitehead, stated that "neither common sense nor science can proceed without the strict consideration of what is actual in

experience” (Schutz, 1973, p. 290). Brentano (1973) makes a distinction between the natural sciences that investigate physical phenomena, and the human sciences that investigate mental phenomena, in particular perception, memory, judgment, and anything presenting itself mentally (Brentano, 1973). Many other authors have echoed and built upon these ideas (Dewey, 1938 /1998; Kolb, 1984; Moustakas, 1994).

Phenomenological researchers search for the essence, or essential invariant structure, surrounding the meaning of human experience. They emphasize the intentionality of consciousness (Creswell, 1998). Moustakas quotes Husserl as explaining the intentional act “is the perceiving of something” (Husserl, 1931, p. 243; Moustakas, 1994). Husserl described intentionality as “the fundamental characteristic of ‘psychic phenomena’ ” (Husserl, 1977, p. 41; Moustakas, 1994).

In phenomenology, perception is considered the primary source of knowledge (Husserl, 1977). Husserl refers to perceptions that arise from looking at the thing in question from a variety of angles as *horizons*. In this horizontalization, every perception is critical to consider as it adds something important to contributing to knowledge and understanding of the experience (Moustakas, 1994).

Creswell (1998) reports that the research communities that follow these ideas come from many social science areas, especially sociology and psychology, and fall into different philosophical orientation groups, such as reflective/transcendental phenomenology, dialogical phenomenology, empirical phenomenology, existential phenomenology, hermeneutic phenomenology, and social phenomenology. In the social phenomenology group, the sociological perspective owes much to Schutz, who discusses the essence of phenomenology for the study of social acts. Schutz’s focus of interest rests in the meanings people develop as a result of interacting with each other (Creswell, 1998; Schutz, 1962, 1967, 1973; Swingewood, 1991).

PHENOMENOLOGICAL RESEARCH STRATEGIES

In phenomenological research, evidence is derived from first-person reports of life experience. Through phenomenology, a particular methodology is implemented for investigating human experience and for eliciting knowledge from a state of pure consciousness.

Moustakas (1994) puts considerable emphasis on the researcher undergoing the process of *epoche*, or setting aside all prejudgments, biases, and preconceived ideas about the topic of inquiry. The term *epoche* comes from the Greek word meaning to stay away

from or abstain. Moustakas explains he conceptualizes this term as “a warning to be alert, to look with care, to see what is really there, and to stay away from everyday habits of knowing things, people, and events” (Moustakas, 1994, p. 85). The challenge is to be able to look at things as though with new eyes in a naïve and unrestricted way. This process requires a kind of looking and noticing that is unclouded by prejudgement. As the researcher goes through *epoche*, she/he views all things with equal value, and determines nothing in advance. The researcher undergoes a state of “reflective-meditation”, where she/he allows preconceptions to enter consciousness and leave freely (Moustakas, 1994, p. 89). In this state, the researcher is both receptive and unbiased. A perfect achievement of *epoche* is rare but the intention that underlies the process increases the researcher’s ability to let go of the influence of preconceived thoughts and prejudices (Moustakas, 1994).

Through *phenomenological reduction*, new dimensions of the phenomenon appear or new senses of meaning emerge. The process of *phenomenological reduction* is about gleaning the textural qualities of an experience that elucidates the relationship between the person and the phenomenon. These qualities may be represented as terms such as “smooth” and “rough”, “colorful” and “bland”, and “fearful” and “courageous”. They allow the researcher to see how the description of the experience stands within a range of possible reactions. During this phase, *bracketing* takes place, and the focus of the research is placed in brackets, resulting in everything else being set aside so the entire research process is implanted solely in the subject and question. *Horizontalizing* occurs as the researcher treats every statement as having equal importance. Later, statements that are irrelevant to the study focus, as well as the overlapping or repetitive ones, are deleted, leaving only the *horizons*. New *horizons* of the experience arise as others recede. They are unlimited, and don’t become exhausted. Things become clearer as they are considered again and again, through different vantage points and different lenses. The textural meanings of the phenomenon thus emerge through this process. Finally, the researcher *clusters horizons into themes*, and *organizes the horizons and themes*, ultimately into a *coherent textural description of the phenomenon* (Moustakas, 1994).

In the research process is *imaginative variation*, following the *phenomenological reduction* phase. This step seeks to derive possible meaning through the use of imagination. The researcher varies the frames of reference, viewing the phenomenon from multiple perspectives and angles. The goal of this step is to develop a structural description of an experience to answer the question “How did the experience of the phenomenon come to be what it is?” (Moustakas, 1994, p. 98). The sequence of steps in imaginative variation include considering the possible structural meanings underlying the textural meanings; identifying underlying themes and contexts connected to the phenomenon’s emergence; considering universal structures linked to the phenomenon; and

drawing out representative examples that illustrate the invariant structural themes and description of the phenomenon (Moustakas, 1994).

The ultimate step in the phenomenological research process is intuitively to integrate the basic textural and structural descriptions into a general statement of the essences of the experience of the phenomenon under investigation. This is an identification of the universal qualities or conditions under which the phenomenon can be viewed. It is not specific to an individual case, but it can be located within multiple cases. It is an identification of the essence or essential invariant structure of the experience. As Creswell (1998) states, this narrative affirms “that a single unifying meaning of the experience exists,” and as one reads it, she/he comes to understand more clearly how that experience feels (Creswell, 1998, p. 55)

DETAILS OF QUALITATIVE METHODS

A phenomenological research study shares many of the logistical steps and preparation required for other approaches to qualitative studies. These including formulating a question; identifying those people who will be interviewed; following ethical principles and practices; addressing issues of data validation; reviewing professional and research literature; considering data collection methods; and organizing and analyzing data (Moustakas, 1994).

But in phenomenological research, the focus of inquiry grows out of a strongly felt interest in a particular topic. In phenomenological studies, the research question is generally one that the researcher finds personally significant and one that she/he identifies as socially meaningful. The question itself needs to be clearly stated and clarified so that the purpose and direction of the research is distinct and apparent. Key words in the question need to be to the point and not open to multiple interpretations (Moustakas, 1994).

INTERVIEW SELECTION PROCESS

Identifying those people who will be interviewed in a phenomenological study means ascertaining that they have experienced the phenomenon and have a real interest in exploring and understanding the nature of that experience. Moustakas (1994) uses the term *research participant* when he refers to those who agree to become involved in the study. He extends this discussion to highlight an additional term of *co-researcher*. This

terminology shifts emphasis in reference to those interviewed to include the characteristic of serving as a co-investigator along with the researcher.

Seidman (1991) also discusses terminology for those interviewed. He notes a variety of possibilities such as “interviewee” or “respondent” and points out that use of these terms “casts the participant in a passive role and the process of interviewing as one of giving answers to questions” (Seidman, 1991, 8n). Some authors use the term *subject*, but Seidman feels that although this changes the person being interviewed from object to subject, it still implies that the relation is a hierarchical one. Some anthropologists use the term *informant*, because they are informing about a culture. Seidman’s preference is the term *participant*. This term reflects the “active stance that encourages people to reconstruct their experience actively within the context of their lives” (Seidman, 1991, 8n).

Creswell (1998) notes that the number of research participants could be up to ten. Seidman explains that some researchers, such as Lincoln and Guba and Miles and Huberman, offer an emerging research design that does not establish the numbers of participants in advance, but permits adding participants as research issues require (Lincoln & Guba, 1985; Miles & Huberman, 1984). Other researchers, such as Bertaux, recommend employing a *snowballing* approach to participant selection (Bertaux, 1981). Seidman (1991) points out that one criterion to use as a guide is that of sufficiency. Do the numbers reflect the range of participants and sides that make up the population? Another criterion is saturation of information (the point at which the researcher is no longer learning anything new). He cites Douglas, who suggests the number twenty-five, but hastily adds that he himself would be reluctant to establish such a number (Douglas, 1985). Seidman feels the researcher ought to be guided by practical issues of time, money, and other resources that play a role, including those that apply to the doctoral research process. Moustakas (1994) indicates twelve to fifteen research participants. Weiss suggests that a researcher stop adding further interviews when she/he is experiencing diminishing returns, when the information repeats itself, and when she/he learn little that is new to what she/he already knows. These factors are viewed in the light of time and cost of the interview process (Weiss, 1994).

Seidman (1991) and others warn of the “perils of easy access” to research participants such as one’s coworkers, students, and friends. He advises that interviewing such individuals can create an atmosphere that contains conflicts of interest, inflict the interview relationship with tensions, and affect the interview relationship in other ways such as altering its level of seriousness (Seidman, 1991, p. 31). On a related point, however Maxwell discusses not cutting one’s research off from other aspects of one’s life

as the experiential insights that one brings to the situation have deep significance in regard to one's ability to respond to aspects of the data (Maxwell, 1996).

Associated to the issue of familiarity with research participants and research settings, Ely et al. remind researchers that although they might be investigating ideas and people with which/whom they have familiarity (sometimes a useful thing), they must *make the familiar unfamiliar*, if they are to avoid any presumption of understanding (Ely, Anzul, Friedman, Garner, & Steinmetz, 1991). Moustakas cautions the researcher to initiate the interview process by undergoing the *epoche* process described earlier, "so that past associations, understandings, 'facts,' biases, are set aside and do not color or direct the interview" (Moustakas, 1994, p. 116).

DATA COLLECTION IN PHENOMENOLOGICAL RESEARCH METHODS

Data collection methods in phenomenological research are typically long in-depth interviews. Seidman (1991) has developed a three-interview process with interviews spaced three days to a week apart and about ninety minutes each in duration. He points out, though, that there are not as yet absolutes in terms of the world of in-depth interviewing, and he discusses the fact that little research has been done on the effects of following one procedure over that of others. He suggests a governing principle be that the method is repeatable and documentable. He points out that due to the realities of this world, conducting interviews under less than perfect conditions is superior to not conducting them at all. Weiss (1994) suggests that, if possible, researchers should interview respondents more than once. Interviews, he explains, should generally last an hour but he indicates that they can continue (with breaks) a duration of up to eight hours.

The details and nuances of the interview process are similar for various qualitative approaches and have been discussed in great detail by a number of authors including Seidman, Patton, and Weiss (Patton, 1990; Seidman, 1991; Weiss, 1994). Most authors advise taping and transcribing interviews. Weiss (1994) suggests that if time and budgets are limited, the researcher may choose to listen to an entire tape and then select only certain sections to be transcribed. He also discusses the possibility of doing telephone interviews. He has found these useful, but comments that he does not feel as "in touch" with the respondent as he does in person (Weiss, 1994, p. 59). He explains that if one chooses to do the interview by telephone, it is advisable to have met the respondent prior to that interview.

Patton (1990) points out that the basic thrust of qualitative interviewing is to reduce to the greatest degree possible imposing predetermined responses. Therefore, and especially

in the context of the in-depth interview process, it is critical that questions be posed in a truly open-ended manner. Such questions do not presume which dimension or ideas will be important for the interview, but they allow the research participant to guide the direction of thinking as it relates to the general research question. Seidman (1991) points out that the first law of interviewing is to “listen more, talk less” (Seidman, 1991, p. 62). Also, when asking a question, ask real questions: only ones where you do not know or anticipate the response. He cautions to avoid leading questions (ones that are leading by virtue of both the words or the tone), and to not interrupt. Instead of interrupting, the interviewer should make a note and follow up on it later when there is an appropriate point or time. Another technique Seidman shares is to ask the research participant to tell a story, or perhaps to imagine that the researcher is some other individual with whom the participant is comfortable. Also important is keeping the research participant focused on the interview topic, asking the participant to spell out concrete details first and then having him/her follow up with his/her feelings about the concrete event. Other advice he offers includes not taking the ebbs and flows of interviewing too personally; tolerating silence; sharing experiences on occasion; asking participants to reconstruct, not to remember; avoiding reinforcing participants’ responses; exploring the source of a participant’s laughter; following hunches; and trusting one’s instincts.

Moustakas provides a general interview-question guide for researchers:

1. What dimensions, incidents, and people intimately connected with the experience stand out for you?
2. How did the experience affect you? What changes do you associate with the experience?
3. How did the experience affect significant others in your life?
4. What feelings were generated by the experience?
5. What thoughts stood out for you?
6. What bodily changes or states were you aware of at the time?
7. Have you shared all that is significant with reference to the experience? (Moustakas, 1994, p. 116)

Seidman (1991) explains that although the researcher may have prepared an interview guide ahead of time, she/he ought to be cautious depending on it. The in-depth interview process is not designed to test hypotheses; rather “it is designed to ask participants to reconstruct their experience and to explore their meaning. The questions most used in an in-depth interview follow from what the participant has said” (Seidman, 1991, p. 69).

ORGANIZATION AND ANALYSIS OF DATA IN PHENOMENOLOGICAL RESEARCH METHODS

This stage begins as the researcher sets the transcribed interview data before her/him and starts to examine data through the methods and procedures of qualitative analysis. To summarize the process, discussed earlier in detail, first the researcher *horizontalizes* the data in regard to every statement relevant to the topic. Next, the horizontalized statements are reviewed for *meaning* or *meaning units*, which are then listed. These units are then *clustered* into common categories or themes, with an eye toward overlap and redundancy. From these categories, *textural descriptions* of the experience are developed. Finally the textural descriptions, structural descriptions, and an integration of textures and structures are constructed into the meanings and essences of the phenomenon (Moustakas, 1994).

Working with the data is a time-consuming process, something the researcher must allow for. Seidman (1991) points out that data analysis takes as least as long as all the other aspects of the research. Data organization requires attention to detail and documentation, so that at all stages of the research, one is able to trace interview data to the original source on the interview tape (Seidman, 1991). Loftland and Loftland (1995) offer detailed guidance on logging and managing data, and keeping track of field notes and memos (Loftland & Loftland, 1995). Seidman (1991) comments that his preference is to complete all interviews before initiating the analysis process. He reasons that he wants to avoid imposing meaning from one participant's interview to another's interview. If, however, the researcher is following a selection process that involves adding interviews as she/he goes along (according to the approach discussed earlier), then a certain amount of analysis must occur in order to select the subsequent interview participants (Lincoln & Guba, 1985; Miles & Huberman, 1984).

ETHICAL PRACTICES IN PHENOMENOLOGICAL RESEARCH METHODS

Ethical principles and practice concerning qualitative research methods include obtaining informed consent; maintaining confidentiality; gaining clear permission and agreement from the research participants that includes an obvious understanding of the research's full purpose; and ensuring proper and appropriate disclosure of research findings (Moustakas, 1994).

Literature Review #2: Situated Learning and Sociocultural Approaches to Mind

INTRODUCTION

Museums can be very fluid professional working environments where skill requirements often change. How does new learning occur when one is already embedded in the professional environment of the museum? Two bodies of literature that inform this question are the research and writing surrounding ideas of *situated learning* and the sociocultural approaches to mind. This chapter will discuss selected literature from these areas, and examine theories and ideas of how context and social interaction affect learning.

Exploring ideas of situated learning puts one at the nexus of several collections of literature. These ideas cross historical and current thinking in many fields of study, including cognitive psychology, sociology, anthropology, philosophy, linguistics, communications, and organizational development. The theories embedded within the literature are broad-ranging, yet interwoven throughout is one prominent focus: in order to understand the individual, we must not consider him/her in isolation, but rather as a participant within his/her situated context in the world, a context that is saturated with social interactional, cultural, and historical influences that shape his/her actions, identity, knowledge, and thinking processes (Chaiklin & Lave, 1993; Resnick, Levine, & Teasley, 1991; Rogoff & Lave, 1984; Wertsch, Del Rio, & Alvarez, 1995b).

Such cross-disciplinary examination is not easy. It means we must cross a multitude of boundaries of practice to mine the literature that informs the work in these many fields. In doing so, we are presented with a challenge that mirrors the research findings themselves: trying to understand the thinking, concepts, language, and activities gleaned across a variety of practices in order to understand how learning is inexorably linked to situated circumstance (Resnick, 1991).

As adult situated learning is pertinent to my research questions, I will emphasize the ideas in the literature pertaining to adult learning in real-world contexts. First, I will discuss some of the grounding influences and early work relevant to understanding ideas of situated learning. Next, I will review the evolution of related research across several disciplines that has occurred within the last few decades. Finally, I will look at how these theories are informing thinking in the educational settings of schools and museums.

HISTORICAL ANTECEDENTS

The sociocultural approach to mind is a view that is heavily grounded in the writings and research of a multitude of theorists. Each of the diverse fields mentioned in the chapter introduction have thinkers whose ideas have provided stimulus, foundational thinking, oppositional ideas, and methodological considerations. Perhaps the most influential of these theorists, in terms of the heritage of sociocultural ideas, is the work of Lev Vygotsky along with his followers, but work by others such as J. Dewey in education (Cole, 1995), G. H. Mead in sociology (Berger & Luckmann, 1966; Perret-Clermont, Perret, & Bell, 1991), E. Durkheim in anthropology and sociology (Schegloff, 1991), and J. Piaget in psychology (Siegal, 1991), has been a catalyst for thought and research for many contemporary sociocultural scholars.

THE VYGOTSKIAN HERITAGE

The work of the Vygotskian school of thought took place in the Soviet Union in the early to mid-1900s, and is highlighted in the literature primarily through the work of three men: Lev Semenovich Vygotsky (1889-1934), whose research focused on the effect of social interaction, language, and culture on learning (Fosnot, 1996), Aleksei Leont'ev (1903-1979), who is associated with his theories of activity (Cobb, 1996; Zinchenko, 1995); and Aleksandr Luria (1902-1977) whose work investigated understanding human consciousness with regard to external conditions of life (Wertsch, 1995). The psychological research and writings of these three men serve as a benchmark in the evolution of sociocultural thinking. At the time of their conception, these ideas were labeled "sociohistorical" or "cultural-historical" by Vygotsky and his followers (Wertsch, Del Rio, & Alvarez, 1995a; Zinchenko, 1995).

The Vygotskians labels have been appropriated by disciples of this view of thinking, at least in the West, and have been modified to the term *sociocultural*. Thus, *sociocultural* is the label most commonly applied to this idea, and the one often used in contemporary debates in the human sciences (Wertsch et al., 1995a). However, reflecting the interdisciplinary nature of this topic, as well as the evolving thinking in connection to the topic, there are a variety of terms used in the literature that reference, relate to, or are associated with this concept. These terms include: situated cognition; socially shared cognition; distributed cognition; socially situated learning, situated learning; communities of learners; communities of practice; and learning communities.

Lev S. Vygotsky

The focus of Vygotsky's work became the dialectic between the individual and society, and how social interaction, language, and culture affect learning. He posited that instruction, both formal and informal in nature, transmits information regarding cultural tools and practices, in the form of things such as language, writing systems, visual representations, memory aids, and created objects, from experienced members of society to inexperienced members (Rogoff & Gardner, 1984). Vygotsky was influenced by Engel's writing on the importance of tools. Vygotsky felt that tool development goes beyond the realm of physical tools in that in addition to physical tools, people have developed psychological tools to assist their thinking and actions. He referred to these tools as *signs* and stated that we must examine the signs that culture provides in order to understand human thinking (Crain, 1992).

Vygotsky (1930/1978) posited that the most influential sign systems are speech and language development. Words enable people to symbolize things and events that exist on a plane beyond their immediate context and circumstance. They also permit communicating beyond the existing time frame, allowing us to reflect on the past and plan for the future (Vygotsky, 1978, Chptrs. 1-4). As people use signs, they are engaging in what he characterized as *mediated* behavior. This means that, in his view, their behavior is not just a response to their environment, but a response influenced or *mediated* by their own signs (Crain, 1992).

Vygotsky concluded that speech in the child is social from its inception. For Vygotsky, the *egocentric speech* characteristic of very young children is the forerunner of inner speech that becomes a tool for thinking in later developmental stages. Through the progression from first using audible speech and then inner speech, outward social interactions eventually become integrated into the intrapsychological mental functions. Egocentric speech in Vygotsky's perspective doesn't fade away; it goes underground and becomes essentially a silent internal dialogue one has around the problem at hand. Through the use of speech, the individual eventually becomes able to *internalize* social process. According to Vygotsky, moving from this process of thinking aloud to a silent inner speech is the general progression over time that characterizes the development of *higher mental processes*. These are the forms of thought and attention that are inherent in using cultural signs (Crain, 1992).

Vygotsky did research with both children and adults on the use of memory aids. From his work with adults, he found that they didn't need these aids or didn't benefit from them. He suggested that it was because they had replaced their need for memory devices

with mental notes, rather than external cues (Crain, 1992; Vygotsky, 1978, originally published 1930, p. 41-45).

Within this general theory is embedded the idea that intra-individual skills have as their source involvement in inter-individual activities (Greenfield, 1984). For Vygotsky, the notion of activity applies to both collective and the individual's functioning. Thus activity can be social in two ways: first, in the sense that it is socioculturally defined; and second, that a person's experience involves social activity – activity involving one or more other persons. The very processes of these social relationships are eventually internalized by the individual to form their cognitive process (Wertsch, Minick, & Arns, 1984).

Vygotsky argued that two concepts are involved in children's development: their own *spontaneous* concepts springing from their direct experiences, and the conceptual understanding they derive from their interactions with others, which he termed *scientific* concepts. These latter concepts arise from the structured activities such as classroom instruction. He saw *scientific* concepts as more logically defined. His interest was to identify exactly what process facilitates the learning that moves the child from *spontaneous* concepts (which he also referred to as *everyday concepts*) to the *scientific* ones. He theorized that the two conceptual forms represented a vertical continuum on which the child travels in his/her conceptual transformation. In his view, *scientific* concepts move down toward the spontaneous concepts, and when the child's *spontaneous* concepts have developed sufficiently, they move up and clear the way for the scientific concepts to be absorbed. He termed this space between the two levels of conceptual understanding the *Zone of Proximal Development (ZPD)*. It is in this place that a child's spontaneous reasoning meets the logic of adult reasoning. This ZPD differs for each concept and is unique for each individual (Crain, 1992; Fosnot, 1996).

Vygotsky sought to study dialogue. He was interested in the role played by an adult and the learners' peers as they discussed, explained, queried, and negotiated meaning. For Vygotsky, this sociocultural teaching, this guiding of developmental pathways, could occur through a formal intentional process and/or through informal intentional means. His term for this kind of teaching was the Russian word *obuchenie*, which literally means "learning from somebody else who is supposed to be more knowledgeable" (Matusov & Rogoff, 1995, p. 104n). This Vygotskian idea has been extended by others, and the term "scaffolding" has been applied to pinpoint the process (Fosnot, 1996). This metaphor, originated by Wood, Bruner, and Ross (1976), illustrates the ideal role of the teacher, and is the origin for a theoretical model of the teacher in informal education (Greenfield, 1984; Wood, Bruner, & Ross, 1976). This scaffold supports the child's extension of current skills and knowledge toward a more expert level of competence (Rogoff & Gardner,

1984). Patricia Greenfield (1984), in her discussion of scaffolding in connection with informal learning situations (as illustrated by the process of learning to weave in Zinacantan, Mexico), points out that we need to seek answers to questions such as: what abilities and experiences are key to the development of scaffolding skills? What component processes are employed in scaffolding? And what are the stages of mastery of scaffolding abilities? Identifying answers to such questions could be useful to understanding the process of learning experiences in the everyday world (Greenfield, 1984).

Followers of the Vygotskian School

Aleksei Leont'ev and a group of colleagues set out the task to rework the elements of Vygotsky's project (Cole, 1995). James Wertsch et al. (1984) explain that followers of the Vygotskian school feel that the theoretical framework in which these ideas are best understood should take *activity* as the basic analytic unit. The purpose of this unit is to orient the individual in the world of objects. These units refer to "an actual, identifiable activity as opposed to a generic notion of human activity" (Wertsch et al., 1984, p. 154). Leont'ev believed that cognitive development is to be perceived through *appropriation* of socially evolved ways of mediation and modes of activity (Axel, 1997; Cole, 1995; Wertsch et al., 1984).

In describing Leont'ev's theory, Lave, Murtaugh, & de la Rocha (1984) state that Leont'ev identified three levels of activity. The highest level occurs in relation to *motive* or "energizing force" (e.g., play, work, formal instruction.) To illustrate this level, Leont'ev stated that hunger would constitute a *motive*. A second level of activity is an *action* defined by its goal (e.g., solving an arithmetic problem, finding the shelf in the supermarket housing the canned tuna fish). A third level in Leont'ev's theory is *operations* (e.g., shifting a car into gear, accessing the tuna fish off the shelf and placing it in one's cart) (Lave, Murtaugh, & de la Rocha, 1984). The ultimate goal of the theory of activity according to Wertsch et al. (1984), is to understand the interrelationships among the three levels of analysis – activity, action, and operation (Wertsch et al., 1984).

Activity theory views activity as systems that produce events and actions. The activity system is one that is constantly being shaped by actions and discourse. A quality of activity that Engestrom (1987) points out is that it is multilayered and multivoiced in nature. On the one hand, it spurs change and development, and on the other it serves as a source of stress and conflict (Cole, Engestrom, & Vasquez, 1997, p. 4; Engestrom, 1987).

Impact of the Vygotskian School on Museums

Sociocultural thinking initiated by the Vygotskian school has captured the interest of those involved in museum studies. Many researchers and practitioners concerned with issues of learning in the museum feel that culture, environment, and history are pertinent to every learning event and context. Those professionals interested in understanding the learning process within and surrounding the museum environment are being informed through a sociocultural theoretical perspective and associated constructivist ideas of experience, prior knowledge, and conceptual change (Dewey, 1938 /1998; Gelman, Massey, & McMannus, 1991; Hein, 1998; Roschelle, 1995; Schauble, Leinhardt, & Martin, 1997).

SOCIOCULTURAL THEORY

AN EMERGING FIELD

Cole, Engestrom and Vasquez (1997), reviewing the evolution of research in sociocultural issues in psychology from the late 1970s to the mid-1990s, posit the emergence of a new interdisciplinary approach to human studies, beginning with a search for a new unit of psychological analysis that includes context as central to the constitution of human nature. They point out that among the number of publications on these ideas (e. g., Gelman 1978, Brofenbrenner, 1979), perhaps the most influential was the appearance in Vygotsky's (1978) *Mind in Society*. In 1986, Vygotsky's *Thought and Language* was translated and made available (Cole, 1995; Vygotsky, 1978, 1986, originally published 1934).

This literature linked American thinking about context and people's cognition with Russian ideas about the influence of history, social origins, and mediation on human psychological process. More recently these perspectives have become infused with ideas from scholars from other nations, resulting in intense interaction among psychologists, anthropologists, linguists, sociologists, and scholars from other disciplines, and leading to the formation of new interdisciplinary studies, some of which have become institutionalized. Examples of such hybrids are cognitive science and communication, and cultural psychology (Brofenbrenner, 1979; Cole et al., 1997; Gelman, 1978).

VIEWS ON LEARNING, THINKING, AND PRACTICE

Views on Learning

Resnick (1991) explains that interest in the social aspect of cognitive psychology occurred in conjunction with the rise of *constructivism*. The constructivist view of learning looks on knowledge as “an interpretation based on schemas, often idiosyncratic at least in detail, that both enable and constrain individuals’ processes of sense making” (Resnick, 1991, p. 1). It is increasingly apparent that much of human cognition is so varied and sensitive to cultural context that investigation of the mechanisms of how we shape each other’s knowledge and reasoning is critical. The constructivist view holds social processes as integral to cognition and thus the ways in which people jointly construct knowledge and the particular social goals and interaction under which this occurs is worthy of investigation (Resnick, 1991).

Lave (1991) takes issue with two views of learning: internalization (or learning by ingestion) and learning transfer (or treating life’s situations as “so many unconnected lily pads”). She believes that “the structure of the social world as a whole is both constituted and reflected in the structure of its region, institution, and situation, so that they are neither isolated from one another nor composed of unconnected relations” (Lave, 1991, p. 79). When Chaiklin and Lave (1993) organized a two-part conference on what they initially labeled “the context problem,” they explained that what emerged from the initial conference conversations was that the topic of learning must be addressed as well as the topic of context.

... if context is viewed as a social world constituted in relation with persons acting, both context and activity seem inescapably flexible and changing. And thus characterized, changing participation and understanding in practice — the problem of learning — cannot help but become central as well. (Lave, 1993, p. 5)

Lave (1991) recommends

a decentered view of the locus and meaning and learning in which learning is recognized as a social phenomenon constituted in the experienced, lived-in world, through legitimate peripheral participation in ongoing social practice. (Lave, 1991, p. 64)

She argues that learning is not about internalization of knowledge by individuals, but actually about the process of becoming a member of a sustained *community of practice*.

The development of identity with this community and acquisition of knowledge and skills are integral to this process, where the quest for personal identity motivates, shapes, and gives meaning to the knowledge achieved. She asserts that it is in the relationship between identity and knowledge that the research should be focused (Lave, 1991).

Lave points out that learning is ubiquitous in ongoing activity, although in most cases this goes unrecognized. People involved in activity are often observed helping each other, thus assisting others to change. So, in effect, describing and analyzing people's involvement in the practical world is to examine people's engagement in learning. This perspective on *learning* differs from the conventional views of the term "learning." In this view, participation in everyday life may be thought of as a process of changing understanding in practice, thus *learning* (Chaiklin & Lave, 1993; Lave, 1993).

Rogoff (1997) speaks to a similar point when she discusses two conceptions of development that prevail in ongoing research, theory, and practice. The first conception views the process of learning as occurring through *transmission of information* and ideas to the brain from the outside world. The other prevailing conception is that learning occurs through *acquisition of information* and ideas by the brain. Rogoff believes that both these views are versions of a one-sided model of development. In the transmission model, the world is the active participant, and in the acquisition model, the individual is the active participant. Rogoff argues instead for a third conception of learning. She posits that people's development occurs through a two-sided process of social interaction where both sides are active participants in the learning process. She call this model the *participation view* of learning. In this model, development is seen as transformation of participation. Rogoff states that "a person develops through participation in an activity" (Rogoff, 1997, p. 271).

Although Lave and Wenger (1991) don't deny that learning can take place where there is direct teaching, in their view the fundamental distinction is that intentional instruction is not the source or cause of learning (Lave & Wenger, 1991, p. 31). Their theory is about learning within the lived-in world of engagement of everyday activity. It is a theory of learning as a dimension of social practice (Lave & Wenger, 1991).

Views on Thinking and Working Together

Rogoff (1984) points out that *interaction* with other people and use of socially provided tools and schemas for solving problems is central to the everyday contexts in which cognitive activity occurs.

Cognitive activity is socially defined, interpreted, and supported. People, usually in conjunction with each other and always guided by social norms, set goals, negotiate appropriate means to reach the goals, and assist each other in implementing the means and resetting the goals as activities evolve. (Rogoff, 1984, p. 4)

A number of studies have provided empirical data on the dynamics of dyad interaction: adults with children; adults with adults; children with children. Many of these studies incorporate the idea of novices' learning through experts' support.

In an investigation focusing on social interaction between adults and children in joint problem-solving situations, Rogoff and Gardner (1984) concluded that their findings supported the idea that adults assist children by guiding the transfer of knowledge and skills and helping them make connections from more familiar contexts to those less familiar. They found that information and skills are conveyed tacitly through pragmatic communication within the context of the problematic situation. It is within the interaction between the novice and expert that the instruction occurs, as they jointly move toward solution of the problem. Through this interaction, the novice becomes aware of the more mature understanding of the problem. The scaffolding provided by the expert is modified in relation to the support the novice needs. The researchers found that the manner in which the adult handles this modification is to offer support at a level that is just beyond the level that the novice can independently manage (Rogoff & Gardner, 1984).

Greenfield (1984) came to a similar conclusion about how experts support novices when she noted and compared the characteristics of scaffolding practices in two groups: a language acquisition study involving a middle-class sample from Los Angeles and a study involving Zinacanteco women in Mexico. She was struck by the similarity of these practices across both cultures. The finding's similarities included:

- adaptation of the scaffold to learner level;
- a decrease in scaffolding provided as learner skill level increases;
- internalization of the scaffold by the learner to enable independent accomplishment;
- an increase in scaffold level as task difficulty increases; and
- that scaffolding is not obvious either to the expert or the novice, as both appear unconscious of the process in which they are involved (Greenfield, 1984).

Wertsch et al. (1984) conducted a study in rural Brazil that compared the interaction of dyads of children and their mothers on the one hand, and children and teachers on the other. They found significant differences in the interactions between the two groups. The researchers concluded that the governing motive differed for the teachers and the

mothers. For the teachers, the goal of teaching or learning functioned as the governing motive. For the mothers, the motive that governed their activity process was the correct and efficient completion of the task at hand. The researchers explain that this finding confirms an important point in relation to the distinction between social and individualistic perspectives in psychology. They argue that differences in behavior must be considered not only in terms of the characteristics of the individual, but also in terms of the organization of systems of activity at the societal level. This level establishes important parameters that influence the manner in which an individual or group of individuals carry out and master particular types of goal-oriented activities (Wertsch et al., 1984).

Sociocultural research is also conducting studies that examine the dynamics of interaction among larger groups of individuals. Resnick (1991) explains that cognitive scientists are moving toward theories more connected to both the physical and social world. They are examining ideas that perceive knowledge as distributed across several individuals and how interactions among these individuals affect decisions, judgments, and problem solutions. Resnick points out that many current thinkers, including Hutchins (1991) and Hastie and Pennington (1991), argue that it is important to analyze the ways individual cognitive interpretations are formulated and take into consideration how they interact to produce a shared group understanding of the circumstances at hand (Hastie & Pennington, 1991; Hutchins, 1991; Resnick, 1991, p. 14).

Distributed cognition is a characteristic of many real world situations. As an example, Hutchins (1991) explains that in naval navigation, the burden of cognition is distributed across the environment. This is apparent in both the social interaction and the use of tools and technologies on the ship. In these situations, cognitive accomplishments are joint, not attributable to any single individual, and all divisions of labor coordinate participants' activities through a system of *distributed cognition*. There are two types of cognitive labor: First, there is the cognition that is the task. Second, there is the cognition that governs the coordination of the elements of the task. Hutchins's findings indicate that it makes a difference when all members of the group have the same access to information. He proposes that shared decision making is a process in which a *community of systems* arrives at a balanced state (Hutchins, 1991).

A cultural group may be perceived as a widely distributed memory. The memory of the group memory is clearly stronger than the memory of any one individual and undoubtedly has a much greater capacity than any individual's memory (Hutchins, 1991, p. 284-285; Roberts, 1964).

Hastie and Pennington (1991) examined the process of small-group decision making. They focused their research on a petit trial jury process of decision making. According to Hastie and Pennington's findings, social satisfaction plays a key role in this kind of decision making, and complete agreement on interpretation is not a prerequisite to group decisions. They suggest that empirical investigations of phenomena will promote the most efficient development theories of socially shared cognition (Hastie & Pennington, 1991).

This idea of shared thinking is addressed in the organizational literature where the process of team decision making is considered. Senge (1990) argues that when a team becomes more aligned, a commonality of direction is created and individual energies are in sync. When a common vision or mental model is present, "individuals don't sacrifice their interests to the larger team vision; rather the shared vision becomes an extension of their personal visions." (Senge, 1990/1994, p. 234-235; Senge, Kleiner, Roberts, Ross, & Smith, 1994).

The Importance of Context

Interest in the process of learning in context has moved research out of laboratories and directly into the context of authentic work settings. A growing body of literature focusing on work place situated learning is broadening the theories of situated learning into multiple aspects of the human experience (Chaiklin, 1993; Stamps, 1997).

Rogoff (1984) explains that in the field of cognitive development it has been typical to describe mental changes in individuals independently of their contextual influences, but there is growing interest among psychologists to consider context in their examination of cognitive activities (Rogoff, 1984).

Rogoff highlights the fact that cross-cultural observations have shown that people who have difficulty with a task in a structured laboratory environment can perform related tasks with skill or much less difficulty in everyday contexts. These findings appear to be consistent with adults as well as toddlers and infants, as shown by a number of studies (Gelman, 1978; Gladwin, 1970; Rogoff, 1984).

Rogoff (1984) argues that it is unrealistic to try to understand people's intellectual capacities or thought processes without concern for the context of their activity. She explains that thinking is intricately interlaced with the context of the problem to be solved. Rogoff defines *context* as the problem's physical and conceptual structure as well as the activity's purpose and social milieu in which it is implanted. Cognitive activities,

in Rogoff's view, are not completely specific to their circumstance. She feels that in order for people to function, they must be able to generalize some aspects of knowledge and skills from one situation to another new situation (Rogoff, 1984).

Rogoff (1984) explains that thinking is a practical activity and one that adjusts to meet the situation's demands. This means that what might be considered a logical approach to a problem in an academic setting might be totally inappropriate in everyday situations. Practical problem-solving requires efficiency, not a full analysis of the total circumstance and all its parameters. Everyday situations require action-directed thought and actions intended to devise satisfactory, and opportunistic, solutions. The use of tacit knowledge is readily available in the setting and is often applied in such situations. This process of practical problem-solving may proceed through the use of "contextual cues that interface with tacit knowledge rather than through the systematic application of explicit steps in problem solving" (Rogoff, 1984, p. 8).

Rogoff (1997) argues that investigation of the individual without consideration of the testing context and the "real world" context it relates to is an artificial situation and is likely to yield findings that do not reflect the full range of circumstances surrounding the question being investigated (Matusov, Bell, & Rogoff, 1995; Rogoff, 1997).

Perret-Clermont, Perret, and Bell (1991) report on the difficulties of using traditional methodologies in social research situations. They observed that subjects prioritized the social meaning of situations above the logical and symbolic features of the presented task. They concluded from their work that it is virtually impossible to design context blind research for the study of the teaching-learning process. They point out that there is a "complex interdigitation of social and cognitive factors, whose causality is not simple" (Perret-Clermont et al., 1991, p. 58). They urge further research on the creation and transmission of meanings and knowledge in social interaction, interpersonal relationships, intersubjectivity, and construction of context (Perret-Clermont et al., 1991).

Michael Siegal (1991) argues that children's conversational modes are integral to specialized settings. He points out that researchers employ a social style that uses a set of conventions different from children's conversational ones. Children's responses are reflective of this situation and may not yield findings indicative of more authentic contexts (Siegal, 1991).

Interest in researching social activity in real-world settings has led to a body of empirical studies conducted in everyday settings. Lave et al. (1984) chose a supermarket setting to investigate arithmetic decision-making processes during grocery shopping. The authors posit that the holistic nature of activity can be observed in such a setting. Working within

a theoretical framework of activity as proposed by Leont'ev, they sought to determine people's derivation of meaning by observing the relations between the levels of activity and action on the one hand, and action and operation on the other. The researchers concluded that procedures for problem solving are dialectical in nature as the setting and activity mutually create and change each other. Problems are both generated and resolved in the process. People and settings simultaneously create problems and shape solutions. Additionally, settings are places that store information, offer calculating potential, and provide ways of organizing sequences of activity (Lave et al., 1984; Wertsch et al., 1984)..

Yrjo Engestrom (1998) explains that in the field of sociology the traditions of research have focused either on the macrosociological level of technological development examining the skills and organization of work, or on the microsociological level analyzing locally constructed and negotiated work activities. In Engestrom's view, the issues of people's everyday actions and interactions doing work in various organizational positions and settings have not been sufficiently addressed. He notes that many studies looking at the microsociological aspects of work (such as local interaction, negotiation, and talk) also show a concern for the links between situated research practices and changes in the workplace with relation to new technologies and organizational forms. Studies of work practices have come through a range of literatures, including psychology, communication, cognitive science, computer science, linguistics, anthropology, and education. Discipline boundaries blur, as the concern is not so much on the content of the discipline, as on "the way human practices emerge as work: as societally located and socially intelligible actions of reasoning and communication" (Engestrom & Middleton, 1998, p. 3).

In her research into practical thinking among workers in real world settings, Sylvia Scribner (1984) investigated the practical knowledge and thought-for-action observed among workers in an industrial milk-processing plant. She defines practical thinking as "all thinking that is embedded in larger activities and that functions to carry out the goals of those activities" (Scribner, 1984, p. 9). Scribner posits that choosing the context of work was based on the contention that work offers many opportunities for the development of expertise in tasks involving complex intellectual skill. The context of a plant, such as the milk-processing plant, can be viewed as a "culture." In such a setting, occupational activities are socially organized for socially defined purposes and employ "culture-specific" knowledge domains and technologies. Scribner's study suggests that a pattern of development from novice to expert performance may not be restricted to only specialized activities but may also represent the path of adult skill acquisition in commonplace tasks. She found that effort-saving functioned as a criterion distinguishing skilled from amateur performance, and she believes that this poses an intriguing direction

for further inquiry into how practical thinking becomes adaptive when it serves the interests of economy of effort (Scribner, 1984).

Charles Goodwin and Marjorie Harness Goodwin (1998) did conversational analysis of the complex dynamic of the Operations Room of an airport. They concluded that activity emerges from the ordering of communications and interactions and not from pre-existing mental frameworks. The behavior is significantly influenced by organizational practices, circumstantial occurrences, observations, mediating tools in the environment, and the local community that sustains their practice. Situated activity is task-relevant and the authors urge that this fact be taken into account when designing collaborative work practices (Engestrom & Middleton, 1998; Goodwin & Goodwin, 1998).

Urs Fuhrer's (1993) research focused on observations in a university Career Center setting where he examined novice users reactions to an unfamiliar setting. Fuhrer highlights the fact that there is considerable emotional content associated with orienting oneself to a new setting or community. People's reactions and coping responses in these unfamiliar settings are directly related to this emotional dimension of their learning. Fuhrer suggests that with the ever-increasing exposure to new settings and technologies that modern society demands, we need to do continued research on questions related to the newcomers' needs for successfully adapting to new settings (Fuhrer, 1993; Lave, 1993).

Sociolinguistics

Researchers in sociolinguistics and anthropology are looking at how language works in both conveying information and situating people in social systems (Resnick, 1991). Resnick (1991) highlights the importance of linguistic consideration in understanding how people's social interactions affect their development. Language is a function of people's formulation of world views (Resnick, 1991). This point is extended by Rogoff (1995), who points out that S. C. Pepper (1942) explained that the meaning of a word in a sentence carries with it both the previous meanings of that word as well as the meaning of the other words already expressed in that sentence. Thus, it also influences future use of that word. A person's past is always present as he/she acts on the basis of previous experience (Pepper, 1942; Rogoff, 1995, p. 155).

Bakhtin's (1986) particular interest was on examining the utterances of people's speech and their characteristic of what he termed *dialogic overtones*. Bakhtin examined these dialogic overtones to try to understand how speakers and listeners comprehend each other's meaning and their active response toward its utterance. In Wertsch's view,

Bakhtin's theories are of particular relevance to a sociocultural approach to mind in that "social language is a way of speaking that is characteristic of a particular group in a particular sociocultural setting" (Bakhtin, 1986; Wertsch, 1991, p. 95). Bakhtin theorized that using social language involves a process he termed *ventriloquation*. In this process, one speaks through a voice found in a particular social language. In doing so, the speaker imbues it with his/her own meaning and intent, thus taking ownership of it. Wertsch suggests that ventriloquation is significant for thinking about examining cognitive skills and other mental functioning in a sociocultural approach to mind (Wertsch, 1991).

Establishing meaning in communication is part of sociocultural activity. Clark and Brennan's (1991) research examined the way that people seek to establish a common ground in their communications. The researchers analyzed the conversational elements of *presentation and acceptances*. They refer to this process as *grounding* (Resnick, 1991). First, *grounding* is a process in which the conversants keep one another properly updated. This process differs depending on the communication mode, i.e., face-to-face, writing letters, and so on. Second, *grounding* attempts to establish mutual understanding between the conversants and allows participants to try to reach mutual belief (Clark & Brennan, 1991).

Schegloff (1991) concluded that participants in ordinary conversation organize an *understanding-display* device to make apparent their understanding of the matter to which their talk is addressed. According to Schegloff, this shared understanding on the part of the coparticipants in conversation is part of socially shared cognition (Schegloff, 1991).

Apprenticeship

Lave and Wenger (1991) posit that learning "is an integral and inseparable aspect of social practice" and explain that apprenticeship learning occurs in many nonschool settings, and these more informal learning contexts best represent opportunities for what they term *legitimate peripheral participation* (Lave & Wenger, 1991, p. 31). In their 1991 book, Lave and Wenger present five studies of apprenticeship learning and how they illustrate their principles of *legitimate peripheral participation*. They explain that they sought not to look at learning that occurs inside formal learning institutions and chose instead to look at learning that occurs outside — in situations of practice. They examined: how apprentice tailors become slowly introduced to the practice of tailoring by beginning to learn the simple tasks and they eventually are supported in developing more complex skills; the practice of midwifery, which generally begins at a very young age and usually by daughters of current midwives; how new members of the naval quartermaster corps move from peripheral positions to key distributed tasks as they learn to plot a ship's

position; the apprenticeship of butchers that involves a combination of trade school and on-the-job training; and the process of becoming a nondrinking alcoholic through the organization Alcoholics Anonymous (Lave & Wenger, 1991).

Many of those involved in research that relates to situated learning have done extensive studies examining apprenticeship both in the United States and internationally in diverse places around the globe such as West Africa, the Trobriand Islands in the Pacific Ocean, and Mexico (Childs & Greenfield, 1980; Hutchins, 1993; Lave, n.d.; Lave & Wenger, 1991; Rogoff, 1991).

Rogoff (1995) explains that apprenticeship “involves active individuals participating with others in culturally organized activity that has as part of its purpose the development of mature participation in the activity by the less experienced people” (Rogoff, 1995, p. 142). Rogoff believes that when we examine any activity, we need to consider it on three planes of activity: the personal plane, the interpersonal plane, and the community plane. Apprenticeship provides a model in the plane of *community activity*. Research on apprenticeship in the plane of community activity examines institutional structure and cultural technologies of intellectual activities. It considers, for example, the purposes of the endeavor, the cultural constraints, resources, values assigned to the means for reaching goals, and cultural tools (Rogoff, 1995).

For Rogoff, apprenticeship is a form of what she terms *guided participation*. Her theories of guided participation draw from Vygotsky’s (1978) sociocultural theories and are extensions of Vygotsky’s ideas on *zone of proximal development*. She posits that children are active participants in the process that Vygotsky describes, either centrally or peripherally, guided by those more expert (Rogoff, 1991).

Rogoff (1991) believes that the apprenticeship model is a good metaphor for guided participation, for three reasons:

- Apprentices actively gather information and practice skills as they participate in skilled activities.
- Apprentices’ learning is structured by practices developed by their predecessors to meet goals valued by that society.
- Apprentices are assisted in their learning by communication and involvement with those more skilled — experts and advanced apprentices — and these people help determine how to divide the activity into smaller goals that a novice can begin to handle, as well as help provide guidance on how to handle the tools and skills required.
- Apprentices seldom learn alone. They are involved with skilled practitioners, and often learn in a community of other relative novices (Rogoff, 1991).

Apprenticeship techniques include cognitive as well as physical skill learning. Brown, Collins and Duguid (1989) point out that many professions with much cognitive content, such as law and medicine, are traditionally learned through apprenticeship (Brown, Collins, & Duguid, 1989)

Lave (1991) and Lave and Wenger's (1991) model of *situated learning* is discussed from the vantage point of the apprenticeship-master form of learning where the process of becoming a full practitioner comes through increasingly "intense, interconnected, and knowledgeably-skilled participation" (Lave, 1991, p. 69). Lave cites Becker's (1972) view that learning-in-practice is a widely distributed and commonly found feature of contemporary life. It is characterized by authentic activities of many trades, a broad view of the practice, a self-made and directed curriculum, and apprenticeship in an individualized and realistic learning setting (Becker, 1972; Lave, 1991, p. 69). Lave raises the fact that Becker points out two flaws inherent in apprenticeship learning: teaching resources are scarce, and they must be recruited at the initiative of each apprentice. Lave takes issue with these points raised by Becker. She explains that, in her view, resources for learning are integral within the community. First, the broad view gives the novice definition as to what things are needed to be learned. Second, the inclusive process of sharing and organizing knowledgeable skills, increasing participation in that practice, and working alongside peers and experts provides conditions that also make resources available to learners (Lave, 1991).

Situated Learning

Clancey (1995) in his discussion of Dewey's ideas points out that the terms we use to describe a situation are grounded in our physical method of looking – for example, how we orient the paper, or gesturing or aligning the reference object. In this way, context is a conceptualization. It is not the observer's description, but the actor's experience. Dewey argued that the conception of a situation and of interaction in that situation cannot be separated (Clancey, 1995, p. 9; Dewey, 1981, originally published 1902).

Lave (1991) introduces her perspective for the concept of situated activity by explaining it is complex, as its general theoretical perspective is generated through an interconnection of theories of perception, cognition, language learning, agency, social effort, and the interrelationships of these theories (Lave, 1991).

Lave explains there are at least three different genres of situated approaches:

- The first genre she terms a *cognition plus* view. This approach extends the scope of investigating an individual's cognition to include everyday activity and social interaction. This belief is based on the conclusion that social factors become conditions that affect individual cognition.
- A second approach she defines as the *interpretive view*. This view locates situatedness in the use of language and/or social interaction among individuals who have unique experience and perspectives. This approach sees meaning as a negotiated process, language as a social activity, and situated cognition as relative to interest.
- A third view Lave calls *situated social practice*, or *situated learning*. This view has several tenets common with interpretive theory, i.e., relational interdependency of agent and world, activity, learning, and knowing. In addition to these beliefs, this view reframes ideas of thinking, learning, and knowing to incorporate the concept that these ideas are “relations among people engaged in activity *in, and arising from the socially and culturally structured world.*” (Lave, 1991, p. 67).

Lave posits that this world itself is socially constituted, hence from this point of view, knowledge of the social world is open-ended and always socially mediated. Cognition and communication occurring in the social world are linked to both its history and its current evolution. This way of looking at practice puts it in the social practice of the lived-in world. Lave posits that the challenge then is to translate this perspective into a specific analytic approach to learning (Lave, 1991).

Legitimate Peripheral Participation

Lave (1991) points out that viewing learning through a situated learning framework leads to a particular description of learning: *legitimate peripheral participation*. In this view, communities of practice become produced and reproduced. Newcomers to the community develop a changing understanding of practice over time as they participate initially peripherally (a process deemed legitimate by members of the community) then eventually move toward a higher level of knowledge and skill. The identities of newcomers then move from a point of lower identity as a community participant to an increasingly higher level as they become old-timers. This process is a social one, where participation moves from the peripheries or edges of the practice toward one that is increasingly more centered in the community of practice (Lave, 1991; Lave & Wenger, 1991).

Experts are at the center of practice because they have mastered the skills and knowledge of the practice. As novices develop, they move from the peripheries to the center of

practice. It is then the position in the group, and not the properties of the individuals involved, that is the focus of concern for those wishing to understand development (Cole et al., 1997; Lave, 1991; Lave & Wenger, 1991).

One of the products of becoming a full practitioner in a community is the continuity of the practice itself. Another product is displacement of old-timers. As newcomers and old-timers are interdependent, this situation introduces a tension into the community. That tension is fundamental to the learning process (Lave, 1991; Lave & Wenger, 1991).

Communities of Practice

Scribner (1984) uses the term “practice” to highlight the culturally organized nature of specific activities (Scribner & Cole, 1981). Scribner and other investigators have found that particular mental representations and cognitive skills involve culture-specific practice (Childs & Greenfield, 1980; Hutchins, 1979; Lave, 1977). The construct of *practice* offers a potential for integrating social-cultural and psychological levels of analysis and yielding explanatory accounts of how basic mental processes and structures become specialized and diversified through experience (Scribner, 1984).

WENGER’S THEORY OF COMMUNITIES OF PRACTICE

Etienne Wenger (1998) deeply explores of the concept of communities of practice in his book *Communities of Practice: Learning, Meaning, and Identity*. He explicates what in his view defines and characterizes a community. He examines the idea of community as a whole and looks more closely at its various components. A community, in his view, is a system within larger systems, and his theory includes a discussion of the interrelationships of multiple communities. In addition to looking at the community as an entity, Wenger also focuses his discussion from the individual’s perspective as a member of a community. He posits that an individual’s identity is all about membership in particular communities and an individual’s participation (or nonparticipation) in multiple communities of practice (Wenger, 1998).

Wenger (1998) proposes a social theory of learning that is grounded in social participation. His theory includes the following assumptions: we are social beings; knowledge is a matter of competence with respect to valued enterprises; knowing is a matter of active engagement with the world; and meaning – the ability to experience the world and our own engagement in it as meaningful – is what learning is to ultimately produce. For Wenger, participation encompasses:

. . . being active participants in the *practices* of social communities and constructing *identities* in relation to these communities . . . participation shapes not only what we do, but also who we are, and how we interpret what we do (Wenger, 1998, p. 4).

His theory examines four components that are mutually defining and interconnected.

They are:

- meaning (a way of talking about changing ability);
- practice (a way of talking about shared history, resources, frameworks, and perspectives);
- community (a way of talking about the social configuration in which our enterprises are defined);
- identity (a way of talking about how learning changes who we are) (Wenger, 1998).

Communities of practice are everywhere, and people belong to many simultaneously as they survive together to meet common goals and needs. This kind of support spurs community building. Wenger argues that we need to rethink what it takes to understand and support learning. He believes that we need to look at it through three points of reference, the individual, the community, and the organization. For the *individual*, learning is an issue in engaging and contributing to practice of their communities. For *communities*, learning is an issue of refining practice and ensuring new generations of members. For *organizations*, learning is an issue of sustaining the interconnection of communities of practice through what it knows to enhance its effectiveness and value as an organization. Wenger does not view learning as a separate activity, but as one that is integral to our daily lives. He sees a need to develop a systematic vocabulary to talk about learning in this integrated fashion. For example, the word *understanding* requires some caution as it can reflect some standard of the knowable. In Wenger's view, understanding in practice is the “art of choosing what to know and what to ignore in order to proceed with our lives” (Wenger, 1998, p. 41).

Collective learning, Wenger posits, is the interaction with each other and the world. This learning results in practices that are sustained by a pursuit of shared enterprise – communities of practice. Working with others who share the same conditions is central to defining the involvements with which they engage. People “collectively orchestrate their interpersonal relations in order to cope with their job” (Wenger, 1998, p. 46). This involves colluding and colliding, and conspiring and conforming together. Practice includes both the explicit (such as language, tools, and documents) and the tacit (such as subtle cues, underlying assumptions, and shared world views) (Wenger, 1998).

Wenger argues that social production of meaning is the critical level of analysis for talking about practice. This analysis includes negotiation of meaning, participation, and reification. Wenger posits that living, or human engagement, is a constant process of negotiation of meaning. Each situation builds and extends on prior situations, and negotiation of meaning characterizes the process of how we experience the world (Wenger, 1998).

Wenger sees the nature of practice as being made up of two components: *participation* and *reification*. He states, “Participation and reification form a duality that is fundamental to the human experience of meaning and thus to the nature of practice” (Wenger, 1998, p. 52).

In Wenger’s theory, *participation* is considered in the common use of the term – to take part in some activity. It involves mutuality of negotiation but not necessarily equality. Identity is constituted through relations of participation. Participation shapes our experience as well as shaping our communities. Social elements are present in our activities, even when we are performing them alone.

Reification is about turning a concept into a concrete reality. For example, “the hand of fate” illustrates a reified concept. Wenger believes that when we reify our ideas, thinking, and beliefs, we do so to create tools that “leave fingerprints” for the more fleeting qualities of spoken conversations and thoughts. Reifications in our practices can help with negotiating meaning, but documenting them can also have the property of freezing the meaning. *Participation* is therefore essential to “repairing the potential misalignments inherent in reification” (Wenger, 1998, p. 64). We discuss in order to compare interpretations; thus both processes require and enable each other. Wenger compares the process metaphorically when he likens it to the mutually transformative process of the river carving the mountain, and the mountain guiding the river (Wenger, 1998).

Wenger sees the *community of practice* as a unit that is defined by three components: *mutual engagement*, *joint enterprise*, and a *shared repertoire*. He points out that mutual engagement means that people are truly involved with one another and are actually involved with acting and negotiating meaning. It is not a community of practice just because a group has been assigned a label such as “team” or “network.” Engagement must be enabled, and involve mutual relationships. The second component, *joint enterprise*, is the result of the collective process of negotiation, people’s response to this negotiation, and their mutual accountability for the practice. A *shared repertoire*, the third component, is something that evolves over time within the community of practice. A common history and memory, and shared resources of mutual engagement characterize the shared repertoire (Wenger, 1998).

Communities of practice are what Wenger refers to as “indigenous enterprises” (Wenger, 1998, p. 75). They don’t exist in isolation, and they are generally a part of a larger context. Yet in their day-to-day reality, a practice is still local, subject to local influence, and unique to its locality. Accountability for the practice arises through the negotiation of its mores and values (even when these are reified into statement). Wenger states that an important aspect of becoming an experienced member of a practice is the ability to make distinctions between reified standards and competent engagement.

Practice is not stable even within its historical framework. The world changes and thus demands that any practice must constantly reinvent itself. Revising policies, processes, and new membership are all part of this process. Sometimes these changes are subtle and go unnoticed (Wenger, 1998).

In each community of practice, there are boundaries at the peripheries. As discussed by Lave and Wenger (1991), these boundaries are places where new members can find entry to the practice (Lave & Wenger, 1991). Boundaries also are involved in other processes. They are the locations where practices can influence each other. *Brokers* are individuals who are in a position to make connections across new communities and open new possibilities. When a member belongs to multiple practices, it is through the boundaries that he/she can provide influence as a *broker*. *Brokering* involves: translation; coordination; alignment of perspectives; facilitating transactions; coping with being alone in brokering activities ; and seeking other brokers to provide support for activities (Wenger, 1998).

In addition to a person serving as a broker, certain things such as *objects* can serve as a focus for coordinating multiple perspectives. The term *boundary object*, Wenger explains, was coined by sociologist Susan Leigh Starr (Starr, 1989). A boundary object can be an artifact or even a location, and it may belong to multiple practices. Boundary objects can therefore serve as a nexus of coordination for the multiple perspectives existing in those varied practices (Wenger, 1998).

As mentioned earlier, practices don’t exist in isolation but are part of larger, and sometimes nested, systems. Sometimes a practice can be part of what Wenger terms a *constellation of practices*. A group of practices can be considered a constellation when they share roots; have a related enterprise; serve a cause, belong to a common institution; face similar conditions; have members in common; share artifacts; have geographic proximity or interaction; have overlapping styles; and compete for resources (Wenger, 1998).

Wenger (1998) believes that any educational design must offer opportunities for engagement. Participants in a community of practice are not like those in a classroom where gaining particular and specific content knowledge is the same object for all. Wenger (1998) argues that learning outside of school contexts for both adults and children takes place in the same manner:

... we are all engaged in the pursuit of a socially meaningful enterprise, and our learning is in the service of that engagement. Our communities of practice then become resources for organizing our learning as well as contexts in which to manifest our learning through an identity of participation. What is crucial about this kind of engagement as an educational experience is that identity and learning serve each other. (Wenger, 1998, p. 271)

For Wenger, then, communities of practice are places where we learn and places that shape our learning. They incorporate social relationships and interests as essential ingredients of learning in order to maximize the engagement of their members (Wenger, 1998).

SITUATED LEARNING FOR SCHOOLS AND MUSEUMS

Situated Learning in Schools

Brown, Collins, & Duguid (1989) argue that schools would do well to adopt a methodology which they call *cognitive apprenticeship*, that would “enculturate students into authentic practices through activity and social interaction.” (Brown et al., 1989, p. 8) They liken this to craft apprenticeship. In such apprenticeships, situated modeling, coaching, and fading are employed methodologies. They recommend that this approach be practiced in schools. Brown et al. posit that knowledge, like language, is inextricably a product of the activity and situations in which it is produced. Knowledge indexes the situation in which it arises and is used. It becomes coded and is connected to the activity and the environment in which it is developed. A concept is always under construction. The authors explain that tools share features with knowledge in that they can only be fully understood through their use. Use changes the user’s view of the world, and users adopt the belief systems of the culture in which they are used. As one uses tools, he or she participates in building a richer and more clarified understanding of the world in which the tools are used. For Brown et al., activity, concept, and culture are interdependent, and each can only be understood if considered along with the others. In order to understand many communities, one must view them from within the culture. To learn

tools as practitioners use them requires entering the culture and participating in authentic activity. In some cases tools become so tied to the cultural environment that task performance and knowledge are embedded in the situation (Brown et al., 1989).

Brown et al. (1989) argue that if authentic circumstance is required for true understanding, then transferring activities from their cultural base to a setting such as a school dilutes the authenticity. The activity becomes part of the school culture and is therefore not an accurate representation of the true activity. Students in schools then become *school specialized*, but this skill doesn't facilitate transfer of learning into the world outside (Brown et al., 1989).

Herrington and Oliver (2000) state that schools and universities have traditionally separated knowing and doing. Schools teach essential principles, concepts, and facts, but in an abstract and decontextualized form. Thus, much of this abstract knowledge is not retrievable in real-life problem-solving situations. The authors point out that a philosophical shift is occurring in the instructional technology community: it is moving from a behaviorist position toward a constructivist framework. The authors suggest that the theory of learning that has potential for bridging the gap between formal schools and real life work is that of situated learning. They cite Resnick (1987), who proposed "bridging apprenticeships" be used to span the gap between formal instruction in classrooms and the world of real-life work settings (Herrington & Oliver, 2000, p. 1; Resnick, 1987).

The term *learning community* is one that is often heard in connection to an educational enterprise, and it is used in a somewhat different sense than the ideas of communities of practice discussed earlier. For example, an idea that is key to educating adults is the "learning community." Theories of adult learning often highlight the fact that adults learn most effectively in groups they join by choice where they can engage in dialogue and discussion with others, interact, collaborate, reflect, and mutually receive and provide academic support from/for other members of the learning community (Baldwin et al., 1990). These ideas are consistent with sociocultural learning theories (Resnick et al., 1991). Benefits of such organized structures include a variety of ways for adults to implement their developing knowledge. Occasions to practice and to have work experiences and internships provide adults with a chance to apply and act on what they've learned. Collaborative projects give learners field-based opportunities to try new skills and ideas, do problem solving, and modify approaches in real-world settings, with the support of others in their learning community. The idea of *learning community* in an academic setting is therefore a way to incorporate sociocultural learning ideas into a formalized learning setting. By blending structured learning with authentic experience, the formal learning situations are informed and supported by the real world practice – thus

allowing for some degree of legitimate peripheral participation (Baldwin et al., 1990; Lave, 1991).

Museums as Sites for Situated Learning

Matusov and Rogoff (1995) explain that participating in a *community of learners* occurs in specific institutions such as schools and museums. In this process, people work together to pursue areas of inquiry; make connections among a variety of concepts; share interests with other participants; learn how to learn; and learn how to help and collaborate with others. This kind of activity is consistent with Matusov's and Rogoff's philosophy of learning, which they state is the participation model. This model considers that all the participants in the educational institution are "learners who share interests and expertise" and that learning can be observed (and assessed) taking place as the participants take on more responsibility for an activity (Matusov & Rogoff, 1995, p. 97)

In a community of learners, there is a shared engagement among participants, and the educational agenda arises collaboratively among them (Rogoff, Matusov, & White, 1998). Learners' development includes not only increasing skill performance but also learning to participate in line with the community's value systems and styles of performance (Matusov & Rogoff, 1995).

Matusov and Rogoff (1995) explain that the museum itself can be viewed as a crossroads, a place where different practices and their participants can meet and learn from one another. They posit that a museum is comprised of three communities: the museum's exhibits, the museum staff, and the museum visitors. They argue that this is not a hierarchical relationship, but one where, through negotiation and mutual contributions, people form a new type of community – a community of learners (Falk & Dierking, 1992; Lave & Wenger, 1991; Matusov & Rogoff, 1995). The authors state that in museums, visitors encounter three other kinds of communities of practice: those represented by the museum (i.e., in a science museum, experts in a particular field of practice, such as physicists); those who organize the museum (i.e., education staff, curators, businesspeople); and fellow visitors (i.e., members of other communities of practice who are visiting the museum in the same time frame) (Matusov & Rogoff, 1995).

The social mediation that takes place involves a complex negotiation among communities having different (possibly complementary and/or contradictory) agendas, goals, and stakes in the institution. As the museum community is comprised of a variety of diverse communities of practice, and these communities may hold different definitions of the object and/or goal of the museum's activities, this situation may require a dynamic

process of negotiation about the purpose of museum learning. For example, funding agencies need to know why they should provide support; while schoolteachers may want to know how the museum can provide resources and how museum learning complements formal school mandates (Bailey, 1998; Matusov & Rogoff, 1995).

Matusov and Rogoff (1995) state that the goals of an institution are an aspect of sociocultural activity. This activity can be managed more successfully if the participants are aware of their values and philosophies. They suggest that museums:

- Define their goals and philosophies of learning – identify how staff and visitors define learning, what are their values, what is involved in the museum's practices, and how the museum's purposes are arrived at by its constituents.
- Define their relations among the communities involved (both directly and indirectly) with the museum and evolution of these relationships.
- Define the roles of each community of practice involved in the museum (i.e., educators, visitors, businesspeople) in all phases of visioning and planning for museum activities and events.
- Define how the museum's community of practices links to the practices of other institutions – both educational and noneducational (Matusov & Rogoff, 1995).

Viewing the museum as an organization comprised of a number of diverse communities of practice allows us to consider the institution and its participants in terms of sociocultural considerations, with all the ramifications that this implies, including that the museum is a place where situated learning happens – for both its visitors and its staff members.

Literature Review #3: Professional Development of Museum Educators

ISSUES IN THE PROFESSIONAL DEVELOPMENT OF MUSEUM EDUCATORS

Museum educators come from a variety of backgrounds, fields of preparation, and a broad range of experiences (Brooking, 1999; Sweet, 1984; White, 1992). Over the years of my own professional museum education and program evaluation work, I have listened to the stories of museum colleagues, heard how they came to work in museum settings, and learned of the diverse bodies of experience and knowledge they bring to their work (Bailey, 1998b).

A characteristic of museum work is the fluid quality of changing professional needs, knowledge, and skills (Hirsch & Silverman, 2000). Museums do not work in isolation, they are nested into a complex global system, linked through a variety of connections to this system (Senge, Kleiner, Roberts, Ross, & Smith, 1994; Stapp, 1995). The day-to-day performance of the museum educator is influenced by the varying needs/requirements of the institution, the changes in museum audience, the current needs and interests of people the museum serves, and general societal factors, cultural influences, and forces (Falk & Dierking, 1992; Falk & Dierking, 1995; Hirsch & Silverman, 2000). As changes occur around them, museum professionals are frequently faced with the need to know about particular things in order to effectively function in their positions (although sometimes the specific needs are clear to the practitioner, and sometimes they remain more ambiguous and need to be first identified). If the required knowledge is not part of their prior education and experience, museum education professionals must build this knowledge while conducting their practice. This form of learning takes on a situated nature and can be a complex process that incorporates multiple and intersecting influences, including sociocultural factors, work contexts, and memberships in communities of practices (Chaiklin & Lave, 1993; Engestrom & Middleton, 1998a; Lave, 1993; Lave & Wenger, 1991; Wenger, 1998; Wertsch, Del Rio, & Alvarez, 1995).

Thus, ongoing situated learning can be a characteristic of museum work. Of course, this need for life-long learning is not peculiar to museum work. Many other professions, including teaching in the formal education community are impacted by changing work environments (Chaiklin, 1993; Engestrom & Middleton, 1998b; Lieberman & Miller, 1999). Yet, although connected systemically to the rest of the world, museum work is conducted in an climate that is unique unto itself. The issues, needs, considerations, and

search for meaning are peculiar to the field. Perry et al. (2000) posit that the current issues the field of museum education must address include:

. . . what it means to be a museum today; on-going support for visitor research and evaluation; . . . training and graduate education focused on the public dimension of museums; . . . the excitement and the opportunities, but also the difficulties and the complexities, need for vigilance, resilience, patience, and optimism . . . [as we accept] uncertainty, and ambiguity as the foundations of growth, as museums – along with communities, families, and other institutions – struggle to determine what is meaningful. (Perry, Roberts, Morrissey, & Silverman, 2000, p. 47)

One of the issues in the field of museum education is its status as it relates to professionalism in education. Unlike formal education settings, where most teachers seeking employment and retention need to comply with state and district regulations (Carnegie Task Force on Teaching as a Profession, 1986; National Commission on Teaching and America's Future, 1996), most museums work independently in their hiring process, do not demand that applicants have completed a standard preparation and credentialing process, and determine the requirements and experience for any given museum educator position, on a case-by-case basis (American Association of Museums (AAM), 1994; Bailey, 1998b; Roberts, 1997).

Museum education jobs and job descriptions are not precise and can vary among institutions. They differ in terms of where the position falls within the organizational structure/chart/design of an institution (and hence to whom the position reports); roles and overlapping responsibilities for the position that may be considered separate in other institutions; prioritization of responsibilities and activities within the position; wording for position's professional title; skill requirements and qualifications for holding the position; and physical demands of the position (Lister, 1999).

Museum studies programs provide formal preparation for museum positions, and these have been increasing in number. An online review of current museum studies program availability shows that many of these programs concentrate on curatorial work, preparing people to work in art and history museums. Some programs do include and/or focus on museum education (e.g., Bank Street College and George Washington University), but this appears to be the exception rather than the norm (Gradschools.com, 2002; Roberts, 1997). Some universities offer distance-learning programs such as the Division of Continuing Studies, University of Victoria, Canada and University of Leicester in the United Kingdom (University of Leicester, 2002; University of Victoria, 2002).

As Falk and Dierking argue, in order to make museums better learning experiences for visitors, museum staff need to have a firm grasp on the nature of learning (Falk & Dierking, 2000). Literature resources on museum learning and the place that museums hold in the educational infrastructure have only recently become available to museum staff (Falk & Dierking, 1992; Falk & Dierking, 1995; Hein, 1998; Hein & Alexander, 1998; Hooper-Greenhill, 1994; Pitman-Gelles, 1981). These resources have increased (particularly in the last decade), filling the void and providing a theoretical base for museum professionals as they explore, exchange, share, and dialogue around professional knowledge, issues, and ideas. Seminal documents such as *Museums for a New Century* and *Excellence and Equity* have provided stimulus for discussion and reform (American Association of Museums (AAM), 1984, 1992). In the United States, journals such as the *Journal for Museum Education*, *Curator*, and the Association of Science-Technology Centers' *Dimensions* offer additional opportunities for sharing and gleaning knowledge. In the last few years, listservs, for both general museum education and science museum education, have become major forums for idea exchange, combining practical knowledge with more theoretical and esoteric issues within the field of museum education (ISEN ASTC-L, 2002).

Over the history of life in museums, the process of mentoring staff as a resource and support for professional growth traditionally has been informal. Matelic's (2001) research explores the history and implications of the mentoring process in museums. She highlights the importance and value of having experienced staff share their wisdom and perspectives with others, but points out that this kind of sharing requires commitment and time (Matelic, 2001).

Access to, and knowledge of, resources such as those described above appears to be linked with a museum professional's connections to the field as a whole. In the pilot study for this research question, familiarity with museum theory, museology, educational theory, and content knowledge were shown to be linked to museum educators' background, institutional orientation to professional learning, relationships, and access to professional development activities and resources. It appears that an individual's ability to make these links, depends on a myriad of factors including organizational structures and support; personal style, interests, and issues; motivation and need; and chance circumstance (Bailey, 2001b).

STRUCTURED PROFESSIONAL DEVELOPMENT FOR PRACTICING MUSEUM EDUCATORS

Only during the last few decades has structured professional development for the field of museum education, and science museum education in particular, become significant.

Annual professional conferences and meetings have been a primary source for professional development in the museum community. Most – such as the national Association of Science-Technology Centers (ASTC) and the American Association of Museums (AAM) conferences – can be very costly, so most educators require the financial support of their institution, as well as the time, to attend. As a result, many mid-level and entry-level employees are not able to attend. Some institutions try to rectify the inequities in conference attendance by rotating which staff are sent to the conferences (Bailey, 2001b).

The availability of regional conferences makes attendance more feasible, as it reduces travel costs and sometimes eliminates the need for a hotel. For example, the New England Museum Association (NEMA) serves all types of museums, has been operating for over twenty years, holds an annual conference, and conducts one-day workshops (New England Museum Association, 2002). In the science museum field, regional conferences have been recently instituted, creating more local access and thus providing science museum educators less expensive opportunities to attend professional development sessions and to network with colleagues. In the New England area, the Northeast Informal Science Education Network (NISEN) conference has been held annually for the past five years (Hein, 2001; Museum Institute for Teaching Science, 2002).

Another recent approach to making professional development opportunities more frequent and more geographically spread out are the ASTC Roundtables for the Advancement of the Professions (RAPs). This initiative was created to respond to the need for year-round professional development for science museum professionals. They are presented at and by different ASTC member institutions worldwide, focusing on the needs and interests of specific museum departments, including marketing, exhibits, and education. A calendar of these regional programs is posted and linked to the ASTC web site home page (Association of Science-Technology Centers, 2002).

Further professional development opportunities for museum educators come through established local museum groups that provide regular meetings, seminars, and workshops for members. Some of these groups are the Museum Educators' Roundtable (MER),

holding meetings in Washington, DC (Museum Education Roundtable, 1992); the Greater Boston Museum Education Roundtable; the Massachusetts-based Museum Institute for Teaching Science (MITS) (Bailey, 1998a); the New York Museum Education Roundtable; and the San Francisco-based Cultural Connections. In addition to participating in museum-only networks, some museums are part of local collaboratives that include other kinds of cultural and educational institutions such as the Louisville, KY, Cultural Consortium. In other cases, professional development opportunities in science are available to museum educators through involvement with national and local science professional groups and initiatives. These include professional development opportunities available through the National Science Teachers Association (NSTA); partnerships with school districts, universities, and businesses; and participation in local grants such as the Massachusetts Statewide Systemic Initiative (PALMS), the Washington State LASAR Project, and the Texas Statewide Systemic Initiative (Bailey, 1998b, 1999a, 2001b).

Within the last few decades, a number of special and intensive museum education professional development projects and programs have been organized and implemented. These projects have been designed to provide museum educators support and opportunities for dialogue. These projects and programs have been funded in some cases by organizations such as the Museum Education Roundtable, the National Science Foundation (NSF), the American Association of Museums (AAM), and the Fund for the Improvement of Postsecondary Education of the United States Department of Education and the New York State Council on the Arts (Museums Collaborative, 1983; National Science Foundation (NSF), 1997; St. John & Hennan, 1997; Stapp, 1999; Sutterfield & Middlebrooks, 2000).

Sutterfield and Middlebrooks (2000) reviewed projects with specific professional development foci for science museum staff members. These projects include: the ASTC Institute for Teacher Educators; the Youth Alive! Network; the Institute for New Science Centers; the Science Carnival Consortium; the Regional Science Educators' Conference; and Science Theater (Sutterfield & Middlebrooks, 2000).

A REVIEW OF THE RESEARCH AND OTHER LITERATURE PERTINENT TO THE PROFESSIONAL DEVELOPMENT OF MUSEUM EDUCATORS

A review of the literature focusing on professional development for museum educators and/or museum teacher educators yields some limited empirical data. In terms of science museum teacher educators' professional development, St. John and Hennen's (1997)

evaluation of the ASTC Institute for Teacher Educators provides some insights. His findings include that the Institute:

- Helped participants to define their field and gave them a professional identity
- Validated the efficacy of investing dollars in professional development for teacher educators
- Helped participants create a professional network of teacher educators within the museum field
- Moved participating teacher educators into the national effort and context of science reform
- Impacted participants' home institutions
- Stimulated leadership activities for participants
- Developed a pool of future leaders in science education
- Confirmed the centrality and importance of in-depth personal experiences with inquiry.

The study highlighted barriers impeding professionals in the museum teacher education field. These include:

- The field of museum teacher education is young, not well defined, and not well esteemed (a factor that precipitates high tur over)
- Museum teacher educators, like classroom teachers, need continuing support
- At the institutional level, there is a lack of commitment to funding teacher education programs in general and to supporting professional development opportunities for museum teacher educators.

St. John posits several implications arising from the work of the Institutes. These implications are:

- That the design and implementation of successful professional development for museum teacher educators and others is deceptively complex
- That there is a need to formalize and deepen the structures of successful inquiry-based professional development
- That there is a need to address issues of how to transfer knowledge of professional development for inquiry learning toward a classroom teacher audience
- That museum education professionals need each other's support (St. John & Hennan, 1997).

Spock and Perry's (1997) research on museum staff's memories of their own early learning experiences with museums offers anecdotal data from museum staff and contributes toward an understanding of how early encounters with the museum experience impacted their eventual career choices and professional development process (Spock & Perry, 1997). Leichter and Spock (1999) in a subsequent discussion of this same study, highlight the power of storytelling as a method for understanding the museum experience (both for visitors and for museum professionals). The authors' findings on how museum staff entered museum work, indicate that staff who worked in "conventional" museums (museums other than children's museums) seemed to follow a definite path and plan to go into museum work. Leichter and Spock state that stories from these staff members "had deep roots in past museum experiences and carried a certain sense of inevitability" (Leichter & Spock, 1999, p. 52). The researchers found this response contrasted with data from staff of children's museums, where many of these people reported coming to work in children's museums through an "accidental encounter which provoked a sudden revelation that led to a lifelong commitment" (Leichter & Spock, 1999, p. 52). It may be relevant to note, that the staff members interviewed in this study were all attending either the American Youth Museum (AYM) Conference and/or the American Museum Association (AAM) Conference in Philadelphia in 1995 (Leichter & Spock, 1999).

Museum collaborations and partnerships appear to be connected to professional growth of museum educators (Dierking et al., 1997; Hirzy, 1995, 1996; Sneider, DeLatour, & Mendelow, 1993). In David Chesebrough's (1998) research exploring the characteristics, factors, and conditions of museum partnership from the perspective of museum directors, successful museum partnerships were noted to affect staff growth. His findings included the fact that partnerships serve as relationships, and successful partnerships can result in a rich variety of staff and leader interactions occurring across the partner institutions.

Positive internal effects of museum partnerships included staff growth, institutional changes and growth, improved performance, relationship building, and satisfaction. As a result, when partnerships went well, they bred more success, growth, and higher intensity levels, and/or prepared a foundation for the museum to engage in more partnerships. (Chesebrough, 1998, p. 94)

A number of research studies were conducted on children's museums in conjunction with the project Children's Museums: Bridges to the Future. The project has been reported in the volume *Bridges to Understanding Children's Museums* (Gibans, 1999). One such study, by Khalsa, Steuert, and Sykes (1999) focused on collaborative relationships among museums. The researchers found that professional development can be associated with

influences that children's museums have on other kinds of museums. Collaboration and staff migrations among different kinds of museums can serve as a means through which new ideas and differing approaches to learning may transfer among institutions (Khalsa, Steuert, & Sykes, 1999).

Several other studies in the Children's Museums project highlight the influence on learning for museum staff through their relationships with schools and community groups. Mabry and Stake discuss the complexity of the relationship between the Gilbert House museum in Salem, Oregon, and the Salem-Keizer School District, and the learning that emerged for parties on both sides of that relationship (Mabry & Stake, 1999). In another article included in the report, Takahisa (1999) echoes this discussion about the challenges surrounding mutually meeting the needs, approaches, and requirements of two kinds of institutions, museums and schools. Takahisa defines collaboration as dialogue: "a conversation, a bopping back and forth of ideas. In the process, each side grows and changes" (Takahisa, 1999, p. 110). She concludes that the dialogue that these relationships stimulate will serve to "raise standards and develop strategies to ensure excellent teaching and learning practices for all students" (Takahisa, 1999, p. 110). A third study included in this project was Elshtain and Turner's (1999) research on children's museums that are involved in community collaborations. The authors posit that museum staff involved in projects with community learn through these involvements. Their findings note that museum staff are:

. . . constantly taking the pulse of their communities. They have researched perspectives on difficult, but unavoidable issues; they have examined and compared how subjects such as poverty and prejudice are being dealt with at other children's museum sites. (Elshtain & Turner, 1999, p.120)

Elshtain and Turner point out that the process of their research involved the act of talking at length with museum staff about their involvement with community. The researchers observed that this methodology awakened the reflective process for these people, stimulated their analysis, broadened their perspective, and provoked new action on their part (Elshtain & Turner, 1999).

In other instances, data concerning the professional growth of museum educators has been gathered through evaluations and/or reports of projects and programs that included museum teacher educators along with other participants such as classroom teachers and/or university personnel (Bailey, 1998a, 1998d, 2001a; Rankin, 1999; Stein & Rankin, 1998). Additionally, research projects conducted in concert with my own doctoral studies offer insights into the factors associated with the professional development of

museum teacher educators such as their direct experiences working with teachers and project-driven learning needs (Bailey, 1998b, 1998c, 1999a, 2001b).

Another resource for understanding the process of professional growth of museum educators comes through writings that contain personal and institutional stories connected to learning and growth experiences and staff development initiatives. Sometimes these stories are embedded in discussions about other issues, but their presentation offers documentation toward an examination of museum professionals' growth (Brooking, 1999; George, 1999; Gurian, 1999a, 1999b; Nichols, 1989, 2000; Roberts, 1997; Sweet, 1984).

NEED FOR FURTHER RESEARCH

There has been a call for ongoing research efforts to move an understanding of the informal learning process forward and to develop innovated methods and new tools for building theory (Crane et al., 1994). There is a need for more empirical research in the field of professional development in science museum education. This contrasts with the growing body of research looking at the relationship of science museums to the visitor experience; family learning; school field trips; their work with members of the formal education community; their part in the general educational infrastructure; their relationship to interdisciplinary, and cross-media aspects of science learning (Bailey, 1998a, 1999b; Borun, Cleghorn, & Garfield, 1995; Crane et al., 1994; Falk & Dierking, 2000; Falk, Donovan, & Woods, 2001; Frechtling, Sharp, Carey, & Vaden-Kieman, 1995; Hein & Alexander, 1998; Inverness Research Associates, 1996; Price & Hein, 1991; Ramey-Gassert, Walberg, & Walberg, 1994; Stein & Rankin, 1998). Much less research has been focused on investigations of the professional development of the museum staff whose role it is to serve museum visitors and the specific audiences with whom they work. Findings about the professional development of museum educators from other studies have been derived through a variety of particular lenses, such as particular professional development projects; museum-school partnerships; and the perceptions of those in other institutional roles (Chesebrough, 1998; Finnerty, Ingram, Huffman, Thimmesch, & Gilman, 1998; King, 1998; Science Museum of Minnesota, 1996; St. John & Hennan, 1997).

A search through the museum literature did not uncover any empirical research specifically exploring the phenomenon of professional learning of museum educators in relation to their ongoing, day-to-day, situated work. It is my hope that this research study, on how museum educators build and carry out their profession, will add to the

museum field's understanding of the learning process occurring for the professionals whose work carries forward the institutional missions within science institutions.

Section Three – Findings, Discussion, and Implications

INTRODUCTION TO FINDINGS

Interviews with the respondents sought to examine how these museum educators learned to do their work. During the process, it became obvious that for interviewees to explain *how* they learned, it was important/necessary for them to discuss *what* they learned. In addition, their discussion also gives evidence of their beliefs, values, and perspectives and thus offers an initial glimpse into who works in museum education. Therefore, their need to express what they do and who they are was valued, and used to guide both data analysis and reporting of findings by addressing up front the *what* and the *who* of museum education work. Findings relating to the *how* of their learning process are discussed afterward.

Part One, *Definition and Description of Museum Education*, includes: what museum educators do; what they consider to be critical skills and attitudes to do this work; the context and culture of their work; and their attitudes about their work.

Part Two, *Learning to Do Museum Education Work*, looks at the ways and means that constitute the process of building the knowledge, skills, and attitudes that relate to doing science museum education. This section also explores other aspects of museum professionals' general experience that link to and/or influence their professional growth.

FINDINGS PART ONE: DEFINING AND DESCRIBING MUSEUM EDUCATION WORK

The most central characteristic of all museum education work, according to Lisa Roberts, is to provide the interpretation or communication bridge between the public and the museum's expertise and mission (Roberts, 1997). The work described by the museum educators interviewed in this study is consistent with Roberts' statement.

The respondents had many reflections about what their work involves. These included the responsibilities and activities of their museum education work; their beliefs concerning the skills and knowledge they see as necessary to do their job; their perceptions of the context, community, and culture in which they work; and how they view their work with the formal education community.

THE RESPONSIBILITIES AND ACTIVITIES INVOLVED IN MUSEUM EDUCATION WORK

What Museum Educators Do

Much of museum education work is carried out in the form of programs. Often implemented within the public spaces of the institution, such activities are generally noticeable to the museum-going public and include demonstrations in the galleries, museum tours, and programs available for both the museum's casual visitors and especially registered participants. Sometimes museum education programs (such as evening programs and programs held in museum classrooms off the gallery floor) are only visible to specific audiences. In addition, many programs and projects are conducted off-site. These, referred to as *outreach* programs, include programs that museums implement in schools.

Findings indicate that a considerable proportion of museum educators' work is allotted to the shaping, designing, organizing, and oversight of these programs. Activities include:

- The planning and development of programs and exhibits and the production and management of their associated materials
- Communicating and building relationships with program audiences
- Pursuit of funding for projects and programs
- Attending to marketing, budget, administrative, and management-related issues
- Conducting evaluation and research
- Supporting other museum staff (both within their institution and across institutions)
- Pursuing their own professional development.

Although, according to data, programs are their primary involvement, museum educators also have been involved with exhibit development.

Exhibits are hugely more complicated and require more collaboration than programs (Mod 2nd, 77-82).

[I did a program about dinosaurs] and then I've used that dinosaur information – as a matter of fact, if you go out to the dinosaur exhibit here, the newest piece of the exhibit has dinosaur fact and fiction, and . . . part of that development is from me (Jem 1st, 1405-1409).

Titles and Reported Activities

Museum educators carry many different titles that even for jobs of a similar nature can vary among institutions. Titles reflect the way institutional leadership, members of the organization, and the museum educator him/herself view that position within the organizational hierarchy:

I am the Director of Exhibitions and Public Programs, which I think is a very intelligent title, because what it does is it ties together two things that are inseparable. The development between them has to be seamless. A lot of places still separate them. So you have – “let’s build an exhibit, and oh yes, we have to, as an afterthought, do programming [for that]” . . . Having the two combined in a single position was a stroke of genius, and I credit my boss with that (Rab 1st, 1649-1670)

The following is partial listing of titles respondents currently hold or have held:

Humanities Program Director (Rab)
 Director of Exhibits and Public Programs (Rab)
 Museum Education Specialist (Pob)
 Program/Volunteer Coordinator (Dib)
 Education Director (Lod)
 Director of Science Programs (Mod)
 Assistant Director of the Resource Center (Mod)
 Regional Education Coordinator (Ked)
 Director of Education (Jog)
 Director of Education (Lig)
 Education Associate III (Rah)
 Teacher Services Supervisor (Rij)
 Education Associate III (Kol)
 Curriculum and Evaluation Coordinator (Pul)
 Director of Education and Public Programs (Jem)
 School Visits Program Manager (Hes)
 Assistant Director of Education (Hes)
 Director of Education (Sut)

All respondents described having an assortment of job responsibilities either currently or over the course of their time in the profession. Many explained that their museum work

responsibilities have changed over time, resulting in an increasingly diverse range and depth of experience.

I was first hired . . . to handle the children's and family programs and to work with teachers . . . And then, probably like most jobs in nonprofits, you are given more and more as the organization grows and expands. . . . for example. . . . I am now sort of the functions manager of this building, in charge of renting it out for weddings and lining up hosts to be here. . . . And within the education department, I've been asked and been willing to do more to support the adult programs, . . . helping to set up and take registrations during the busy times (Dib 1st, 203-222).

I became increasingly responsible for sales and materials. I became ultimately the editor of the newsletter . . . that goes out to teachers. I began to do more and more teacher workshops. I became ultimately responsible for teacher workshops (Rij 1st, 984-991).

Additionally, the particular history of their organizations and the history of the field of museum education itself is reflected in museum educators' changing job descriptions over time. All of those interviewed reported some degree of change of their work role, responsibilities, and concerns.

I am seeing more and more how the state standards are affecting what we do. We spend a lot of time aligning our program to changing standards (Pob 2nd, 28-32).

We came from a mindset of teacher institutes where we set the agenda. We've done a lot of one-day workshops, and you could sew together a bunch of one-day workshops and make a one-week workshop. [We were searching] for something different. We found that there's always been a creative tension between wanting to grow the teachers' agenda and their projects, and make it more sabbatical-like, something that has more of a spirit of reflection [and] a different kind of educational culture (Rij 1st, 1090-1103).

In [this] museum, a long time ago [we did] those two-hour workshops for in-service. . . . we all knew that we didn't want to do that anymore because it wasn't effective and that there were other strategies that we could use in a different design of working with teachers, we shifted out of that and moved to the content-based institutes (Hes 1st, 600-614).

We are probably not alone in that new realization that as an environmental education center, we are also a museum. . . . I think this new organizational awareness will affect my own learning. . . . For example, I am beginning to get involved in conversations of looking at displays and exhibits (Lig 2nd, 39-46).

Each respondent outlined specific job responsibilities they currently hold or have held

1 Rab:

Does outreach programs for teachers in schools

In charge of galleries

In charge of a science theater

In charge of a discovery room

Responsibility for “experimental exhibit”

Visitor studies work

Program and exhibit department head

2 Pob:

Program development

Providing professional development for teachers

Grant writing

“Chief cook and utility” person

“Temperature taker” for floor activities and workshops

Develops curriculum

Designs kits and loads kits

Coordinate Museum Institute for Teaching Science (MITS) institutes for region

3 Dib:

Does programs for children and families such as tours

Functions coordinator

Support work for adult programs such as registration process

In charge of special event days such as “Earth Day”

Designs docent training programs

Volunteer coordinator

4 Lod:

Explainer

Does programming for exhibits

Does outreach workshops with teachers

Responsible for content of distributed written materials

Develops signage

Schedules public programs

Hires outside instructors to teach programs

Works with exhibit director to evaluate new and existing exhibits

Involved in planning exhibit placement and rearrangement

Works with district and school personnel on partnership project for exhibit development for schools and classrooms
 Teaches outreach programs to students in classrooms
 Presents to adult audiences
 Does interdisciplinary research in science

5 Mod:

Developer (content expert) of educational programs, materials, and systems for communities groups and schools
 Exhibit developer
 Works with teacher groups to develop pre and postmuseum visit activities
 Works collaboratively on exhibit development teams
 Supervises family workshops and library projects programs

6 Ked:

Planetarium lecturer
 Animal programs presenter
 Curator of collections
 School programs
 “Delivers services” to schools
 Does public programs
 Does what “needs to be done”
 Keeps alligators at bay
 Does mini-workshops for teachers relating to field trips
 Works with regional educator’s network
 Grant writing
 Works on budgets
 Teaches kids and adults
 Does research
 Reviews materials for interpretation use
 Serves on committees for the statewide organization of institution
 Responsible for education for the local institution (i.e., works in and with schools, camps, vacation programs, and teacher professional development)

7 Jog:

Develops programs
 Leads guided zoo tours, themed programs
 Does mailings
 Does registrations
 Writes and prepares guides

- Goes into classrooms with programs
- Organizes special events days
- Does animal care
- Does off-site programming for public
- Does educational programming

8 Lig:

- Manages entire education program for the regional organization (adult, children, and family programs, school programs, partnership programs, docent training, and functions)
- Manages some interpretive information and materials
- Manages some publications
- Does grant writing
- Focuses on adult learning
- Innovates new programs
- Give tours to groups
- Hires and supervises education staff

9 Rah:

- Develops a variety of professional development programs for teachers, including outreach workshops, mini-residency program, in-house workshops
- Coordinates and organizes the marketing of profession development programs
- Kit Program manager

10 Rij:

- Consultant for [local public school] teachers in their classrooms, observing, providing feedback, and technical support
- In charge of all professional development programs, including workshops, and mini-residency program
- In charge of Teacher Resource Center (TRC)
- Collects and “scrounges” for resources of TRC
- Responsible for sales and materials
- Editor of museum’s newsletter to schools
- Works with volunteer assistants
- Works with teachers one on one who come into museum for technical support and resources
- Serves as resource center for the museum staff in general

11 Kol:

- Does hall presentations on stage (i.e., animal and physical science demonstrations)

Does demonstrations for school groups by appointment
 Does school programs in museum classroom
 Develops and manages education programs for museum, such as mini-workshops for teachers, outreach teacher workshops including budget management, materials management, and logistical arrangements
 Greets school groups and does orientation for school groups from educational perspective
 Works and supports the museum outreach teacher educators
 Creates teacher programs for new technology center

12 Pul:

Curriculum coordinator
 Organizes meetings and provides oversight
 Does professional development work with teachers in schools
 Works in classrooms with teachers and students
 Does evaluation of museum programs

13 Jem:

Directs science theater
 Writes science plays
 Writes music for plays
 Plays instruments for plays
 In charge of public programming for schools (natural science and ancient civilization)
 In charge of general programs for public (i.e., concerts, films)
 Coordinates efforts such as bookings, lighting and sound needs
 Does exhibit development

14 Hes:

Professional development workshop facilitator
 Oversees school visit programs to museum
 Helps teachers plan their visits to museum
 Develops and is in charge of teacher content institutes in geology and paleontology
 In charge of teacher education programs
 Does adult education work with volunteer interpreters
 Exhibit development
 Coordinator for partnership between high school science class and museum
 Involved with project developing videos for inquiry-based learning
 Serves on committee for museum staff's professional development

15 Sut:

Initiator of an environmental education organization "from ground up"

Teaches field-based programs for teachers and students
 Administers education programs, including budgets
 “Does what needs to be done”
 Develops, evaluates, and revises programs
 Develops curriculum for local school district
 Models science instruction for teachers
 Coordinates Museum Institute for Teaching Science (MITS) institutes for region

Although the specifics of each individual’s activities are colored by the particular focus of their institution, it is evident from data that there are types of activities that are common for museum education across all the respondents’ institutions.

In general, respondents see *working with people* at the core of their jobs. They view their work as facilitating people’s understanding, interest, and actions in relation to science and other disciplines. Many of those interviewed emphasized that their institutions are educational venues for public learning. They explained that collections should serve as a focus and tool to further people’s understanding and appreciation about the world in which they live.

I think that the biggest thing that people in museums forget is that it's not about the painting; it's not about the sculpture; it's not about the science exhibit; it's about the person that's coming in to look at it (Jem 1st, 2298-2303).

I think that as you spend more time in places like zoos, you realize that zoos really aren't about the animals. . . . they are about teaching people about conservation, and why we need to preserve wild lands. . . . the more knowledgeable they are about science, the more knowledgeable they are about health, they make better decisions for themselves, and also for the world (Jog 1st, 115-121; 1875-1887).

We were trying to get kids to understand the world around them, whether it was art, whether it was science, whether it was history. . . . It was not enough to memorize and spit it back out. . . . We wanted to make sure that people understood the why; that people understood the connections between all of those things (Rab 1st, 438-448).

The public with whom museum educators work is comprised of segment audiences: children, parents, adult groups, youth, school groups, teachers and others working in the formal education community, and a variety of special-interest groups. Respondents reported working with a number of these audiences, but the extent to which they work with particular audiences differed according to their own particular job description and institution.

Several museum educators believe that museum projects and programs should ultimately reflect the mission of the institution. They explained that museum programs need to connect to changing times and serve to help drive educational reform.

For so long, it's been kind of ingrained in my head, thinking . . . any museum program that we do should be based on the strengths of our institution, and that means mostly programs, but – if we didn't have anything on sharks here, then why would we do a program on sharks, for example, . . . [we should] always [be] trying to keep that balance of why it is that we are doing [it and] how does it fit with the mission of our institution (Hes 1st, 1028-1038).

I'm in a position not just of doing the work, but thinking about how we shift to change the work, how the work fits with what else is going on in the world, and if we're going to try something new. Generally, we're involved as educators in helping drive shifts and changes, and what our work looks like (Kol 1st, 735-741).

PERSPECTIVES ON KNOWLEDGE, SKILLS, AND STYLES NEEDED

This section provides findings on what the museum educators identify as skills and knowledge pertinent to effectively carrying out their work. Respondents also considered attitudes and styles that they view to be advantageous when performing museum education work.

Knowledge and Skills Required for Museum Education Work

KNOWLEDGE ABOUT TEACHING AND LEARNING

Several respondents believe that learning through experience is highly effective and they employ that method in their own teaching. They highlighted influences from prior instructional experiences that employed experiential approaches, their personal preferences for learning in this manner, and the impact of how these two highlighted situations have influenced the way they teach.

They discussed how the act of exploring things first-hand encourages memory and deeper understanding; the benefits of being able just “to mess around” with their exploration as opposed to a cookbook methodology; and how this approach to learning engenders a comfortable and collaborative learning environment.

If I am learning the names of plants, it's better to actually see the plant, smell it, touch it, feel it, not just see a slide of it or look at it in a book. . . . So when I

teach other people, . . . the avenue I tend to go down is to try to get them as involved personally with it as I can, sensually. That is why I like to work with kids so much, is because they are very sensually oriented (Dib 1st, 618-630).

So that's how I teach: a lot of hands-on and just being able to let the students investigate themselves and . . . sometimes in labs that I was taking as a student, I wanted more time to be able to do things, or what happens if I don't do step three before step four? And I just wanted myself to be able to mess around or to work with things, rather than have everything cookbook, and so that's how I teach and that's how I felt comfortable learning and teaching (Sut 1st, 537-547).

Respondents discussed a process of fine-tuning in their teaching that they attribute to gaining expertise, know-how, a backlog of experience, and developing intuitive savvy in particular areas. They also pointed to a general form of expertise that comes through maturation and developing a more sophisticated world knowledge.

So it's being very prepared, mentally and material-wise, but not necessarily throwing it all at people. I used to in the beginning and then [realize], ooh, here is the kernel and here is what works best, that evolves over time. And it evolves that way over one topic. Then I think you hopefully get a little more savvy that now you can translate if you're doing something totally different, you know, you have that confidence and you can say, gee, I think this might really be the way to start this group off on this particular topic or something (Lod 1st, 1007-1020).

I also think it's related to personal maturity, that when you become older and more experienced in the way that the world works and the way that people communicate, you start to see nuances that maybe you weren't picking up on when you were younger and had all the answers – when you knew all the answers already. So, yes, it's definitely amazing, and something that when I was younger, and still doing this kind of work, I was not attuned to, so time, maturity and experience all contribute to that, I think (Jog 1st, 1847-1858).

PROGRAM AND EXHIBIT DEVELOPMENT SKILLS

All the museum educators interviewed are involved in the planning, design, and development of the programs they implement. Respondents discussed the skills they believe are important for effective development of programs and exhibits.

They explained that designing effective professional development programs for teachers includes designing program experiences where participants can learn by doing; keeping the ideas and content in manageable packages; and incorporating museum exhibits into professional development programs as a means to model object- and phenomenon-based learning.

[In order to address] the real sea of change for folks [in science, we try] to set up situations where they can take small bite-size tries at that and say that they learned from a little bit of the doing. It's not let's design a whole curriculum, a whole semester for your kids in botany during this week or two weeks; it's let's give you some experience of doing the science (Rah 1st, 1018-1025).

All my presentations are usually hands-on. . . . I really like to put teachers in that role. . . . as they go through some of the activities. . . . It gives them a different perspective on teaching and on learning. I will often have teachers say, Now, I understand what my students feel like . . . or . . . Oh, wow, I finally understand that concept, because I went through this activity and I worked through it myself (Sut 1st, 939-959).

I [write] professional development programs that are based on the exhibits, . . . and work . . . both directly with teachers, and [with] students as a way of modeling the way we work with kids . . . and gradually scaffolding that, so that teachers play more and more of a role in working with those kids (Rij 1st, 1704-1717).

Some of the respondents have developed skills in creating exhibits. In the view of one respondent, this requires the ability to tell stories and knowing how to engage people.

I think we're trying to tell stories all the time, and we're trying to make somebody connect. . . . if I want them to read a sign, I know if I just stick a paragraph up there, nobody is going to read that. I need to ask them a question in order for them to engage, or better yet, tell a joke, or illustrate it in some sort of – it has to stop them for a minute (Mod 1st, 802-810).

PRESENTATION SKILLS

Having good presentation skills – talent working with an audience a certain degree of stage presence – is key to carrying out museum education work. These skills are necessary for implementing programs in the galleries with the public, for doing general interpretation activities with groups of all ages, and for presenting teacher workshops and other similar museum education programs. They also discussed the need to develop an individual presentation style, the use of humor in their work, and the ability to incorporate these skills while sharing content knowledge.

And I think it's kind of fun to be spontaneous and to take some chances, to put yourself out there, not be afraid to be a little silly if you are trying to teach someone if it is going to help them loosen up a little bit (Dib 1st, 1589-1593).

I think [informal education work] does combine this unique package of skills. You have to be a presenter; you have to have some skills that are probably in

common with performers and artists, and that's one component of it. When you work in a natural history field, you also have to be like a science head to some extent; you have to be someone who has that interest, and the ability to hold in a lot of information, because you get questions from all over (Jog 1st, 116-131).

Issues they view as key for skillfully presenting museum programs in general and teacher education programs in particular include engaging one's audience by tapping into their interests and areas of comfort; connecting to teachers' worlds and concerns; and challenging teachers to stimulate their learning.

It only takes one thing to fire – to spark someone's imagination and desire for learning . . . Most of the time you give people that, and it will spark them, and they'll go on and they'll run with it (Jem 1st, 1245-1246; 1280-1287).

If I'm going to recommend a whole series of activities, I'll say, look, I've done this myself with [kids], and when you do this, watch out for this, because . . . Oh, so [they realize] he has done this. He knows what kids may do, or something like that. So it buys me credibility with working with teachers (Kcd 1st, 1665-1662).

What works for me is to challenge teachers without hurting them, without threatening them. I tell them that one of my jobs in the [one week residency] is to be a provocateur, to provoke them (Rah 1st, 944; 958-962).

CONTENT KNOWLEDGE IN SCIENCE

Museum educators interviewed had a range of content knowledge in science. All believe it is necessary to have science content knowledge, but for some it has been a process of building this knowledge and/or filling gaps in their knowledge. They explained gaining needed knowledge as the situation required.

So, I went to Harvard Extension, and I took animal behavior, bird biology, two geology courses. I took three or four astronomy courses, because I was going to have to be teaching that (Pob 1st, 312-316).

ORGANIZATIONAL, MANAGEMENT, AND PROBLEM-SOLVING SKILLS

A few suggested that it was valuable to have skills for project organization and management, such as skills ranging from systems for creative development to systems for accomplishing the nitty-gritty aspects of materials management and workshop logistics.

One thing, you learn [is] you need a system to doing your work . . . When I used to do exhibit development, it was [to] start with what do they need to know to get

this across . . . [A colleague and] I developed this huge chart about what is needed? “Who cares? What would make it a grabber? What would make somebody want to try this? What are the problems?” A whole series of questions that help you sort. It's a big sorting thing (Mod Ist, 470-471; 555-565).

So, I took on this program, and of course, there's the bottom line challenges out there – there's budgets to be met, and programs to be run, and stuff – all the stuff . . . to be packed in boxes, so when you get out there you have the right things. There's all the logistical things, which is one of my strengths (Kol Ist, 1044-1050).

SITE-SPECIFIC KNOWLEDGE

Another skill highlighted by respondents was the need for an intuitive understanding of one's institutional structures. This kind of knowledge was a certain savvy about *how things are done* or *how things work* in that organization. This skill set, according to respondents, allows one to navigate the bureaucratic parts of the organization with relative confidence and ease and develop a basic knowledge of the institutional systems and culture.

[I was never given a] sense of this is how you fill out this business form. . . . This is how you do this . . . those things are important. If [you]. . . feel that you have to ask somebody for everything. . . it gets tiring and it makes you feel . . . I should know these things, but why don't I? (Pul Ist, 1605-1614).

I had to learn a lot about this place, . . . when I came here I really had to learn a lot very quickly. I felt like I really need to understand how this particular botanic garden works, . . . So, I needed to learn a lot about the history and a lot about the plants, themselves (Lig Ist, 581-591).

I have always been one of those people that if I'm going to do something, I have to learn every little square inch of it. . . . If I was going to be an effective part of the museum staff . . . I needed to understand everything about it. I needed to understand the entire entity. . . . You can't figure out what's going on in a culture until you sit there for a year and get the whole . . . picture (Rab Ist, 886-895; 915-930).

[In] our own little museum, . . . you have your sort of private language – you know, a common language within (Kol Ist, 2293-2296).

Styles and Strengths Useful for Museum Education Work

Many respondents believe that there are specific personal traits, styles, natural strengths, tendencies, operational modes, and orientations for this kind of work.

In one respondent's perspective, it requires a predisposition toward thinking creatively about presenting a topic and the ability to continually focus upon it, while seeking and making connections.

One thing is about this field of development of programs and exhibits – I think you have to bring something to it. . . . It's hard to learn. I brought something to the job, I didn't learn on the job and that was how to explore a topic, keep your eyes and ears open. . . . You have to always be on it. It's a topic that's always active in your thoughts and conversation (Mod 2nd, 21-35).

A number of respondents emphasized the importance of being a self directed learner in order to be an effective museum educator. They pointed out the need to drive one's own learning and be able to navigate through a self-study process that can be unclear at times.

I think you have to be very self-motivated to be good at this field. So, the responsibility is really on you to develop yourself. If you don't have the – an education background, which I didn't have . . . definitely at the beginning it was kind of hit and miss (Jog 1st, 607-614).

Several respondents discussed the need to be able to work within a climate of change. They explained that flexibility and a certain tolerance level to surprises and new ventures were necessary to working successfully in the museum world.

. . . if you're in a museum that is changing its exhibits around a lot and getting different kinds of programs funded, then you're probably going to need to tolerate a lot of change. . . . things are in chaos more than they're not in the development of things. . . . I think if you don't tolerate that kind of work style, you're not going to last too long (Mod 1st 1391-1407).

[Things are] always changing. – you kind of never know. You have your schedule of the programs . . . but . . . we come in some days and the power head has sprayed . . . half the water out of the touch tank. Well, there goes whatever project I was going to work on today, because now we have to take care of this problem. . . . So, much for schedule (Sut 1st, 1263-1373).

A number of respondents believe that an inclination to take risks, such as being able to admit a lack of knowledge and to have the courage to take on new challenges, was important to doing museum education work.

... when people offer you an opportunity ... "Do you want to write something? Do you want to work on a curriculum? Do you want to work on a theatrical piece? Do you want to come up and help the curator put up this particular piece of material, or help the exhibit designer/director develop these?" ... It doesn't make any difference if you don't know what you're doing. ... It doesn't matter; just say yes! And when you get finished you will know (Jem 1st, 1918-1936).

Most respondents discussed the need to have keen observation skills and ongoing diagnostic skills to effectively do museum education work.

I think ... you sort of can be in a situation, and learn from it as you're going on. ... I can be ... a participant in a class but I can also be looking at how she's teaching the class (Pul 1st, 1026-1033).

MUSEUM EDUCATORS' PERCEPTIONS OF THE CONTEXT AND CULTURE OF THEIR WORK

Where and When Museum Education Work Takes Place

Activities that relate to performing museum education work take place in a number of locations that include: on-site in the museum; off-site at schools; at other community facilities/centers; at meetings, conferences, and other events; and in the homes of museum educators.

Museum educators' official work schedules frequently do not align with business world or formal education community working times and often involve evening and weekend work.

You know, early in the morning or covering classes later at night, I have a really nice comp time system, where anytime you work overtime you are compensated by taking hours off other times (Dib 1st, 913-917)

A number of the respondents discussed working and trying things out at home including just thinking, problem solving, and doing things that require focus, space to spread out, quiet, open-ended time frames, and just because circumstances at work inhibited them

from getting things accomplished. Two respondents reported working at home as less desirable because they had made a conscious decision not to do so, or because home didn't offer appropriate work conditions

I . . . [was] . . . trying a lot of different things physically myself the night before, playing with all the stuff, and seeing what's intriguing, what else might we use in here . . . A lot happens at home just because you physically want to spread stuff out and not have to put it away in two hours. . . . Because you're a professional. It doesn't matter if you were planning on two days of prep for this teacher workshop you were doing . . . you end up being on the floor because everyone is sick and away. You do it at night and at home to make it happen (Lod 1st, 1843-1848).

I have my journals and magazines that I have a pile on the dresser. Every night before, almost every night – I would say six out of seven, anyways – I read for 15-20 minutes another article, or get through a magazine. So I try to stay current with what's going on in the field. I get a lot of neat reading that way (Ked 1st 1940-1948).

. . . occasionally, I try to work at home sometimes, and I can read, but I'm just not really that motivated to do it there. So – I like having all my stuff around me; I like having all my resources in one place (Lig 1st, 1400-1404).

Several of the respondents explained that they are mentally and emotionally involved with their work around the clock. For many there are fuzzy boundaries between activities they define as work and things they choose to do in their nonworking hours.

I think, like a lot of people, my job is most of my life. So either you're doing things that are associated with your job, or a result of your job, or will help you do a better job, or your vacations are job-related (Ked 1st, 1930-1936).

So I know for myself, a lot of work happens after hours at home because I can focus and do it, and especially [reading] the listserv. . . . I take that more as almost . . . personal – I mean, I enjoy it. It is part of my work, but it's who I am too. It's my hobby and my job all rolled into one (Lod 1st, 1760-1768).

Influences of Institutional Size

A number of respondents discussed how institutional size affects their museum work. Several of those interviewed linked institutional size to the characteristics and scope of their work. They discussed its effect on their work involvements, collegial interaction,

and projects. Most but not all of the respondents raising these issues work in smaller institutions.

In smaller institutions, where people carry a variety of responsibilities, the work foci may be wider. This can permit (or even necessitate) job overlap and the wearing of multiple “hats.” In the view of one respondent, working in a smaller institution provides increased opportunity to be involved in key decision making. Also, in smaller institutions, circumstances often require that staff members be familiar with other roles in the museum, so that they can fill those roles where needed.

In a small organization you are always wearing more than one hat (Sut 2nd, 338-39).

And I think this place is unique too, in the sense that I can play such a large role in programming exhibits . . . so you can really make a difference, [make] a lot of decisions and carry them through rather than [in] a very large institution where you're just one little cog in the whole system. . . . If a problem comes up on the floor we can all step [into] each other's shoes and we have to (Lod 1st, 187-199; 1969-1971).

A respondent in one institution with a very small education department had worked initially as the lone educator in the organization. This educator reported missing the ability to interact on-site with colleagues with similar professional orientation.

In addition to the primary responsibilities of their specific job descriptions, many of these museum educators are drawn into supporting other organizational concerns, such as keeping museum systems and goals in place and up to par. This can include taking part in housekeeping aspects of the organization. Several respondents explained that this kind of intimate working environment can engender high levels of feelings of responsibility and obligation toward one's coworkers and the institution and motivate people into making sure that all sorts of tasks get accomplished.

[In addition to] the program development . . . professional development sessions, and grant writing, all of that stuff. [I am] chief cook and utility – like most museum people, you do whatever has to be done. You change the sheets in the Sick Room, and make sure those get laundered. . . . and . . . do what you have to do (Pob 1st, 629-637).

The job descriptions are loose [in a] nonprofit, because we are all working together for some common goal (Dib 1st, 468-471).

You feel like I can't go home until this is done because everyone's going to know. Or if we're short staffed. . . . there is a lot of that. . . . Some of it is self-imposed,

but it's because it's like your own place and you want everything to be just right for everyone who comes in (Lod 1st, 1687-1697).

Many of the respondents working in institutions with small staff numbers, feel the work load in their museum is often stretched to the limit among that small number of people.

I think we do some pretty important things with a very small staff that's torn in twenty different directions, you might say (Lod 1st, 2028-2030).

It's way too busy. I'm very glad to have a [new] full-time person, who just started with me, and I'll be hiring, hopefully, another person shortly. There's just a huge need, and a huge interest here from teachers, from families. I get so many requests that are valid requests, that are wonderful ideas, that I can't meet as one person (Jog 1st, 351-358).

One respondent currently working in a larger institution associated the size of that institution with the kind of projects with which that museum tended to become involved. Many of these projects have had a national perspective, something that this museum educator identified as important and stimulating for professional growth.

. . . also what has helped me is being [in] a large institution, I have been exposed to so many different opportunities and projects. That, I think has helped me build my professional capacity in working with teachers. . . . [When I was] away from the organization while [in a museum] . . . in [another state] . . . I missed the opportunity to be involved in so many different types of projects, and working nationally with different people on projects (Hes 1st 557-564; 1598-1603).

Working in Informal Learning Settings

A number of respondents highlighted the special characteristics of work in informal learning environments, and many contrasted differences in how learning happens in museums with how learning happens in schools. They pointed out museums' learner-directed and individualized quality; treat-like aspect; natural and relaxed atmosphere around the learning process; positive audience attitude; and opportunities for teachers to observe their students in other learning settings.

In a [museum], . . . people really have more of a choice to learn. [It is different from] the classroom. . . . When they come to a place like a museum, there has to be a different motivator to learn, . . . "It's Saturday; I'm here with my kids. I just want to have a good time", or "I'm here with my school group, and this is a field trip for us." It's a treat (Jog 1st, 1374-1388).

Kids come in and they were enthusiastic, and they were happy to be there, and they're happy to see you, and you were great, and everything you did was wonderful (Pob 1st, 61-64)

Teach[ers] . . . having opportunities to watch their students in other settings, . . . we see that a lot here at the museum Teachers we work with will often comment on changes they notice in their individual students. Sometimes they see them in new light. Social interaction and other things change for some kids in the museum setting (Lod 2nd, 95-108).

Museum education work, as described by several of the respondents, can have periods of intense activity and periods that are less intense. In some cases, such as in centers with outdoor exhibits, this activity fluctuation appears to be connected to the seasons, weather, and the museum's venue. In other cases, it appears to be linked to scheduling of programs; the schedules of visitors, such as school groups; and specified deadlines.

. . . another thing that is really nice about the work that I do here is it's very evolved through the seasons . . . and the frenzy of the spring [is contrasted against]. . . the winter months [which are] more contemplative. So it is always different, what you are doing and the pressures are a little different, and you know that there is a hard time, but then there will be a time for rest later on, when you can regroup a little bit (Dib 1st, 1390-1402).

It's a wonderful feeling to feel that you can make a difference, but . . . there is only limited time and energy to put to [programs]. . . And some of those are seasonal too. January is so horrible because it's when so many things culminate, the newsletter and just feeling like you have all these deadlines that can't move at all (Lod 1st, 1902-1915).

Working in a NonProfit Environment

All but two of the respondents currently work in museums that are organized as private nonprofit institutions, and all have worked in a private nonprofit at some point in their career.

Over two-thirds of the interviewees discussed what it's like to work in nonprofit environments. Museum education is a service profession. The decision to stay in museum education means accepting a number of things: high demands in terms of experience and credentials; job insecurity connected to working in nonprofit organizations; managing one's life within a low income category; and working in an environment that is constantly scrounging for resources. However, each respondent

raising these issues also stated that what keeps them in this profession is that it gives them great satisfaction. Two of the respondents appeared almost uncomfortable about bringing up the issue of low pay, explaining how much they enjoyed their work.

You have to be very flexible. You have to be willing to accept the fact that you're not going to make much of a salary. . . . they'll list job descriptions that make it sound like you have to have all of this – you know, we want you to have a master's and preferably a doctorate. We want you to walk on water; salary \$18,000 a year. So,– you know, it's essentially a service profession (Pob 1st, 1901-1910).

The down side of it is, it's been rare that there were two years in a row that I knew I had full-time work. And that's really hard (Mod 1st, 1019-1021).

You're probably never going to own a house. You're never going to have the big fancy vacations or drive the big fancy car. But at the end of your career, you're probably going to be able to look back and think what a rewarding life you have (Ked 1st, 2003-2008).

The Museum Community

Museum educators from institutions of all sizes feel a strong sense of community within their institutions. They discussed sensing how everyone was working toward the same goal, being supported by their colleagues, being among friends, and sharing a common language.

We really feel like we are a community here, or resources for each other. And that is a nice feeling. . . . a thing that is very attractive about a nonprofit is that you feel that you are all working for the same goal and you want to help each other do a good job for the sake of the [organization] (Dib 1st, 450-458).

It was a very, very nice place to teach . . . everybody pulled together. . . . So, if you didn't know, there was somebody that could get you to the right place to get you the answers that you needed (Pob 1st, 418-423).

[There are] just incredibly wonderful people [that] I work with. I mean, a lot of people go to work for eight hours a day, earn a lot of money so they can afford to go out and do fun things, and I think coming to work is pretty generally fun, and some of my dearest friends are here, not because I came to work with my dearest friends, but because the way we work builds friendships (Kol 1st, 2133-2140).

People Drawn to Museum Education Work

A number of respondents explained that the profession draws people who don't follow a traditional set of career goals; have a specialized curiosity and problem-solving bent; are able to work in a fast-paced environment with odd working schedules; and have a comfort for, as well as acceptance of, all aspects of museum life.

Museum education draws people who – they just march to different drummer. . . . People who are willing to do that will come to an environment like this (Pob 1st, 2032-2035).

I'm . . . in an environment here where people . . . are curious. . . . Let's try this; let's try that; whether it's the scientist or the engineer or the problem solver in the folks who are hired here; [If] . . . I can't get it, I can find somebody who can (Rah 1st, 626-633).

There is a big turnover in the first few years of people in the museum field; and I've seen this every place I've ever worked. . . . There's a lot of people who . . . leave [the museum] for other fields of endeavor. Some go and become public school teachers. . . . Others will go and decide research is a place for them to be. . . . But once somebody's been in the profession for seven, eight, nine years, you finally tend to hang around for, for quite a while. People may change their jobs or go to a different museum, but the museum life is something they want (Ked 1st, 1180-1208).

The respondents assigned very high value to “making a difference” in their professional choice of museum education. People highlighted that working in a field that achieved a “higher purpose” was more important to them than monetary compensation. The ability to “help build a better world,” contribute to the community through being an educator, and support teachers from an informal education perspective were among the reasons cited as to why they feel they are in the correct profession.

. . . for me job satisfaction and the wanting to come into work every day is – definitely weighs very heavily in my compensation package. It's very important. I worked in retail for a year. . . . I hated every minute of it. . . . It just . . . seemed to have no higher purpose to me (Jog 1st, 299-316).

Yes, so I took a wage cut to come back. But you've got to be able to live with yourself, [it's not good] having a job that you hate going to every morning and not feeling like you're doing a damn thing for, for the society or for the world . . . pushing paper for [some] company. Here I feel like maybe I'm making a difference. . . . You can see that you're planting seeds all over the place (Ked 1st, 2084-2096).

I's just that whole feeling that you give at your community. You help make a better world. You help people where you can. . . . I'm a big believer that if you have information that can help somebody else, you have an obligation to share it. . . . You help make a difference by passing along what you know. So it's all about learning and passing (Rab 1st, 1812-1814; 1454-1468).

Something really important for me in coming here was the museum's mission to make a difference in the formal school setting. I was given the freedom to develop programs that would support that mission. . . . I wanted to see whether what I believe about education would work somewhere else, other than in a safe home of [a school district]. . . . I wanted to see whether it's transferable. . . . I really do believe that teachers are professionals and they deserve professional support. That was my mission, and still is (Rah 2nd, 41-48; 351-362).

The majority identify themselves as educators and/or teachers. Some came from formal education backgrounds; others came from science backgrounds and now have embraced the identification of educator.

I've always said teaching is not something I do; it's something I am. And if I have any sense of frustration here, it's because I don't get to do that very often (Pob 1st, 1854-1857).

And when [my daughter] got a little bit older, I kind of thought about [going back to the research lab full time], but by that time the opportunities here, were opening up, and I just really loved it. . . . I think some of my former colleagues at the lab helped me see that too. . . . I could just talk for hours and hours, and I was just so passionate about this. And they would say "Gosh, you love this. There is no way you could do anything different," you know? (Lod 1st, 100-108; 115-123).

Respondents also discussed the draw of museum education work from a personal perspective. They explained how their own personal characteristics, styles, beliefs, interests, and motivation resonate with the field of museum education.

Several respondents described themselves as generalists, and as such have found that museums are places where such an orientation is useful.

I had the luxury of being not a specialist in anything, and so they called me a generalist, . . . but you know, maybe my specialty is being an amateur, an enthusiastic amateur (Mod 1st, 474-479).

I'm a good solid generalist and I don't claim expertise in any one area. I think my usefulness in museum education is that I really do try to think outside the

box. . . . I describe myself . . . as the utility player around here. That's a baseball term, someone who can play several positions. I like to think that we [generalists] provide the balance. Because the people with the refined expertise are so focused and so myopic, – you need people like us that can come in with multiple perspectives (Pob 2nd, 59-69).

A number of respondents discussed their wide-ranging curiosity about many things; and their feeling that this is a trait consistent with being a science museum educator. Several emphasized their drive to keep on learning.

I need to constantly be learning, or I go dead. I have to have something gnawing at me. I have to constantly be learning. . . . I'm curious about everything. . . . I don't think you can go to work in a science museum if you're not that kind of person. It's the essence of science practice anyway. That's who I am (Rab 1st, 1290-1292; 2123-2128).

. . . so when I do my research, yes, I do get lost in it, and I just . . . enjoy finding things out. . . there are little bits of information . . . that you find out [and] the breadth of all these different things (Lod 1st, 1087-1093)

Many of the respondents discussed their inclination to take risks and go out on a limb in connection with their work. This quality included being able to admit inexperience or unfamiliarity, ask for assistance, and venture into uncharted territory.

. . . there are people who haven't done as well as me in museums, who studied museums; . . . who know more than me, but never say that they do. Whereas I say at the top of my voice I don't have any idea, but I'll try, and that's the difference (Jem 1st, 2117-22123).

I found that . . . I was less risk-averse than my predecessor, so I was willing to take more chances, which is an interesting discovery about myself. . . . I was more confident that I could make things work with extra effort (Lig 1st, 455-461).

A number of people discussed finally “finding” the museum as a place that fits them and fits their style.

Mine has sort of been one of those circular journeys that people sometimes have. You know, you're kind of in the right vicinity for you, but it needs to be refined, and it constantly gets refined. . . . I actually still do think, “Boy, I have a great job!” (Jog 1st, 242-252).

It's just what I have to do. . . . I'm one of these kind of people that – if I lived in paradise, I would have eaten the apple because I just can't stand things to be too much the same way for too long, you know? I like to see things evolve and grow; and museums allow me to do that (Jem 1st, 1482-1486).

Career goals of museum educators differ among the respondents. Several reported career goals that extend beyond their current work. Others explained being content working as they've been. These respondents described passing up opportunities to move into more administrative positions where they would not be working with teachers, and/or continue to have the flexibility they currently enjoy.

. . . professionally, . . . I keep talking about this, it's a dream. I don't know if I will ever do it, but I want to maybe be a principal someday, or maybe there is some other director position that I would have to support the adult staff in their teaching assignments (Hes 1st, 1616-1631).

I deliberately decided not to become middle or upper management. . . . Not enough opportunity to be in the company of people who teach. And not enough opportunity or perceived opportunity to assist folks who will get into professional development, or being in contact with teachers (Rah 1507-1522).

And when [the Director of Education] position was opened, it was very clear that I wasn't interested in that for myself, because I just like – I like the flexibility and variety of the jobs that I get to do, working with so many ages, you know, from pre-K all the way up through people in nursing homes. . . . So I really enjoy . . . my position (Dib 1st, 235-243).

General Perspectives on Working with the Formal Education Community

As previously discussed, one of the purposes of this research is to gain a deeper understanding of how museum educators learn about working with the formal education community. Thus, the respondents were chosen with the criterion that they have a substantial responsibility with the formal education community. Below are findings related to how museum educators conceptualize their role, and what is involved with this work.

SUPPORT FOR SCHOOLS, CLASSROOMS, AND TEACHERS

The majority of the museum educators reported that their work with schools is supplemental to what occurs in classrooms. They see themselves as helping schools achieve their goals for students by providing resources, support, models, extensions, and an added level of excitement for student learning.

One of my goals . . . with kids when they're here [is to do something] different than what could happen back at school, so that it was worth their time to be here (Kol 1st, 890-893).

Some schools have me working with the teachers as doing modeling for them, or helping to write curriculum. [One] school district. . . [is] trying to overhaul their science curriculum so they use me as a science consultant. (Ked 1st, 1474-1480).

Working in education from the vantage point of museum teacher education provides an opportunity to have a broad impact on students and teachers. By working with multiple schools, classrooms, and teachers, these museum educators were in a position to influence many more students than they would teaching in the classroom.

I always felt that when I have my own classroom, I could work with 125 kids a year, . . . working with 22 teachers, if I could get half a dozen of them to that point, then I thought . . . how many more kids I'm actually getting to impact and that's really a neat feeling; that is very satisfying (Pob 1st, 530-537).

. . . the potential impact that we have to be able to bring together twenty teachers . . . and then they go back to their classrooms and they share those resources with the other teachers around them, or the kids. The impact level is great. That's really exciting. Even if one of those twenty teachers goes back and does something, I am excited about it (Hes 1st 1604-1612).

Respondents reflected on their specific position in building relationships with teachers and the essence of what this process entails. A number of respondents described the dual character of this relationship-building as a partnership, one that respects and acknowledges teachers' expertise, – coupled with an offer to share the museum's expertise and a passion for the topic with teachers. Additionally many respondents pointed out that critical to building these relationships is striving toward clear communication between the informal and formal education communities through developing common language and understanding. Highlighted also by a number of those interviewed was appreciating the time required to build these relationships and the need to consider and balance the concerns/situations of all the partners.

You know, if I would talk about what's most important to me now, when I work with teachers, it is . . . relationship building. . . . "What can we do together? . . . You've hired me to come work with you on something that you're working on, and I'm bringing a different point of view and a different focus and maybe together we can figure out how you can definitely have science in your classroom." Well, there's a big difference there, a partnership. . . . I think that

our work has gone from being vendor-driven to [being] partner driven (Kol 1st, 1493-1522).

A lot of our field trip planning is to establish some common language or to let them know that we respect what [teachers] are doing and have things to share with them if they choose to use any of the resources that we offer (Hes 1st, 1556-1560).

It takes a lot of time to build that relationship with the school district, or with the science curriculum person at a school district. . . . So, it's being able to be flexible, to be able to meet the needs, not only of the school districts, but being able to meet our terms of having enough staff, or is that a program that we can develop or that we can work with? Do we have the training to do that? Do we have the people to do that? So, it's a lot of balancing and a lot of sitting down and listening to what the individual schools need and how we can help them (Sut 1st, 1285-1303).

KNOWLEDGE RESPONDENTS HAVE BUILT ABOUT TEACHERS, KIDS, AND SCHOOLS

Through their experience, respondents have built a considerable knowledge base in relation to understanding teachers and schools. They are cognizant of current demands on teachers and what techniques and approaches and attitudes are effective for building teacher comfort and knowledge in science. They also honor teacher expertise in working with, and managing, groups of students.

Teachers . . . are being asked to do more hands-on, have to do more things, and sometimes there are subjects that they aren't as comfortable with, or they don't know as much about. . . . [I think it is important to try] to make them comfortable and have them explore, . . . [if] they can do experiments and understand them better, . . . won't they bring the subject to their students with more passion and comfort, and less fear? (Lod 1st, 359-384).

. . . the management techniques – you can't always advise a teacher on that. That's what they're good at. They've got twenty-two hearts and souls . . . chairs, desks, tables, purchase orders, all that stuff. . . . A lot of teachers don't recognize the fact that they are almost there, in terms of content (Rah 1st 1042-1052).

Respondents are sensitive to the culture, concerns, relationships, and climate required to work in schools. Also data show an awareness of teachers' many styles, and their potential reactions.

I appreciate how isolating teaching in classrooms can be: when teachers don't have the opportunities to watch someone else teach, or have someone watch them (Lod 2nd, 92-94).

And then, there's relationships that you can maintain over a school year with your children, as opposed to the sort of short relationships that you have with the children who are coming for [museum] classes (Dib 1st, 116-120).

Teachers . . . quite frankly are our toughest audience, because not only are they an audience that wants to learn a certain thing, but they're educators, so they're always evaluating the approaches that you take to everything (Kol 1st, 1004-1010).

Respondents discussed communication problems they had met around program participation, in particular where program goals became mismatched or miscommunicated to those registering for the program. Also discussed was grappling with issues surrounding partnerships with schools, such as top-down policy decisions for teacher professional development that teachers were not involved in, or aware of.

The thing that concerned me [at that time] was that it [became] very apparent to me that there was dissatisfaction amongst the teachers, . . . [because] often the teachers who were at these workshops were there because somebody told them they had to be. [At that time] they had to check off that they had done a certain number of science hours a year. . . and they really didn't care . . . if it wasn't age-appropriate for them. Or they were the gym teachers. . . . So, [it was] all a mismatch of who was in the room, and what workshop we were presenting (Kol 1st, 1081-1097).

Each individual school; each individual district is different. . . . If it's a district wide decision [to] say, okay, all of the second grades are going to do this program, it's really wonderful from the museum point of view, . . . but yet then there are problems because the teachers are being told you're going to do this (Sut 1st, 1247-1261).

. . . when there's miscommunication and [museum staff] say, well, how come that teacher signed up for that program? I say, well, that teacher probably didn't sign up for that program. A PTO member probably signed them up. Because of the nature of PTO's and enrichment programs, the PTO's are signing up kids to come to the museum (Hes 1st, 1528-1536).

Respondents struggle to meet teachers' specific instructional needs, interests, and requisites such as aligning their programs to Massachusetts State Frameworks content and terminology, or to adjust program offerings to fit belief systems of both public and nonpublic schools they serve.

We definitely do target what we're offering now to fit frameworks at certain grade levels, because it also provides a justification for the classroom teachers to

their supervisors as to why they should make the field trip. We have to learn enough of that language, so we understand, and can put it in a teacher's language. . . . Sometimes, . . . teachers from some Christian schools, . . . will sort of pull me aside and say, "We don't teach evolution, so can you do this program without dealing with evolution" (Jog 1st, 1540-1546; 1495-1507).

All the museum educators interviewed are aware that many teachers are not comfortable teaching science and some highlighted their eagerness to meet the challenge of exciting teachers about science.

We work with the elementary school teachers, and some of them are physics-phobic. They can't help it. It may not be something they're most comfortable with. And I enjoy that challenge of showing them, oh, it's so cool, you know? You do this every day, you just don't think about it (Lod 1st, 220-225).

We still have a long way to go, I think, in our formal education corner . . . toward really making science accessible to everyone for a variety of reasons. . . . a lot of teachers still need a lot of help with their own science learning, as well as with their science teaching. . . . there's . . . plenty of work to be done still (Kol 1st, 2145-2151).

Working with the formal education community is positively reinforced by the feedback that museum educators receive from teachers and schools. Among the points cited by respondents that served to bolster their efforts were reaffirmation that their program goals have been achieved, recognition from teachers that their efforts have been helpful, and seeing evidence that they have transmitted their excitement about science.

Sometimes you look for feedback and sometimes feedback comes from unexpected directions . . . When teachers come back and reaffirm that you have done what you believe [in], that's a very positive feeling (Rah 2nd, 41-47).

There were some teachers that I worked with that got so excited about teaching science. I can remember [one] calling me up one day [saying] "You've created a monster, because now all I want to do is teach science, and letting my social studies and math and my language arts go by the board." A couple of them went on to take additional coursework and become science coordinators in the city. So, there are some . . . that are waiting to get that little nudge, and who just get really fired up, the same way I did, . . . when it's reawakened. I think that they can get back to why they got into teaching in the first place. You see that happen (Pob 1st 507-524).

Serving in a Leadership Role for the Museum

A number of respondents are senior education staff with a long body of experience within the institution. They believe that part of their responsibilities is to support less experienced staff, provide education resources for other museum staff, and help them understand the perspectives of classroom teachers.

I tend to be an advocate for other people's professional development. I'd like to see particularly what I would call younger staff or junior staff folks who haven't had as many opportunities, because they're doing more coverage work, have opportunities to see things and learn things, and that's, I think, part of what keeps people here are these opportunities (Kol 1st, 1644-1646; 1791-1799).

We're a resource center not just for the outside world of education, but for the inside of the [museum], as well. . . . I'm not just an isolated node that happens to just facing outward and serving people out in the schools, but I also face inward and service the people within my culture – institutional culture (Rij 1st, 1512-1526).

I think that one of my roles here is to be a teacher advocate for the staff, to help them understand the perspectives of the classroom teacher, to help them . . . understand that learning here in the museum is different than in the classroom (Hes 1st, 1496-1502).

ATTITUDES THAT MUSEUM EDUCATOR RESPONDENTS HOLD ABOUT THEIR WORK

Many of the findings discussed above about museum work and its context and culture were linked with attitudes that respondents hold about their work. The majority had positive feelings about their jobs. In addition, they commented about the challenges in their work. These findings concerning attitudes follow.

Positive Attitudes Held About Museum Education Work

All reported a great attachment to and love for their work for the following reasons:

- The satisfaction of working with enthusiastic audiences
- They work in an environment that offers learning opportunities
- The job offers variety and change
- The job offers them a say in the direction of their work
- That amidst the times of pressure there are periods which one can regroup
- The job offers social interaction with the public
- Their work offers opportunities to do research in a non-traditional setting, and to approach research in interdisciplinary ways

- The work setting offers opportunities to work in areas of special interest
- They work in a family-like environment
- There is an exciting dynamic arising from working with other staff members
- The job offers a certain flexibility in terms of scheduling work hours
- The institutional work is on the leading edge of education
- They just love their work.

... the exciting part of it is, is that your audience is always enthusiastic. ... The wonderful thing about being in an environment like this is your kids are always highly motivated. They're in a new place. They're excited to be there; you rarely have management problems in a situation like this, and you have one shot, and one day to make an impression; so you want to be the very best teacher that you can be (Pob 1st, 1914-1915; 911-919).

I think one of the reasons that I liked my job early on here was that opportunity to keep learning new thing. ... the opportunity to continue to learn, and learn from my colleagues, not just about the project on my plate, but sort of about many, many things – it's really important (Kol 1st, 1744-1746; 2119-2122).

Lots of things just get added to the job description, but that's a good thing, because I like new challenges. And of course with these new grants that we have brought on board ... it definitely hasn't just been what I signed on for. But that's an advantage to be able to grow in your job and take [on] new challenges (Dib 1st, 224-233).

[There is a] freedom that I've always felt in the job that I've had – in this job, that if there were things I was interested in, I've had an opportunity to kind of investigate them; the opportunity to say this is what the direction I think this job should go in; this is what I think I should do (Pul 1st, 1267-1273).

... satisfaction ... comes from working with children, working with adults. ... I guess that social aspect really is something I enjoy more than I would have anticipated, ... when other opportunities have arisen and I've thought about it, I think this is the best of what I could ever, ever want in some ways (Lod 1st, 124-134).

I had the interest in science. I've always had an interest in history, and then the formal preparation in English, and I feel more than a lot of museum people that I'm familiar with, I bring to this table this interdisciplinary perspective, where I find it very difficult to separate anything out (Pob 1st, 555-566).

... it feels like we are one family. We are all linked together. ... Staff meetings [are a] communal time to come together. It's almost like [having] dinner with your family every night and ... your family is all coming together to sit down and catch up with each other and what has been happening (Dib 1st, 556-557; 1231-1239).

The thing that I like about [this museum] . . . [is] this is a fabulous group of people that I'm working with . . . you can go out in the hallway and you can yell "I need help" and people will come and help you. They'll help you work through a project. . . . So invariably you have what most people would refer to as hallway meetings; [ours] take place in the kitchen. . . . We'll sit there and just hash stuff out (Rab 1st, 1621-1645).

I didn't know that kind of opportunity existed, and I was completely shocked. . . . It has allowed me to be creative; allowed me to take either existing programs and rebuild them, or to create new ones. This museum allows me to do that, and I have to do that (Jem 1st, 255-257; 1479-1487).

. . . I realized it wasn't until I came here that I still thought about chemistry and chemicals almost in a two-dimensional fashion. . . . When I came here I had this whole new appreciation for what I had done, and could see things in a different way, and said to myself, why didn't my training, both in school and in the lab, help me see things? (Lod 1st, 318-328).

. . . with the flexible scheduling, . . . there are lots of different things I can do through the day. [If I were still] in the classroom at this point, [I wouldn't be] able to pop up and run off somewhere (Dib 1st, 912-917; 894-901).

It's been sort of a liberating environment to work in. It sort of encourages you to think of yourself as an educator with some kind of vision instead of being a replicator of what else is happening. The museum has liked to be on the leading edge of education (Mod 1st 1871-1876).

I always say I found the perfect job for myself. If I had designed a job, this would have been it. I'm so lucky, and I'm getting paid for it. . . . I really enjoy it (Pul 1st, 308-312).

Challenges Presented by Museum Education Work

In addition to discussing the positive aspects of their work, every respondent brought up the challenges it presented as well. These feelings included reflecting upon:

- The feeling of often being overwhelmed and overburdened
- Their struggles juggling multiple and time-intensive projects
- Working in a climate of change and chaos.

. . . because things are sort of coming in – zinging in and out. . . sometimes I go a little bit over the edge in this job. Sometimes there's too many things to keep track of, and too many people . . . that one needs to be associated with at once. So, a lot of times I feel like I am just trying to catch up (Lig 1st, 1282-1304; 1603-1607).

... you've got all these other irons in the fire that need tending all the time, and when there's a proposal deadline, everything stops, and you've got to get that out. ... that's exhausting. I don't know how else it can go in the museum world, if they simply don't have the deep pockets to afford the kinds of work that they generally do (Mod 1st, 1037-1048).

There's a certain comfort in having regular things get done that need to happen in order for a program to keep on running smoothly, and you know, I've been periodically stretched by the circumstances around, but I haven't always looked to be stretched in the ways that I have been stretched (Rij 1st 739-746).

FINDINGS PART TWO: LEARNING TO DO MUSEUM EDUCATION WORK

This section of Findings focuses upon *how* people learn to do museum education work. This research seeks to capture, through the voices of those having had that experience, the ways and means that constitute the process of building the knowledge, skills, and attitudes that relate to doing effective science museum education. Additionally, it attempts to home in on the quality and character of this professional growth experience and identify what aspects of museum professionals' day-to-day happenings are linked to their professional growth.

According to data, developing this body of knowledge and these skills is an ongoing process. It may begin before entering the museum world and then continue to develop throughout a career.

GENERAL FINDINGS

Analysis of data yielded three general findings. First, all respondents were able to discuss the concrete events that they associated with this learning experience, as well as offer their personal reflections and insights relating to their learning process.

Second, they discussed this learning process as a component of a group learning process. Often, respondents used the term "we" when referring to how or what they learned indicating strong feelings of community.

Third, when asked the question of *how they learned what they know*, the respondents reflected on the complexity of the process of learning, including wondering: how one identifies what one needs to learn; how this process occurs; and how the processes of

gaining expertise via formal course-based learning contrasts with informal experiential learning.

MOTIVATION TO LEARN

Becoming engaged in the learning process is key toward adult learning. Adult learners need to pay attention to ideas and be moved toward engaging with these ideas (Knowles, 1993; Nevills, 2003). Respondents believe that it is important for museum educators to have a knowledge base of content, methodology, context, and culture; and this belief drives their learning process. They discussed wanting specific content knowledge necessary for their work; a desire to gain conceptual understandings of ideas, issues, and relationships; a need to become familiar with new working contexts and cultures; and how organizational support for professional development motivates their learning process.

Data show that motivation to learn content or invest energy in projects included:

- A need for specific and deeper content knowledge, skills, and experience and a desire to increase professional capacity for their work
- A need to have and disseminate accurate information
- A need to learn more about the culture of their teacher audience
- A thirst for learning science
- A feeling that they “should know” something
- Becoming emotionally connected with a topic
- A need to update or enhance their formal background;
- Working in a new context and/or a new region
- Personal advocacy for their professional development
- Influences of institutional goals and structures for staff development.

When I first started, I needed to learn how to . . . do a workshop for teachers: work with teachers, arrange that timing, that kind of stuff. I also needed to learn a lot of natural history, because I didn't have that background (Pul Ist, 670-676).

I was comfortable with what I was teaching at that time, because it was such pretty basic, superficial stuff. As I got deeper into it, when I went into the science outreach, and then became a kit developer, [where] you're really getting into science curriculum, then I did feel the need for formal preparation (Pob Ist, 306-312).

There was a great fear on my part of ever presenting the wrong information, or not presenting it well (Pob Ist, 324-326).

I realized that I really loved teaching, . . . and also . . . I started doing a lot more professional development, . . . with teachers and I [needed to feel] as though I was on the same playing fields as those certified teachers. I was a museum educator, but not a certified teacher. So I took all of my certification classes while working full time (Hes 1st, 232 - 243).

I think that keeps me a life-long learner here, because I am comfortable with the content of science, but I'm not an expert at it. I'm not a scientist at all . . . I love the subject matter and I think I help people get into it, because people who are science shy, I can help them over that reluctance to engage with the materials, since I find it so very engaging (Mod 1st, 923-929; 945-949).

[The content areas I picked up while on the job] were just interesting things for me to pursue. There was no school teacher telling me I should be interested. I was never interested in any of this stuff when I was in school. I only first got interested in it when I began to work in the museum and it was fun! (Jem 2nd, 42-49).

At least half of the knowledge I worked so hard to gain in college has changed. Most of what I'm doing now I learned on the job. The content knowledge has changed so much. The knowledge I got then is considered archaic now (Ked 2nd, 182-185).

It was a new job, and a new area . . . you come to a new place and you have to figure out what exactly [your] role is, and [learn about the organization] (Sut 1st, 1189-1198).

It's sort of like waking up one day and realizing that you somehow crossed a divide somewhere, and I knew that being out on the floor wasn't going to be enough anymore. I wanted to get into the deeper stuff. I wanted to learn more about the business end. I wanted to learn more about the bigger picture. . . . I wanted some more formal stuff, and decided I was just going to take myself in hand, and just take advantage of some of those opportunities (Rab 1st, 1142-1153).

LEARNING STYLES AND WORKING STYLES OF MUSEUM EDUCATORS

Learning Styles

Museum educators discussed their personal approaches to the learning process. Learning styles appear to be linked with museum educators' approach to problem resolution, their personal natures, as well as their levels of expertise within a topic. Respondents' styles include active, self-directed, persistent, thoughtful, and "raw."

Most museum educators indicated a preference toward learning through active, direct experience, one that incorporates rich sensory experience. Many reported wanting to combine those direct experiences with conversations and dialogue with others.

So I am trying to think about . . . how I learn best. I guess direct experience, just talking with other people that have done this before. . . . I feel my brain being stimulated when I am doing something in a way that isn't . . . just sitting there. . . . I think that actively moving the body and getting yourself involved in all different sensual ways is a very good way of learning (Dib 1st, 633-636; 1004-1012).

I enjoy thinking out loud, and I have colleagues that enjoy that, and other colleagues that don't. I like to do things, see it, hear it, feel it, and then read about it (Hes 2nd, 41-43).

Museum educators tend to be very observant and use observations as a tool for learning. They observe visitors, other staff members, and the museum environment and tune into the interaction of these people in these contexts.

So much of developing these skills, is a result of years of people watching and recognizing cues. I also have very good antennae, plugging into people's reactions and behaviors. I think it's gotten better as I've gotten more experiences and as I've spent more time in classrooms and learning environments, doing what I do. It's a matter of just being wired to watch people. . . . I think you can train people to do this, but some are just more naturally inclined (Rab 2nd, 55-65).

The ability to drive one's own learning is a characteristic of the majority of the respondents interviewed. They discussed needing to be able to assess, on a day-to-day basis, the gaps in their knowledge. Several explained the importance of not being shy in asking for assistance and answers. Two respondents believe in taking on projects as they are offered, as they provide learning opportunities.

There really hasn't been a whole lot of serious mentoring and guiding, and because it's really been self-driven, a lot of it has been sort of hit and miss. So in conversations [when someone] starts telling me about . . . things, [I say] "Oh my, there is a hole the size of a Buick I need to fill." Just talking with people . . . when [they] start throwing out references, I start writing them down (Rab 1st, 1374-1386).

Some respondents described a style of learning that fluctuates back and forth between doing, reflecting, getting outside input, and then returning to active doing. One respondent discussed thinking “all the time” about an idea.

It's interesting to see that [the way I approach learning my work] is sort of the same way I approach my art. . . . I take a blank canvas, and . . . I fill it with pigment. And then I prop it up some place and I look at for several days and then I go back to it. It's a very similar process – to how my learning style is the same as my painting style. And then . . . I sit down with the art books and I read what they say. . . . And then I go back to the painting. It's very similar. It's a back and forth between do it and see how the experts say . . . to do it (Pob 2nd 36-46).

[My way of learning]. . . I guess is to just think; that's often [not] a valued way to spend your time on a job, but in fact, if it doesn't start there, you probably don't get too far. So, some of it is just to think about it all the time – you know, the back burner kind of thing (Mod 1st 969-977).

One respondent whose background did not include formal education courses described approaching learning about education related matters as having a “raw” character.

My approach to things, I think is different; it's more raw I think, because I don't have an education background . . . my first learning wasn't educational models or how to establish a traditional classroom (Jem 1st, 1236-1245).

Several respondents discussed being selective in their pursuit of learning. They prioritize their learning needs due to the time they must invest to pursue that learning.

You see wonderful things you can do [but I must consider] what's that going to cost me. . . . Is it worth it? Is learning those two weeks going to be worth the cost of not having me here for two weeks? And that's important, too. And if I did everything I could professional development-wise that came across my desk, I'd never get any work done. And I've got to get some work done (Kol 1st, 1814-1825).

Working Styles

As discussed in Part One of Findings, museum work often requires juggling multiple projects and needing to “multi-task.” Most people explained that for them, multi-tasking was a comfortable working style. Others preferred to focus on one project at a time.

I love the excitement, and the dynamics, and the intellectual challenges, and always doing something different: going different places, meeting new people,

learning new things. I just love that. I can't imagine myself doing anything different (Ked 1st, 1163-1174).

I think by nature, I'm not a very good multi-tasker. . . . But I've often thought that's the way I work best, to sort of have one project in mind and nail it, and then go on to the next thing. Maybe that was wishful thinking (Lig 1st, 1586-1597).

The museum environment, at times can be distracting and chaotic. The ability to work in this kind of environment differs from individual to individual. Where some discussed thriving and being eager to work in the midst of activity, others must resolve their need for quiet by working at times and in places more conducive to concentration.

I like . . . distraction. [it] . . . doesn't bother me much. A quiet office, where I didn't have things going on around me, I don't think I could work at all then, but other people don't feel that way (Mod 1st, 1370-1374).

I've absolutely got to focus. [For some kinds of work] I . . . go home to my home office. . . . if I need absolute quiet. . . . I'm still very attuned, so that's why if I don't see the environment, I can concentrate better. If I'm near a big window, or whatever else, I'm just always hearing things, or seeing things, or wanting to watch a bird preen or feed. So I just do better with some isolation when I really have to concentrate (Ked 1st, 1009-1018; 1089-1095).

Several museum educators discussed a desire to be responsive and not put things off. Some reported supporting the learning needs others, even at the cost of expending their own time and energy.

[When I need to concentrate] I can turn the phone off, but I sort of do that at my peril, because there are some things that are very important . . . messages . . . build up, and you have more to do later, so I very much like to take care of things very quickly, when I perceive a need, something needs to be done. I don't like to put it off. I like to get it done (Lig 1st, 1336-1337).

When someone asks for information, you have to take time to gather that information, and make sure it makes sense in the form that you're sending it, and probably send a letter with it: "Hi. This is who I am. I'm responding to your request. If you have any questions that aren't answered here, feel free to give me a call, or e-mail me." It costs you money to mail it out, or your time investment, if you're e-mailing the information (Jog 1st, 1321-1331).

Respondents prefer to work collaboratively with coworkers; have free rein to apply their own style and ideas to their work; and have the freedom to resolve challenges as they present themselves without constraint to follow traditional approaches.

I've always wanted to be in a situation where I was much more of a team player, much more interactive; much more collaborative (Lig 1st, 1146-1148).

You know, we're all a bunch of mavericks, and we all like having the freedom to do our job in the way that we want to do it (Ked 1st, 1769-1771).

Quite frankly, the way I work it's much better not knowing [how things have been traditionally done]. . . . [By not] worrying so much that this is the way things have always been, [I say], "Let's see what we can do to make this work" (Pul 1st, 1636-1643).

Learning Through One's Personal Time

The personal life of museum educators often merges with their professional life and has an influence on their professional growth and attitudes.

Respondents discussed how their extracurricular activities such as coaching sports and working with groups of children outside the museum has bolstered their confidence both in performing under pressure and also with working and understanding children.

I have . . . always played sports, and I now coach sports for my son's teams, and I guess sports helped to give me that confidence in myself that I could do something, because – I was a softball pitcher, so I had to perform, and I had to be able to work well under pressure, and I think tha''s helped me to say I can do it. I can take on this task, and I can accomplish it (Sut 1st, 1730-1742).

[At home] we have a horse-boarding barn, and [as a result]. . . this group of ten to twenty kids of different ages that [we] were intensely involved with . . . so I always had a pool of kids that I could kind of try ideas out on, and get to know, and get to know how they're thinking, . . . so I always had kind of a handle on what eight year-olds were thinking, and what twelve year-olds were thinking (Mod 1st, 1602-1615).

Several respondents mentioned how family members have influenced and supported their professional development and growth and provide encouragement and support for what they do.

. . . [I have] the support [and] encourage[ment of] my kids . . . Once I started working here, I'd get this, "Oh, mom. It's so great what you're doing. We're so

interested and we're so proud of you," and those kinds of things. And that's meant a lot to me, too. So I think that has been important (Pul 1st, 1227-1235).

We call ourselves "lifers." Our work is really tightly intertwined with whatever we do. We refer to our spouses as unofficial staffers. And that is because we are so always involved with our work, at all hours, that they have to support us or the relationship doesn't survive. We often drag them into our work as volunteers etc. Or they may spend their day off running errands for us because we are not free to do them. In turn, I also do that for my wife and I volunteer [where she works] too (Ked 2nd, 105-114).

Leisure time choices and vacation activities often connect to respondents' museum work, reflect their professional interests and content specialties, and connect to their professional learning. Museum educators use such opportunities to enhance their knowledge about museum work by conducting careful observations and asking professionally related questions.

I have always loved learning about different schools. If I was traveling around, I would always want to see what their school looked like, or hear about it from my cousins who lived in a different town (Hes 1st, 457-462).

My husband and I are incredible museum freaks, and our kids are the same way. You hit a new town, you see what museums are out there, bang, you go, and you take pictures, and you do this and you do that. It's ruined me for being a regular visitor, I freely admit that, because I keep trying to look at how did they build this? How many watts are in that bulb? How do they move that many people through here? I keep looking at the infrastructure question (Rab 1st, 1983-1994).

JOB-EMBEDDED EXPERIENTIAL PROFESSIONAL LEARNING

When respondents discussed how they learned to do their job, they often described this process in terms of having *learned their job through experience*. Most of the museum educators described their learning as an ongoing process. Information they gather through experience is incorporated into their reflections, analysis, and subsequent actions. Several of those interviewed explained that they have been able to transfer, expand, and accommodate their prior knowledge into new situations and contexts for their work.

They reported:

- Learning their jobs by/through "doing" their work
- Cyclical, developmental, reiterative aspects to building knowledge and expertise

- That their “background” includes not only formal courses taken, but also the knowledge arising out of their work experiences.

You know, you learn by doing. . . . [through] the more people that you sit down and talk with, or the more questions that you ask. . . . you learn by doing, and you learn the [kind of] questions . . . that get the information that you need. . . . So, you learn as you go along. . . . You build on everything that has gone on in the past that you've done. . . . Because we get hopefully better at what we do, because we try different things (Sut 1st, 1309-1346).

. . . every opportunity, every time you do it, teaching and learning, and teaching and learning, it's just this cyclical spiral, and there's always something you take out of it, and you experience it. It leads into the next one (Pul 1st, 1065-1075).

There is a temporal aspect to experiential learning. Many challenges require time to think and resolve.

If I have a little problem that I'm trying to solve – I was trying to solve making . . . these little wooden boats. . . . and I've been trying to figure out how to get a keel on these boats for three years, and I finally came up with the solution, but it's because . . . things remind me of it, and then I think about it some more, and then I go to the hardware store and look around (Mod 1st, 993-1004).

Learning Within a NonPaid or Entry Position

A number of the respondents began their museum careers by volunteering, doing work-study, and/or interning in museums in their youth, during their college years, and/or when they were adults.

For those who began to work in museums while still in school, these experiences provided opportunities to learn skills and to become enculturated into the life of museums. One respondent explained that volunteer experience teaching in a museum during college years was influential toward deciding upon a career path. Serving as an intern can provide an overview of all the museum departments.

They had a deal that when you got into high school, you could come in and learn how to operate the Planetarium projector and do Planetarium shows. . . . So I went in, [and worked in the] . . . Planetarium. Then between Planetarium shows, we would . . . do live animal presentations. Then before the museum opened for the day, they'd have me working in curatorial, and working with the stored specimens (Ked 1st, 22-38).

I started hanging out at some of the local museums, and volunteering there, and taking some internships. . . . I interned with the education director, and with publications, and with the exhibit design people, and just sort of started learning the whole museum business from the ground up; you know, spending a little time here, spending a little time here. Doing all the grunt work, developing tours, working with school groups (Rab 1st, 116-126).

A number of respondents entered museum work as a second career. Their volunteer work provided experience in informal learning environments and inspiration to enter museum careers.

I went to the Volunteer Office, and they interviewed me and . . . they signed me up to come into the Discovery Room and it was one day a week, four hours – a four-hour commitment, . . . and . . . I had to go to some training sessions, to learn how to do this, and then every Wednesday morning, I went . . . and volunteered in the Discovery Room (Pob 1st, 42-56).

A few respondents had young children when they began to work in museums. The museum provided them opportunities to learn as volunteers or employees while still devoting time to parenting.

I started working in a nature center. . . . My little baby was two, and I would take him on my back. And I started off as a volunteer, and then worked my way into the staff. You know how opportunities arise, and when you [are] sort of on the inside track you could go for those. So, that was my first museum. . . . And we trained guides for school groups and then we also led tours (Dib 1st, 21-30).

[When my daughter] was about five years old, . . . she started kindergarten, . . . So I said “Gee, this [museum] is a fascinating place.” [It] had only been open for one year and I thought “I’ll go and volunteer.”. . . So, I basically came here because it was handy, and I could come and work for two hours in the morning the first few years (Lod 1st, 22-35; 59-61).

Volunteering for other organizations with museum partners can lead people into museum work.

I got involved in. . . . [a volunteer] project with the Nature Conservancy that was a joint project with [this museum] (Lig 1st, 250-252).

Understanding the Museum Culture

Museum educators learn about their own community of practice through institutional and organizational collaboration, collegiality, cultural assimilation, and integration. Museum educators build an intuitive understanding of the community of informal science museums, how it feels to work in their museum, and how things work in museums through working in various departments within their own organization, and collaborating with those in other museums. Through this experience they internalize the values, expertise, and characteristics held among its members. They gain knowledge through participation, observation, dialogue, and collaboration and become increasingly integrated into the museum culture.

There is a lot of cross fertilization that goes on at those weekly staff meetings and I think that is a really important part of our organization that we have those times to hear what everybody else is doing and have a chance to ask questions and interact with them (Dib 1st, 1224-1229).

So that, collegial piece within the museum has been incredible. . . that chemistry between us has been wonderful. And each of us has worked at other times with other people, and it takes some time sometimes to develop that relationship (Lod 1st, 737-743).

Respondents discussed the social and political aspects of their organizations and how they developed a sense of organizational savvy. Some mentioned coming to realizations on their own, often by watching others or navigating through particular experiences. Others discussed being mentored in organizational know-how.

I have learned a lot from just watching the dynamics between people and between departments . . . how to deal more effectively with people, . . . watching some people on our staff who are so unflustered and so smooth. . . . They do their jobs so well, and . . . they know how to cultivate other people and treat them well, and then . . . work more smoothly with them down the road (Dib 1st, 565-567; 796 - 805).

[I learned from a colleague, that you must] really pay attention to the politics. . . . It's not just what you're seeing, there is subtext. Pay attention to the subtext. So business politics was something that I had to learn (Rab 1st, 1831-1855).

Learning About One's Audience

Respondents discussed their audiences and how they learn to serve and work with them effectively. They highlighted needing to learn about different audiences (i.e., the museum-visiting public, kids, families, school groups, and teachers, and districts). Often, even those with experience working with a segment of this audience, such as students, had to pick up skills to work with new audiences, such as adult learners.

They reported developing skills orienting audiences and assessing audience needs by observing people, listening to people, speaking with people, interacting with people, translating, interpreting, and gathering data about their audience. They reflect on the information gathered through this process, draw conclusions, and then take action. Also, they explained, they employ empathy, take their own reactions and prior experience into account when designing projects and programs for others.

LEARNING ABOUT MUSEUM VISITORS

Museum educators discussed the techniques they have employed to build their expertise working with school groups and family groups. In many cases, the skills they acquire working in the museum galleries, etc. transfer to other kinds of programs and audiences they serve.

Respondents believe developing an appreciation and sensitivity to people's reactions and questions allows them to build awareness of how people learn and also helps them assess their own teaching methods. They make observations and listen to people during their work with visitors, and use people's questions to detect what revisions, if any, they need to make to increase visitors' engagement and learning.

The audience gives you pretty good feedback, and I learned fairly early on to listen carefully to the questions. I would notice those questions that people asked that I thought I had already answered, and that was one of the very strong ways that I learned to evaluate my own presentation. . . . I learned that people's questions were actually a way of assessing whether they were, one, engaged . . . and, two, what their understanding level is. . . . It sort of came to me pretty early on, just by experience (Kol 1st, 480-487; 530-543; 1328-1349).

Empathy provides a starting point for working with visitors. Respondents discussed considering the perspective of their visitors in their program or exhibit development. Museum educators with a formal science background reported needing to step back so

they could relate to visitor levels of understanding. One respondent discussed using personal preference as an initial guide, but then seeking feedback from others.

I try very hard to sort of put myself in the shoes of the visitor, or the child, or the teacher, the people that [we work with]; and not lapse into the more specialized, lingo heavy mode of the professional mode (Lig 1st, 829-834).

My eye goes toward the bulleted things, and toward lists . . . Yes. I'll read a list, but a paragraph, that's a little work. So, . . . I would steer away from things that I didn't like. . . . I do use myself as a point of reference, but I get a lot of feedback, from others. [You] can't just go with your own (Mod 1st, 821-829).

A few respondents discussed learning how to work with diverse audiences. They explained that these skills arise through working directly with these students..

Here at the museum . . . I'll never forget that an inner-city group. Not having experience . . . with kids from different places, really having . . . no assumptions about kids, and how they learn or that their backgrounds would be different, I didn't really have a lot of assumptions about what kids had or didn't have or would understand or wouldn't understand. All of that, I learned from the kids (Kol 1st, 564-573).

Formally assessing audience needs provides museum educators with information about audience interests, and informs their involvement with program development.

I just recently surveyed some of our students and ask[ed] them about whether they would be interested in having courses online, . . . and I've got a real mixed response. . . . There are some people that are definitely interested and other people that have absolutely no interest, because so much of our educational program is really hands-on and requires manipulation of materials (Lig 1st, 945-953).

LEARNING ABOUT THE FORMAL EDUCATION COMMUNITY

Direct experience interacting with the formal education community either at the museum or in schools permits museum educators to know and understand this community. Going into schools and classrooms and collaborating with teachers, administrators, and students over a period of time allows them to build theories about learning, hone their collaboration skills, develop awareness of curriculum and its implementation, and tune in to the changing culture and current climate in schools.

Museum educators develop understanding about the learning process as they work with members of the formal education community. Many of the respondents without formal backgrounds in education develop an intuitive comprehension of how people learn. A few respondents discussed how their intuitive ideas were corroborated as they came across similar ideas in professional discussions and literature. Ideas now current in the professional conversation, such as *inquiry-based learning* and *listening to learners' questions*, resonated with their own experience and reflections about working with learners.

We would . . . do a teacher workshop . . . to talk about inquiry, to talk about informal learning, but of course, those words were not around. We just called it hands-on learning, and we talked about interdisciplinary learning . . . We used to say, "Make them into detectives . . . and sort through the problem and ask questions that lead to another set of questions." So we didn't know, but . . . that's what it was – {inquiry} (Rab 1st, 468-475; 568-580).

Respondents become familiarized with teacher background experience and comfort level in science through their activities with teachers in workshops settings at the museum, and/or the school site.

Sometimes I would be surprised at how little they actually knew [about science], or how they hadn't had opportunities to do hands-on. . . . They hadn't had the time to just play and immerse themselves in that subject area. So I guess I was surprised, in some ways, of how . . . how little experience they had had with experimenting and being scientists (Lod 1st, 537-561).

Some of the work with schools reported by several museum educators involved opportunities to get to know and work with the teachers and students over a long period of time and led to the development of strong relationships and deeper understanding of school curriculum requirement and needs.

I was sent to [one district], where I worked with twenty-two elementary school teachers, . . . every month. . . . It was really exciting, because first of all, it's unusual in museum education to be able to establish a lengthy relationship with any group of teachers. Usually, you see them for a workshop, or maybe a short series of workshops, where they came in, they're gone, and then you see a new batch. But we all had really strong relationships with the teachers in these different towns (Pob 1st, 147-156; 170-199).

Museum educators become sensitized to the needs, pressures, and culture of schools by working directly in schools and attending meeting with groups from the formal

community. This permits museum educators to observe and gain first-hand knowledge of current policies, practices, curriculum requirements, assessment and accountability issues, and school climate. This knowledge informs their program development and delivery.

If I hear in a meeting [that schools'] field trip budget was totally cut, and these folks are saying that that's going on all over the state, and we'd better get prepared here to feel the impact of that, . . . we're going to lose revenue from field trips, and we had better come out with outreach programs. . . . So, we went through Proposition Two and a Half; nobody having any money; nobody going into the museum for field trips. We had to get out on-site; they would pay to have us come on-site (Pob 1st, 1111-1124)

We had training programs with the [local district] schools as part of their enrichment for teachers program. I taught science across the curriculum . . . and a few other little courses. But as the pressure of MCAS [testing] mounted, the teachers were less willing to take sort of a general kind of course, something . . . not specifically related to the Massachusetts Frameworks. So we have had interest in those classes drop off (Dib 1st, 346-357).

I also saw a lot of teachers . . . [who] had to deal with administrators who . . . didn't want them to be expansive, who didn't want them to think in interdisciplinary ways. . . . I also got to see that a lot of schools were very weak on resources. So the challenge there became how do you introduce resources? . . . Some teachers, . . . didn't feel comfortable with . . . science in particular (Rab 1st, 626-644).

The need to understand the language used within the formal education community was highlighted by a number of those interviewed. They also found their own vocabulary to be equally foreign to teachers, and the challenge was to learn how to bridge those differences.

I think a common language is a challenge. I think there's so much wonderful research around learning and teaching, and I think that sometimes the language that's used around that is very different than say the language that I started out with, which is the language of somebody who is a research scientist (Kol 1st, 2272-2286).

There is a vocabulary that [teachers] . . . use, and if you want to be respected by them, you need to be on their wavelength and use their same terms. . . . Educators often have a sort of a jargon that they use with themselves, so I have always wanted to know what they feel is important (Dib 1st, 1414-1423; 1431-1447).

Respondents reported noting differences between the approaches within formal and informal learning environments, and in particular contrasts in methodologies and ways of working with children.

I'm not a stickler for kids raising hands . . . It freaked some of the teachers out: "Jim, you're supposed to be raising your hand!" . . . Some teachers actually seem a little threatened by the different approach that I can do here, because I'm not as results-oriented, when they're here, [as] the teachers have to be in the classroom (Jog 1st, 1464-1468; 1481-1485).

Museum educators learn about the formal education culture through conversations with its members, people who are living the experience. Even when they had worked in schools in a former career, respondents reported needing to keep up-to-date with current school culture.

I think I learn by listening to the things that I don't know how to do anymore, which is management techniques, [and] dealing with the bureaucracy within an individual school system. I listen to some of their hard times, and whether they have a sense of humor about that. So, you know I learn by listening to them . . . If somebody's been doing for a long time, I mean, they tell you their truth (Rah 1st, 1129-1138).

When I was starting to work with teachers, there was a principal who was very, very good, who explained to me just how focused many teachers needed to be, and that some really needed a cookbook. He explained that theory was nice, but we needed to tie things to frameworks, standards, and pay attention to what was going on in the classroom. It did make it easier for teachers to use materials to have cookbooks (Rab 2nd, 96-103).

Last year we went in, talked to ten different local communities . . . finding out how the museum can play a role in their science education of their students, as well as their teachers. What we found is that many school systems want to develop the professional development capacity to happen within their own teachers and their own districts, . . . instead of hiring outside contractors like [our museum] to come in and do it. So that's a newer shift, or maybe it's an old shift that's back again (Hes 1st, 1050-1069).

Data show that museum educators have endeavored to keep current on what funding has been made available to schools, and the actions necessary to take advantage of it in terms of potential programs to schools.

At that point [we] were starting to figure out what the Eisenhower money was. . . and we would call [schools] and say, "You know you have \$823 [for professional development]?" And they'd say, "Really? We do?" And I'd say,

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“Yes, you do, and we can give workshops.” . . . It really was . . . very entrepreneurial (Rah 1st, 1283-1296).

Respondents highlighted how they’ve learned to do professional development activities for teachers. This learning included both theoretical and logistical considerations of professional development. They discussed:

- Learning about their teacher audience through the first hand experience of organizing and facilitating workshops
- Gaining understanding through careful observation of teacher responses and feedback from participants through the use of informal and formal assessment tools
- Reflecting upon, and then acting upon, these observations.

I had to work my way in to understanding what are the existing logistics, challengewise. How to get the right things in the boxes, and get them out to the teachers and present in a timely manner, two hours after school when they're tired. At the time we had taken it upon ourselves to make a copies and serve the food, as well, so it was really quite a huge job, and very exhausting to . . . set up a workshop – present a workshop, pack it up, and get back to the museum (Kol 1st, 1051-1061).

The teachers during those summer sessions keep . . . a reflective journal . . . that's just a view right into their thought processing, their experience. . . . [and] a really good way to perfect what you do. . . . [Teachers will] tell you what they like about your program . . . So, it is pretty clear what works and what doesn't work. They really like the hands-on activities that they can just take right back to the classroom. They like the things that apply to frameworks and MCAS tests (Dib 1st, 309-323; 332-341).

I tend to talk to teachers a lot. So, even while I'm in a workshop, . . . you know, how's this going? What's working? What do you need to know? And so I'm sort of always processing this stuff as we're going along (Pul 1st, 1037-1062).

Some respondents reported specifically choosing and attending structured professional development activities that would provide models for the work they did with teachers and expand their insights. Participating in learning experiences side-by-side with their teacher audience permits museum educators to learn through and about teachers’ perspectives. Respondents explained that when participating in their own professional development activities they use their reactions as a guide for the style and design of the professional development activities they themselves will implement for other.

I have signed myself up for a professional development experience . . . that's designed for teachers, as opposed to museum educators. . . . I find myself, first of all, paying a lot of attention to how that presenter is interacting with the teachers, but also what it means to be [in] that . . . that particular job, specifically (Kol 1st, 1435-1446).

If I've gone to something that I consider professional development opportunity, and it's really left me flat, well, what was it about that that just didn't work, because . . . if it didn't work for me, it's likely it's not going to work for someone else, and I'm going to stay away from that (Pul 1st, 1728-1736).

Several respondents pointed out that museum educator learning happens in concert with teachers' learning as they explore issues in education together, exchange ideas, and collaborate on curriculum development. Another respondent reported applying techniques with other learners that were originally invented as self-teaching devices.

I'm entirely self-taught in all the respects that relate to the content that interests people about the [museum]. Everything I know comes from my work with the teachers and from the collection of curriculum that I and the teachers have developed over the years (Rij 1st, 1283-1295).

And since I had hard times remembering things . . . I had to make up little games and methods for me to remember stuff, and I found that as I tried to make the complicated simple to me, it was helping other people to understand it as well, and I just found that immensely rewarding (Ked 1st, 129-140).

Another view toward museum educator learning, is learning through collaboration. Collaborating on various projects and doing joint research with teachers was cited as an important way to learn about the formal education community.

[The] last couple of projects have been collaborations where we are putting together school visits to the museum that have in-class preparation and follow-up, and the booklets in the curriculum books are jointly done by the museum and the teachers. The teachers actually did the writing and the creating of the manuals (Mod 1st, 854-861).

When we started people said, oh, you can't work with [that school district], whereas now with [that district's] science department, we collaborate; we co-labor, very nicely (Rah 1st, 866-871).

In their role of collaborators, museum educators often serve as liaisons between the community of schools and the museum community. The roles they carry put them in a position to understand and translate perspectives among members of both communities and provide a bridge between the formal and informal communities. They explained that it is useful to have experience in schools, as it helps teachers to accept them as a empathetic resource. Respondents reported bringing together members of the formal community in an advisory capacity.

Once I got out there, I found that . . . once I said to them I was in the classroom for many years; . . . the whole place relaxed, you know, it's like she's once of us. Okay. We'll listen. Otherwise, it's the – here comes the expert from the Museum . . . going to tell us how to teach (Pob 1st, 356-362).

We always present at MAST, which is the Massachusetts Association of Science Teachers Conference. . . . There's people from different schools that we've met that we see there. . . . that we have maintained a conversation with. . . . We have an education advisory board that . . . I put together . . . that was, in part, responding to all the changes going on in the schools, and how would we respond to them? . . . So we have representatives from universities, we have principals, teachers from high school to pre-school, and some scientists on that board. So that's a nice network that we have (Lod 1st, 1476-1481; 1492-1510).

LEARNING ALONG WITH ONE'S AUDIENCE

Several respondents have found that their own knowledge grows along with that of their audience, as they mutually explore ideas and have collaborative learning experiences.

In terms of their own conceptual development in science and content knowledge, several respondents referred to knowledge gained and insights generated and/or reinforced by their work experience in museum education. This idea was discussed by respondents with a range of backgrounds in science. One respondent with a strong life science background explained that experience in museum education work provided a new perspective on how all the sciences disciplines interfaced.

There was like this “Ah ha” that helped me look back on things I learned that I had known already, and make more sense, and even more interesting than they had been when I was doing them. . . . But I just felt wow, now this is really fascinating, and I can see where I probably would have been much more interested in chemistry and physics from a younger age, had it been presented in these ways to me (Lod 1st, 331-339).

Museum educators' audiences provide continual sources for their professional development. These educators explained how they have built content knowledge along

with their students, and how they have learned more about their audiences as they worked with them. A number of respondents pointed out experiencing new insights on a continual basis, as they observed their audiences' differing responses to the same object and/or phenomenon.

What is so exciting to think [is that] even in all my research I can try to gather all the information I can about a particular subject, but the person beside me is going to open up a whole new world of observations, and ideas, that I might never come to. . . . My background before was you've got the books, you've [got] these lab experiences that are very defined, and so you come up with, similar answers. . . . Here, [what I see] being on the floor is how much people bring and how much knowledge is in people, that may not be factual knowledge, but is a wonderful way to look at something, or [make] connections (Lod 1st, 1180-1196).

LEARNING ABOUT SUPPORTING STAFF

One of the roles for many of museum educators is to support other staff. In learning to support staff, such as younger staff members or tour guides, several respondents reported drawing on their own intuition, experience, or input from other staff members to learn how to design or provide staff support structures.

I just looked at what had been done before, and thought, well, that really wouldn't help me too much if I were giving a tour, . . . So, . . . I went to the guides themselves. I remember going to them and asking experienced guides, what would have helped you if you were taking a course [to learn to do tours]; what things should we include that you didn't hear? (Dib 1st, 414-427).

[We] want to do some observing, but I try to encourage young staff members who are . . . assigned to come see me do this thing or that thing, . . . to do a part of it . . . as soon as possible. I'm going to try to get that staff person to pick up a little of the teaching challenge, to do . . . whatever they're ready to do. . . . You can observe forever (Kol 1st, 2206-2222).

Learning Through Particular Projects/Assignments/People

One's journey through museum work is not necessarily predictable. Museum educators can be assigned to, or become involved with, particular projects and develop associations with particular individuals. Sometimes these assignments are a result of pursuing or responding to a particular interest. At other times, they can be chance or serendipitous assignments. These experiences can be directly connected to professional growth and influence areas of content knowledge, new audiences, different age groups, and specific

skill development. They also offer occasions to work with individuals who may serve as models, inspiration, and support for museum educators' professional growth.

They. . . said, "We need a play to go along with [a] . . . dinosaur theme. Can you do a play?" And I said, "Sure." . . . And so I set out to learn about dinosaurs; and what I found out fascinated me. . . . So, I wrote the play, and the play was a big hit, and everybody thought, wow; he knows so much about paleontology! And I didn't know a thing when I started, except for the word dinosaur (Jem 1st, 1326-1384).

In one of [our] grants [we work with a high school art teacher]. That has been great. . . . that . . . has opened my eyes more to that high school environment and that community service learning too, . . . And to be able to offer a course and to bring together kids of different strengths or interests, and have them blossom in such wonderful ways, I think has been really insightful (Lod 1st, 1432-1445).

Museum educators learn about the management, procurement, and purchase of materials through project assignment.

The first thing I had to do [to set up kits was] . . . to learn where to buy the boxes; where to get the shelves; where to get the telephone; you know, all the infrastructure stuff. . . . We learned where to get stuff . . . and I learned how to be a scrounge, and how to get stuff, and how to look at nontraditional corners to get things (Rah 1st, 576-588; 598-604).

Exhibit development can lead to learning. According to data, both content knowledge and concepts were learned through exhibit development.

You know, the people who learn the most from exhibits are the people who make exhibits (Mod 1st, 669-672)

A number of respondents discussed how knowledge gained from one project informs other projects with which they become involved, and enriches their capacity to be a resource for those they serve.

We learn so much that we can apply in different arenas. . . . All these experiences that we have gained through these funded opportunities really build into us saying okay, how can we use a lot of what we've learned to help perhaps create new . . . opportunities (Lod 1st, 2228-2241).

One of the reasons we can have good conversations with teachers is because we go into their classrooms and they come and see our programs. We learn about

each other's environments. Because we've had so many different kinds of programs, I can take my experiences with one program and apply it to others. . . . It is very dynamic here (Hes 1st, 56-63).

Some assignments, invitations, and new roles lead to seeing the organization and their professional community from a new perspective. Several respondents gaining expanded understanding of their institution when serving on committees. Working cross institutionally planning a conference gives rise to an appreciation and understanding of what such projects involve.

When [we] set up the committee for staff professional development, [they] invited me to be the committee chair. . . . In the beginning, it was a learning experience in that I had never been a committee chair before. I found out information that I wasn't aware of before that time. . . . It was a big eye-opener for me (Hes 2nd, 111-121).

[I was] involved in [planning] . . . a statewide conference, and [it was a learning experience to see] all the pieces that have to come together in order for it to be successful and all the hours of work that go into planning it and seeing it through. . . . it makes you appreciate when you go to conferences all the work that has gone into making it successful, that you don't just throw these things together. A lot of time goes into it; a lot of effort goes into it (Sut 1st, 891-923).

Many projects connect museum educators with leaders in the field and specific groups, such as research teams. These individuals and groups, in many cases, profoundly influenced respondents' work and thinking process. In a number of cases, this influence sparked a desire to augment their learning in particular areas such as new models of professional development for teachers.

This has been the third year [of] a project led by [a science professional development expert] and many of her colleagues. . . . And so, it has been within the last three years that I have had a whole different perspective in looking at professional development for teachers. . . . [In] working on this project. . . . I realize that there's so much more to learn. I want to learn about mentoring and coaching as a strategy in working with teachers, and . . . for our own staff here (Hes 1st, 594-599; 824-830).

Learning Through Trial-and-Error

Learning through one's mistakes was the most frequently cited way of learning, reinforcing the old adage "If at first you don't succeed, try, try again." Beyond this,

though, interviews highlighted several nuances of the trial-and-error phenomenon in the work of museum education.

The trial-and-error approach was linked to having the courage to do the initial trial – thus taking a risk – and, if that attempt is not met with success, to have the perseverance for successive tries. One respondent pointed out that the road to success is characterized by initial failures.

I think the other thing about professional growth is it's about trying on new ideas. You have to be able to do that in order to learn. You need to try things out (Hes 2nd, 45-47).

People in museums want their museum to succeed, they want to succeed. [So] they . . . get out there, and they put their necks out. . . . Sometimes doing that, you get in tremendous crashes, and it takes some recovery, but you learn so much from the crash that you just know so much more better once you've started again. . . . the true fact of the matter is . . . if you don't put your neck out there, and you don't fail, you don't know what it takes to succeed (Jem 1st, 2167-2181).

Several museum educators discussed learning through the trial and error of teaching others. This was often described as part of the process of “teaching as learning.”

Respondents reported a certain mind set that involves a kind of stepping back from a teaching situation to look at and reflect upon the instructional methodologies and thinking about alternative approaches for things that had not worked as effectively as they would have liked them to work.

I think teaching is also learning. . . . we can teach, but then we can also look back and say, okay, you know, that activity really didn't work for the concept I was trying to get across, and so if I'm going to use that activity again, “How can I change it? How can I modify it so that I get the concept across I was trying to get across?” Or even timewise, “Well, that activity took way too long. Are there ways we can shorten it? Are there ways we can make it longer?” (Sut 1st, 1538-1547).

As experience is broadened, museum educators' trials and errors can take place in a shorter time frame. Knowledge gained through experience leads museum educators to intuitively anticipate potential difficulties and have at hand a repertoire of remedies to resolve those difficulties. One respondent reported playing with materials and ideas ahead of time, coming up with a variety of approaches, testing them out, and having alternative options available.

In terms of thinking about how I learn, [it] is by making mistakes, trying things out, and going back and doing them again. It's useful to make mistakes because then you can do things better the next time. . . . So what I do is identify the glitches, that's exactly it, and I try to anticipate the problems that might occur [and] . . . remedy the situation. So sometimes in the middle of the action you can look at the circumstances, evaluate the circumstances, and redirect your activities (Dib 1st, 23-47).

I like to get my hands on it and actually do things . . . [I do] a lot of playing with the materials . . . and trying, and testing out on different audiences. . . . I am the type that always comes up with four different alternatives. . . . to see what might work best. Having a lot of options and testing them out, but knowing that okay, if I do it this way this time, I might pull something that I didn't do from that background knowledge I gained before. It's like having all sorts of . . . options (Lod 1st, 1126-1127; 1100-1109; 1136-1148).

Sometimes, a project is not successful despite all efforts to pull it off. Such projects appear to leave an imprint that sensitizes museum educators toward potentially recognizing problems in projects of a similar nature.

I had. . . an experimental venue under me, which in hindsight, when it was handed to me, it was a flawed concept to begin with. We did our best to try and make it work, but it didn't. . . . It shouldn't have happened (Rab 1st, 817-827).

Learning by Being Thrown into the Pool

A number of the respondents discussed being initiated into some aspects of their work, with little in the way of support or preparation. This might be likened to learning to swim by being thrown into the pool. This learning process has a immediate survival aspect to it. Respondents discussed situations, the challenges they faced, and how they learned through these experiences about such things as the culture in schools, the planning and implementation of doing workshops for teachers, and taking responsibility for a grant-funded program that had been created by others.

I knew that I was in over my head [when I began to do this traveling workshop program], as far as understanding what the audience needed. . . . So you'd have this two-hours' worth of presentation set out, and then . . . and then you'd find out that somebody in the administration building across town had hired you to go do this workshop, and the people at the school didn't even know you were coming today (Kol 1st, 1102-1121).

The first workshop, teacher workshop I ever went to was one that I had to help run. I had never been to a teacher workshop before, and one of my mentors here at the museum said, come on. You are going to help us plan this workshop for these teachers. So, I sort of just jumped in with two feet, without knowing anything (Hes 1st, 78-84).

The first program that I was in charge of developing here had been a grant that had been applied for by [my predecessor]. . . . There was nobody in her position for a while, so that grant got dumped on me (Pob 1st, 1367-1372).

Learning by the Seat of One's Pants

Similar to “learning to swim by being thrown into the pool,” but somewhat different in character, is another category of learning that museum educators described. Most of those interviewed discussed having experienced an unstructured, on your own, self-directed, “learn as you go”, “by the seat of the pants” aspect to many of their on-the-job learning experiences. This kind of learning appears to be about problem identification and problem solving, and employs critical thinking skills. Museum educators explained how they figured out for themselves what they needed to do or know, who they could go to, and how to locate support to meet their needs. This process involves analyzing and reflecting on what their responsibilities entail, deciding what is required to implement them; knowing how to gather those requirements, having the skills to implement them, and knowing how to assess their effectiveness.

There really wasn't any program at that time, that I was aware of, that taught the craft, art and science of museum work. . . . There really wasn't a place to go . . . so I literally had to learn it by just going out and doing the experiences, and spending time running around to museums, and seeing what people do, and learning it literally by seat of the pants (Rab 1st, 186-201).

[As far as learning teacher education skills], it's really learn as you go. We have a process of doing dry runs for any new program, or any new demonstration that you would present. . . . but all of the other learning that happens is more individual experience (Hes 1st 145-155).

I think it's still true today that a lot of people here learn on-the-job. . . . It's not that we don't know what we're doing, it's that the first task is to envision what you're going to do and then start reaching out to all of the people that are going to help you do that (Mod 1st, 201-207).

One respondent described putting together a workshop with a content focus with which the museum educator had little familiarity. This story is presented here as typical of the “seat of the pants” learning. It includes being presented with a project/challenge, identifying and gathering resources, self directed research on a topic, testing and trying things out themselves, and presenting the workshop to an audience.

The first MITS workshop my first summer here was on weather. . . . I knew a little bit about weather, but I’m saying, you know, “I’ve got to teach weather to these people.” . . . I immersed myself in all kinds of books. MITS was helpful in giving me literature and some activities on weather, and then I went to the bookstore, and I went to the library, and found some really neat books on weather activities, and building weather equipment, . . . and so I would take these home at night, and I would do them, and I would build them, and figure out, “Okay, you know, well, this material really didn’t work, but if I try something else, will it work better?” And so . . . I did the activities myself, and I put them together and developed an understanding of them. Then I could take that understanding and those activities to the teachers, and work through with them, because I had worked through it myself, and I had actually done it, so it was a real help. That was how I learned, and so that was how I taught (Sut 1st, 1089-1116).

Learning Through Difficult Experience

Learning through difficult experience has a profound impact on museum educators, characterized by the respondents’ emotional descriptions. Situations they shared included surviving intense or challenging experiences; having to prove oneself when working in a new institution and facing a new culture; and collaborating with community groups divergent viewpoints.. Survival of such times appears to steel museum educators to future challenges. Knowledge of having come through the tribulation builds confidence in one’s capacity.

I look back on that first summer now, and I shake my head sometimes, because it was just so overwhelming. But yet, I learned from it, and I know – when times get tough, I say, “Okay, remember that first summer you were here? If you could get through that summer, you can get through anything,” (Sut 1st, 1145-1160).

But that was a tough time; that was really some walls to hurdle for me, . . . But once we got through it, and – it’s one of our most popular programs, and . . . once they saw the success of it, then everybody here’s cool [about] it, and it made me feel like they then started to have some confidence in me, because up to that point I think [they felt] I was just the loose cannon (Pob 1st, 1378-1401).

There have been times when it’s been hard. Sometimes some [community] groups . . . have a much stronger need for their point of view (Mod 1st, 583-590).

Learning Through Other Jobs

Many of those interviewed have worked in other places prior to their current institution, and they discussed how their previous work has informed their current work. Skills and/or experience that they reported bringing to their museum job included working with teachers and learning about state standards, doing education programs, science education with kids, classroom teaching in schools, and organizational experience with non-profits.

We did small workshops in [another state on] cultural history and the environment, but not the extensive programs that we run now here at the [museum]. So, it gave me a start and a feel for what the teachers needed . . . looking at standards for [that] state . . . and how they tie in to programming, how they tie into teacher workshops (Sut 1st, 435-445).

I had sort of relationships with a lot of different nonprofit organizations, . . . outside of academia. . . . I was involved with some people in the management of [one organization] who really wanted to make some significant changes . . . so I think I had some understanding of the kind of dynamics an organization has of making some new changes (Lig 1st, 540-564).

PARTICIPATION IN STRUCTURED LEARNING EXPERIENCES

During analysis, the category of “structured learning experiences” was defined as professional development activities characterized by things that people “go to,” i.e., workshops, symposia, conferences, institutes, and deep immersion experiences. These activities can involve some sort of registration or invitational process, possible travel and residency, and often financial investment on the part of the participant and/or their institution.

Respondents select structured learning activities for a variety of reasons. These reasons can be viewed on a continuum from the precise – a need to know particular things – through a more general exploration of topics relating to their work, to having a long-term goal such as a degree or certificate.

Selection of Activities According to Role or Particular “Need to Know”

Selection of a structured professional development experience is linked to a museum educator’s desire to learn or refine particular topics and skills. Taking on new roles, beginning to work with new audiences, having to address new policies, or entering into

new initiatives often requires new skills. Examples of these include understanding of new approaches to the teaching of science and technology; current policies, trends, and practices taking place in the formal education community; particular administrative skills; and issues, techniques, methodology involved in evaluation. To achieve this goal, many museum educators become workshop or institute participants, attend particular conferences, and make choices within these events that serve their learning needs. Topics discussed included learning new things as well as new twists on things with which they were already familiar; developing new needed skills and content knowledge; seeking out information pertinent to their specific institutional type; and finding labels and/or vocabulary for previously incorporated strategies, including labels familiar and typical to the culture of their teacher audience.

Through the workshop sessions . . . you get new ideas, or new twists on things – you know, where you say, “I did that activity, but I never did it that way,” or “I never thought about bringing in the math into that science activity” (Sut 1st, 811-815).

It was becoming more obvious that funders were really requiring us to be more accountable and do more evaluation and assessment for our programs and our grants. Since I was a grant administrator, that fell to me. It was clear . . . not too many people here knew much about assessment or evaluation; especially program evaluation. So, I thought, well, I’d better learn something (Pul 1st, 341-343;352-362).

The New England Museum Association has really great workshops for educators, but also for sort of special interest groups, smaller facilities, which is where we fall; facilities with smaller budgets, and also physically small facilities (Jog 1st, 628-632).

For me it’s about labeling things. I might be using a strategy, but when I take a course in that subject, then I can put a label on something. The coursework I took in teacher certification was so that I would have a common language with teachers (Hes 2nd, 78-82).

As museum educators become more experienced, they become more selective and savvy investing their time and energy in structured professional development activities.

And now, you say conference to me, and I’m going to look and see if it’s a valid conference to go to. Some conferences I don’t find worth my while (Kol 1st, 1783-1786).

Participation/Invitation in Structured Learning Experiences

Participation in structured learning events is influenced by a number of factors. One's role and position in the museum hierarchy can give entrée to many of these events. Some are invitational, and linked with a particular project or grant involvement. Museum educators' projects and budget allotments can influence their ability to attend a professional development activity.

We don't really have enough money to send too many people to things like that. . . . It used to be we had a rule that you could go to a conference if you were presenting at it, and so I presented at some, and also a couple of our NSF grants, we did some dissemination through ASTC, so I went to those (Mod 1st, 1530-1550).

. . . because we have . . . the grant . . . they had meetings at the ASTC Conferences. And so I've been fortunate to go for the past three years, and that's been really wonderful . . . being able to network with other museum educators from all over (Lod 1st, 831-837).

I do a lot more administrative stuff than I used to do, and so my budget also supports me going to conferences. I always make sure that it's written in (Pul 1st, 594-604).

Finding out about structured professional development activities occurs in a variety of ways: invitation from a supervisor; awareness through circulars or word of mouth; and learning about it as a result of other projects and involvements.

. . . because I was involved in [a project], I'd be getting notification of the different things that were going on. . . . People will suggest . . . you get involved with one, and then that becomes a way of getting – finding out about another one. You network. You meet people (Pul 1st, 593-594; 611-617).

Issues of equity in terms of being sent to conferences were raised by a number of museum educators. Some museum educators are actively involved in trying to raise awareness of the importance of staff attendance, in terms both of changing organizational attitude and changing staff attitude.

We tried to get managers to consider equity in who they were sending to the best conferences. . . . the content of different conferences, but also kind of the logistics of how to do it and making people aware of professional development and encouraging every person to talk with their manager about their own professional development goals each year (Hes 1st, 1236-1245).

In Massachusetts, the Museum Institute for Teaching Science (MITS) sponsors a variety of professional development events and projects. Through involvement with MITS member institutions, staff members have contact with each other and these involvements have influenced their work. Many of the MITS-involved respondents discussed the value of this interaction.

We are a MITS institute [site], so I go to meetings with the other educators, and there are some wonderfully experienced science educators out there, and I pay attention to them (Mod 1st, 1513-1516).

MITS . . . has run professional development opportunities for museum professionals for many years, and [a colleague gave] a seminar. . . to disseminate . . . ideas . . . of doing teacher sabbaticals (Rij 1st, 1073-1079).

There are barriers to attending structured professional development activities. Respondents reported not being able to “get away” due to time and scheduling constraints. Financial commitment is particularly influential. Many organizations with limited resources can not afford to send their staff member or can not spare their presence at the institution.

When it's a small nonprofit, [barriers to professional development are] usually money and time. You know we are always trying to make budget so you don't have this sort of huge pocket of money for professional development. . . . And the time, being a small organization, [it's] the time to be able to go to these conferences. . . . If you don't set aside the time, you'll never have the time to do it, because you're wearing a number of different hats; you always have something that has to get done. So, those are the two biggest constraints (Sut 1st, 1648-1688).

. . . the time pressure sometimes of the job. . . [during our] very busy season . . . maybe I would lik^e to go on some field trips with our own education program, but I just can't get away. . . . because I have to be here . . . to do my job. . . . you just have to take responsibility for what you have to do first before you can do things that maybe you really would like to do (Dib 1st, 1363-1376).

Taking Courses and Specialized Programs with a “Long-Term” Goal

A number of respondents have enrolled in structured learning programs leading to a degree or specialized certifications. The reasons cited for doing so include “getting ahead”; enhancing their knowledge base; and the need to have a knowledge base in other

fields. In some cases, museums help support museum educators' tuition, through funds earmarked for tuition reimbursement, or through vouchers linked to their alliance with post secondary institutions.

I felt maybe the only way I'm going to get ahead, and get to where I want to be, is to go back and get more schooling. . . . so I completed my doctorate in leadership in schooling . . . and came in contact with a couple of really superb science educators that I would put at the top of the list in this country (Pob 1st, 681-688: 1636-1638).

[When I] went to work at [that] Museum [I] . . . was able . . . [to take] courses at the university during work time (Hes 1st, 268-274).

Perceptions of Structured Professional Development and Conferences

Respondents had a great deal to say about structured professional development activities they attend, or choose not to attend.

Many museum educators discussed finding their professional development experiences they highly meaningful, and they highlighted coming together with colleagues with like interests and concerns; sharing and learning through the experience and perspectives of others; and having extended time to develop ideas and relationships. A number of people discussed sensing a very open and sharing quality among people in the museum community.

When we went . . . to a two-week institute . . . about inquiry-based science, that . . . [was] one of the first times that I professionally was involved with other museum educators who were all passionate about working with teachers, and that was a real highlight for me, and made a difference for me, and helped me gain confidence in the work that I was doing, and helped me get excited about that (Hes 1st, 477-489).

Well, that's where I get to stay up with what's going on. I get to stay up with particularly standards frameworks issues . . . how other people are handling that. There is so much valuable interaction that comes out of that (Rab 1st, 1053-1061).

I think the nice thing . . . is that people in this informal type of education are very open about sharing their successes, but are also very willing to share the things that didn't work out, as well. And if someone's experience can save me from having that same problem, I am very appreciative of that (Jog 1st, 1712-1718).

One of the most frequently cited positive reasons for conference and meeting attendance was keeping connected with colleagues, networking, and making connections with new people. Respondents emphasized the importance of informal social exchanges and the exchanges surrounding the more structured aspects of conferences. The most repeatedly mentioned and valued exchanges included give and take of ideas, brainstorming together, and support for problem resolution. This interchange of ideas was commonly associated with the building of friendships. The strong linkage between friendship and collegial support was a theme running through these discussions. It appears that they stimulate each other in a rather cyclical pattern – collegiality engendering friendship, and friendship strengthening collegiality. They also discussed developing a sense through these exchanges of where they and their institutions “fit” into the world of museums and education.

The networking . . . whether it's over lunch or at the exhibit displays or at some of the socials that they have: It's a way to see old friends, and to meet new people, and just exchange ideas and have that sort of network that's a support group (Sut 1st, 816-821).

It wasn't until I was at [my first ASTC] conference that I even began to place the museum that I worked at in the context of many museums, to understand its relationship with other museums. The depth of resources that we have was not apparent to me (Kol 1st, 1771-1776).

A couple of the respondents have limited interest in attending conferences in general or attending particular conferences. They cited not feeling “justified” in doing so, or not finding their format and climate useful in terms of their own learning style.

I have not, by and large, felt like it was justified for me to go to some of these national conferences. . . . and nobody from the institution has pushed me to go to them. I have felt like it was very important for me to show the flag of [this museum] by exhibiting at the science teacher conferences in Massachusetts (Rij 1st, 1420-1424).

Conferences [are] . . . way down on the totem pole for me. . . . When I think in terms of my own professional development experiences, I don't want to go to network with other museum folks. I want to learn a skill. I choose opportunities by asking around and getting feedback from colleagues who have done it. I ask people here, people in other museums, and people in school systems. You build that network (Rah 2nd, 17-18; 78-83).

Respondents contrasted what they perceived to be “good” professional development events, with effective formats, with those they perceived to be less valuable. The positive

aspects they cited were a feeling of being recharged toward their work, and being given the time and opportunity to establish long lasting connections with people. Negative aspects were feeling tired and having a sense that their time investment was either fruitless or did not meet their expectations.

For me, [conferences are] a way to get re-energized, and get new ideas. . . . You get stuck in the everyday issues and problems that have to get done at work: . . . you kind of get overwhelmed, but you go to the conference, and you see other people, and you hear new ideas. . . . It just gives you that energy, again, to say, you know, what we're doing is really useful (Sut 1st, 789-803).

The second week . . . I think, pulled it all together. If it was only one week, it may not have meant the same to me personally. I don't know. It may have professionally; but, personally, making all of the connections the second week, all living the same area, all eating together, all going out . . . having fun together was important (Hes 1st, 531-539).

When [a professional development event I attend] falls flat, that's when I come away so tired that all I want to do is go home and go to bed, and I'm sorry I spent my day there. . . . It's either that I've misjudged it or it really didn't apply to what I was doing (Pul 1st, 1710-1714).

A number of those interviewed believe that it is important for providers of professional development to continue as participants in professional development activities, thus enabling them to experience such activities from the participant perspective. When museum educators participate in professional development activities, they experience these events with two goals: they seek information on the content offered, and they seek information on the presentation techniques.

When you provide professional development, it's very important also to be a participant, and be on the other side of the table. When I attend workshops and conferences, I watch the presenter's methods of facilitation, and I always learn something new. I think that's something that is really nice about attending workshops and conferences (Lod 2nd, 85-91).

Dissemination of knowledge gained from structured professional development events differs among individuals and institutions. Some people discussed sharing their experiences with other staff that hadn't attended. One respondent mentioned seeing little institutional follow-up to attended events.

We tend to share things like that with the rest of the staff in our weekly staff meetings, so yesterday, [another staff member] and I gave a little report about our attendance at the conference, and . . . workshops that we had gone to that were

particularly useful to us, and people are interested in hearing about what all the other departments are doing it seems (Dib 1st, 1213-1220).

I have found . . . that often when people go off on professional development opportunities here, when they come back, it goes away. There's no long-standing organizational value or change. . . . I think the assumption is that when you come back, shareth and we all continue on (Rah 1st, 1734-1745).

LEARNING THROUGH OTHERS: SOCIAL ASPECTS OF LEARNING

There is strong data on the general importance of social interaction during much of museum educators' learning process. Learning through social modes appears to be a natural, and sometimes preferred, process for museum educators. Working together and talking together about the work was reported as being critical to professional learning. The shared experience appears to provide a springboard for exploring work ideas and issues. Respondents discussed several kinds of social interaction and influences linked with their learning.

I do think I thrive best when I have frequent opportunities to share ideas, go over things, meet people face to face. I think e-mail and phone meetings have a place, but . . . reading a person's body language, their faces, seeing how they react to your perspectives, and seeing . . . the passion . . . when they represent their [ideas], . . . is a very stimulating environment (Ked 1st, 966-975).

Individuals with Strong Influence

Museum educators discussed people who have had a powerful influence upon their professional growth.

Renowned models or influences were discussed, such as Jacques Cousteau and Margaret Mead, often cited as an archetype from their youth.

I think I was influenced by Jacques Cousteau. I mean, it sounds sort of simplified. I had grown up on the beach in the summer, and always been fascinated by the organisms, always been interested in nature, you know? I was good at it. I liked it (Kol 1st, 138-142).

A number of those interviewed cited their bosses, supervisors, and directors as primary influences on learning and shaping their professional growth, values, and attitudes. Sometimes the styles of these individuals appeared to differ from the respondents' styles.

One of the most important [influences was our former director], and . . . learning what is most important, and identifying priorities. . . . I picked up a value system about education, why we are here, what's important. You could see how he was making up his mind. From him, I got guidance in sorting out what's really important in this field. I got a role model in how you hold to that. I think I've tried to apply this in other situations (Mod 2nd, 129-133).

Two bosses . . . [have] influenced [me]. [One is] rough, tough, direct, practical. We can get things done; we've developed this good shorthand; . . . He works in a completely different [part] of the museum, but he knows me and I know him. And he's given me real good advice. . . . Another boss, . . . we spoke English, but we were separated by a common language. She is to the point, super-organized, goal and objective-driven, tight agenda, keep to it, and all that (Rah 1st, 1061-1085).

Conversations with Experts and/or Those More Experienced

Some of the social aspects of learning come through interaction and conversations with those with particular expertise or experience.

Within their institutions, museum educators seek advice from on-site experts. They discussed seeking specific things such as content knowledge, resources, and support for ways of working with teachers. These contacts can range from brief informational interactions to more extensive and time-intensive coaching or guiding.

If you have questions that you can't answer for teachers or volunteers, it is very easy to go to the scientists and conservation department or you can go to the horticulture department (Dib 1st, 438-442).

[My supervisor] was extremely helpful to me in learning about working with teachers. It's her interest. What she's working on in her Ph.D. . . . is how teachers learn, and so we would have conversations, and I could play on ideas, and ask her about things. She could direct me to good materials and good things (Pul 1st, 540-550).

People who know the institutional history are important resources within the professional learning process. Those who have worked with the organization over a long period of time, or those who used to work in the organization, can be a valuable source of for

learning, advice, and understanding what has gone on before. New efforts or continuity of activities benefit from the input of these more experienced people.

Our Research Director right now . . . he's been in at the [museum] for 15 years. He's seen a lot of changes; a lot of things. . . . so he has a really neat insight, and he's a neat person to be able to bounce things off of . . . I guess the fact that a lot of people who have worked here in the past are still in the area, and are still willing to work with us, and to give advice, . . . [our] organization . . . is very teamwork-oriented . . . and even people that were here as interns or former staff members still have sort of that connection (Sut 1st, 1588-1602; 1632-1640).

The teacher education program was already going pretty strongly when I got here. So, I didn't really have to start it, and [the staff member], who works with the teachers a lot, is very, very good with working with them . . . because she tells me what she's doing. I'm learning a lot more about working with teachers (Jem 1st, 956-965).

Dialogue with experts from outside the museum can also stimulate professional learning. Several respondents discussed receiving support and assistance from experienced educators in other institutions who have provided extended opportunities for guidance. Additionally, meeting educational leaders, researchers, specialists, etc. offers museum educators a chance to have personal interaction with concepts and ideas. The passion that these experts have for their areas of interest can prove to be very contagious. Respondents reported that such interactions were meaningful, influential, inspirational, and memorable.

We worked pretty closely with [an experienced educator at another museum in the region], . . . many times in my career because he's such a generous, wonderful spirit. I can't say enough about him, and he really helped us to think about every aspect of what a teacher staff program could be, and based on some [of his] experience (Rij 1st, 1080-1086).

This book didn't mean as much to me at first. . . . It wasn't until I met [the authors] . . . had conversations with them about it, that it . . . had more meaning for me (Hes 1st, 1143-1148).

Another exhibit was the idea of . . . a physician, he wanted to do an exhibit that would help children talk more constructively with their doctors about how their bodies were working, and how they were feeling . . . He was fabulous! He was so inspired, and he was so trusting of us (Mod 1st, 487-492; 514-517).

Mentors

Respondents discussed their perspectives on the importance of being mentored and its influence on their learning. Most respondents interviewed expressed their belief that mentoring is critical for one's professional growth.

You really only can move up, you know, [in] any line of work or any skill, if you're lucky enough to have people who will mentor you forward, and I was just lucky enough for that to happen, because I know people who haven't been that lucky, and it's been very difficult for them (Jcm 1st, 425-434).

The process of gaining a mentor can be overt or more subtle. Many interviewed described being drawn to certain individuals due to their style and interests, intentionally spending time with them, and then finding that association an influence upon their own direction of involvement. A few of the respondents discussed wanting to work with people who were thoughtful and deeply knowledgeable, but were at the same time accessible individuals with whom they could comfortably share.

[There was one professor in graduate school who] . . . was really interested in how people learn, and what you do in a classroom. . . . I kind of hung around with him and learned more about how people learn, and just became sort of interested in the education piece as opposed to looking at the artifact piece (Rab 1st, 105-114).

I tend to be drawn to people who are very unassuming, and yet you realize underneath that there's extraordinary depth of understanding and knowledge. . . . [They] are focused on the learner, and celebrating learning in and of itself. They are the people that you never feel threatened that they know more than you. . . . it's a relationship. It's how they interact with me as a learner . . . So, it's that constant sharing (Kol 1st, 1954-1957; 1984-1994; 2237-2239).

Sometimes museum educators develop long-term mentoring friendships with people outside their institutions that offer professional support, new knowledge, and new areas of interest.

I met a really good guy, who's a professional science presenter. . . . And he and I got to be real good friends, so he taught me a lot of stuff. He taught me a lot. . . . He came to this Science Center to help us look at some equipment (Jem 1st, 145-168).

Museum educators described the characteristics and impacts of the mentoring relationship. They discussed a kind of support that allowed them to build their confidence and extend themselves. They highlighted the value of having someone with more experience with whom they could discuss and reflect upon their activities. Respondents believe that mentoring is critical to professional growth. In one respondent's experience, mentoring changes as one moves up through the organizational hierarchy. This respondent explained being offered more professional guidance and resources upon entering into more managerial roles. Mentoring, in the view of a number of respondents, accelerates professional growth. Several of those interviewed pointed out how one eventually evolves from being a mentee to becoming a mentor for others.

It was important to hear that other people had confidence in you. Sometimes they had more confidence in you than you do in yourself at the beginning. That mentoring was very important. Also important was doing that risk taking, and having someone there to talk with you about it afterwards. . . . A discussion appreciating the fact that some things work well with some and not with others was very good to have (Lod 1st, 76-84).

Working harder in museums and moving up, . . . more museum people would say to me, "Hey, do you know about the ASTC Listserv? Do you know about . . . publications that AAM or ASTC puts out?" . . . I don't know why that is, but it just seems to be the case (Jem 1st, 367-380).

I would say that mentoring really can't be underestimated. . . . Collegial mentoring . . . occurs when you are in a new position or in your first position and is ongoing. This kind of mentoring experience is really important. I think mentoring allows things to happen, and accelerates your sense of profession expertise. . . . And eventually you get to the point, . . . [of] becoming a mentor yourself to newer people in the field. And that's all kinds of mentoring, whether it's sharing expertise, sharing experiences, encouraging certain actions to be taken, and sometimes it's very subtle things (Ked 2nd, 30-37; 65-70).

Work with Cohorts

Another category of social learning is learning through working directly together with others. This category has a distinct character that may include verbal communication – i.e., dialogue, brainstorming, common planning, observation, context-based or situated cognition, and professional activity. It can involve being member of a pair or a team, and/or observing other people's work.

When I started thinking about what I had to learn on the job, I decided all that learning on the job was learning that I did [through] working with somebody (Mod 2nd, 53-59).

The characteristics of working partners varies depending on the distribution of skills and expertise among the partners. Coworking in teams where there were differing levels of skills and experience was cited as a very effective learning opportunity for respondents. In these cases, sometimes the partner had skills, strengths, or alternative perspectives in areas where respondents had less experience, knowledge, or comfort. Working together allowed respondents to observe and learn from their partners' strengths in terms of approach, content knowledge, and areas of expertise. Such partnerships provide models of experience for those with less experience, and mentoring opportunities for those with deeper experience.

That's not where my experience is. So, if I get involved in doing that, then I need to partner with someone who has the content, who has the experience of not only teaching the teachers, but teaching the kids this (Hes 1st, 1723-1727).

We would go out together, and we'd do a program together, and I could learn a lot of the natural history, because that's what she'd be presenting; that was her part of the presentation, so after a couple of times of doing that, then I could do that (Pul 1st, 852-857).

In addition to coworking with those of different levels of experience, working together in partnership with peers who have similar levels of experience was discussed as a very important component of the professional learning process. Activities such as cofacilitating when working with teachers was highlighted as an opportunity to observe and learn from another's working style first-hand. Sharing work for which there is a mutual passion was reported to be meaningful to professional growth. The value of working and learning both with, and from, each other was discussed by a number of respondents. It appears to provide opportunities to both observe another in action and also to step back from the presentation mode and observe the activities from a more global perspective.

I have a partner that I work with here. . . . We sort of switch off days during the week. . . . And I learn from watching her, both what I think works well for the teachers, and what I think maybe hasn't gone over so well. So I get to watch her in action and I learn from that experience. Even though I have taught with her for five years, I am still learning things from her, which is great (Dib 1st, 652-661).

I think one of the most important things to emphasize is about having the opportunity to work with other educators who are passionate about working with teachers. That means: collaborating, doing workshops shops together, cofacilitating. . . . When I work with someone else, it provides an opportunity for me to observe the reactions of the participants and notice how they're

responding. When we work together, we are really sharing resources. Being able to say something in several different ways (through different facilitators) allows me to hear those other ways (Hes 2nd, 27-39)

There were several of us . . . there at the museum that did the planetarium and the animal presentations. We often watched each other. We would go watch other presentations at other places. So it was sort of, you know, the school of hard knocks, kind of, rather than any formal kind of education (Ked 1st, 220-226).

Museum educators learn and are excited by working in a climate with multiple perspectives where there is a mix of input and ideas. Respondents pointed out the synergy that collaborative work can generate. Sometimes this happens through group work, and at other times between two coworkers.

The circle of people that work here. . . . so many people, so many different backgrounds. I think that's what so exciting. . . . We have a phrase – we talk about looking with different glasses. . . . I think that's why it's always different, it's always new, it's always exciting, and it's always this potential (Lod 1st, 1230-1261).

Oh, I lived for those [collaborative] times. . . . the days that I leave this building thinking it's great to work for [this museum and] I really like being a museum educator – are the days when I have those moments . . . of collaboration with staff members (Kol 1st, 2066-2089).

Through the close observation that working together provides, interviewees explained becoming familiar with how others manage and organize tasks. Respondents discussed learning from this experience and incorporating this knowledge into their own work.

I've worked with some people who are so efficient; [one would] come in and have her tasks for the day, and by golly, she'd start in the morning and by the end of the day, she'd pretty much got through them, and it was wonderful to work with her, because she organized you, too (Mod 1st, 720-729).

People who articulate their working thinking process offer museum educators learning opportunities that might otherwise be less visible and more difficult to access. Being privy to this “thinking aloud” process was reported by several respondents as very helpful toward their learning.

[I tell people that the way to learn on the job] is to be willing to work with people who are willing to put things into action and share their experiences with you.

This has happened for me both at the museum and in the schools (Rah 2nd, 100-103).

And I think also the leadership team that helped hold together that institute, . . . were so strong that it was really a pleasure and honor to be with them, and hear a little bit about their thinking of why they were asking us to do the things that they were (Hes 1st, 525-531).

Conversations with Colleagues and Peers

As previously discussed, a willingness to share appears to be part of the culture of museum education professionals. Respondents explained that the conversations and interactions they had with other staff members, colleagues, friends, and family (both within and outside the field) and exposure to, or interchanges with, leaders in the field, were critical to their learning. Additionally, respondents highlighted that gaining fresh and/or alternative perspectives from others (both within their organization and from other organizations) provided an enhancing impact on their work.

In the context of work, . . . I think that I learned best by being able to discuss a shared experience with a colleague. . . . For example, if I'm trying to learn how to teach a particular concept or present a particular workshop, . . . the thing that helps me learn how to do it better, . . . is the opportunity to talk with somebody else who does it as well (Kol 1st, 1185-1196).

The colleagues in other organizations with whom we cosponsor programs, symposia, and classes . . . are people with whom I do things on a regular basis. We have time in between planning where we can talk about common problems, such as what's working, trends we are picking up on, and stories of disaster and success. That's been great. It always surprises me that people are so willing to share things about their work. . . . We home in on areas of mutual interest. Occasionally doing so, I get a whole new idea of a way of doing things (Lig 2nd, 54-64).

I've been on I don't know how many committees, task forces . . . over the years, and I find the group dynamics very stimulating . . . I find the exchange of views, knowledge, everything . . . allows me to do a better job on my piece of the project that I'm going to have to do (Ked 1st, 886-904).

Several respondents characterized the collegial sharing experience as "side-by-side" or "horizontal." It involves both work and conversation, with dialogue interlaced with the work being accomplished. This kind of sharing doesn't appear to have a hierarchical

quality, but is described as occurring among peers, with different areas of expertise and experiences.

The side-by-side thing. It's peer team working. You would be seeing people with a common task and different areas of expertise . . . all sitting at the same table. . . . Then it goes into a major brainstorm session which often gets very noisy. . . . There's usually quite a flow of stuff. It's [character] is very personal and includes people's hates, and likes and fears, memories such as "my math teacher did that." People bring themselves to the conversation. People's styles are present. . . . this side by side isn't necessarily everybody's style, it's my style (Mod 2nd, 59-73).

Collegial sharing, [is] when you get to the point where you have gained expertise to share but also you are interested in absorbing new experiences, content, and pedagogy. So instead of having a senior and a junior situation, this is really when you are equals: people having expertise in different areas and sharing . . . And that has to happen throughout your career. . . . The collegial sharing and the self-motivation are really sort of horizontal things (Ked 2nd, 39-62).

I've learned from the people . . . through working side by side with them, as well as getting their feedback and having conversations with them. That's something that I really do like that about this place. Someone new can work side by side as equals with those who have been here a long time (Rah 2nd, 112-116).

Another distinct category emerging from data was an informal kind of collegial sharing that comes through work interaction and/or conversations that extend beyond the specific work activities. They include end-of-the-day chats or conversations that ensue during through professionally related travel.

[At that museum] there were a couple of colleagues, and we ended up at the end of the day, we'd sit down and talk for up to an hour: going over the day's events, upcoming projects, planning what you wanted to do. And I found that was a great way to end the day, because you sort of decompressed, shared ideas, found out that somebody had a better way to solve an issue (Ked 1st, 948-975).

Conversations with colleagues within different areas of one's institution were discussed as useful toward learning. Often interdepartmental conversations provide new perspectives or stimulus for one's own work.

I talk to [a staff member], who's doing visitor services, and listen to what she's doing, and then, you know, sometimes it sparks an idea of how it might relate to something I'm doing (Pul 1st, 1423-1426).

Talking with colleagues is key to tracking down information and resources to assist problem resolution.

When I started . . . [dealing with] evaluation, I started making phone calls to other museums, . . . [and] . . . I talked to people who . . . do . . . evaluation there. . . . And they'd say, "Oh, well, you should join this professional organization." And once you join a professional organization, then you start getting their publications. And I did that quite a bit, and . . . I got bibliographies; I got recommended [to] conferences (Pul 1st, 639-656).

[A] lot of coming to a big new community like [this] area is trying to find out who does what, and be willing to do things, and wh's good, and so you have to kind of get that information from people (Lig 1st, 446-452).

The general networking among colleagues that occurs at events such as conferences provides opportunities for sharing best practices, support for problem resolution, expanding one's knowledge base, and initiate professional relationships.

When . . . you see that oh, it's not just us. This other place has these struggles, or these breakthroughs. It's very reassuring to share best practices and see what other people are doing, or the philosophical struggles. All of the money is in after-school now. Do we go for after-school? Do we shift? And so hearing from other people, what they're thinking, is powerful (Lod 1st, 855-870).

The informal is very important to me in the museum profession. That's where you learn the neatest stuff, you make your contacts, all of that (Ked 1st, 712-715).

Past professional relationships continue to be part of museum educators' learning process. A few respondents cited keeping in touch and maintaining a long-term dialogue with these colleagues over the course of their careers. These people provide viewpoints on current issues from a different vantage point.

Interestingly enough, the person I collaborated with [in a former career] is somebody that I kept in touch with for a long time. And I have probably an annual conversation about education, and kids and science education, as well, and research data in that field, as well, but in a totally different way (Lig 1st, 748-784).

Collaboration with Other Groups and Communities

Working with groups outside of one's institution offers new perspectives, experience with new audiences, and opportunities to reflect on one's own way of doing things. Museum educators discussed working both with communities with similar cultures, and with groups and communities where the culture was less familiar.

New partnerships can open up areas of interest for museum educators. Outcomes of project collaboration with other groups include transmission of partner interests/passions to museum educators; encouragement of further explorations into new topics; and creation of bonds among those mutually immersed.

I wouldn't have necessarily been that interested in [our local town] history, but because we partnered with the Historical Society in [a] program, I found myself getting more and more excited and interested in the [town] history. I probably would not have ever gone over there to look at that museum if it hadn't been for our partnership, and you know, I have gone back with my husband and gotten books out about [town] history and so, I think probably most anything can be interesting (Dib 1st, 1702-1714).

[Planning a statewide conference] . . . brought the core committee together as a group, and really helps us bond together as a group because we spent so many hours planning and mailing out registration materials (Sut 1st, 899-903).

Working with other groups can provide insight into other ways of working and deepen understanding of one's personal ideas, beliefs, and styles. Observing similarities or contrasts among different groups, heightens museum educators' understanding of their own practice. As one respondent explained, sensing affinities or differences in ways of working helps establish awareness of one's own area of comfort and sources of energy.

We [worked with] . . . two different groups [of institutions]. [With one] group . . . we really shared ideas and [how] it [could] flow. [With] another group, . . . everyone came to the table and said "This is what we're doing" and, "How are you doing it?" It was more independent. . . . sometimes we felt a little more at odds with the style. . . . When you're co-presenting, there are some times when you feel very comfortable and energized by it, and other times, it may not feel as strong (Lod 1st, 674-691; 748-752).

Working with new communities was cited as an effective way to learn. Working directly with members of other communities engenders deeper understanding of their culture and

context. Additionally, respondents explained that working with other groups provides museum educators with a means to augment their audience.

If you've now got a project that's working pretty well [and want to partner with a community center] . . . the community center can tell you the aspects of that project that will or won't work in their settings (Mod 1st, 1134-1140)

We help[ed] sponsor a two-day conference . . . around engineering technology and design, and invited district teams. We partnered with [a university] . . . [and] they brought in a lot of people that we had never worked with before (Hes 1st, 1338-1398).

There are lessons to be learned about the process of partnering. When one respondent's institution hosted a workshop that they didn't design, they noted problems in relation to the project's outcome. In this instance, participant feedback indicated differences between their prior workshop expectations and their actual workshop experience. The museum educator discussed learning through this experience to be more cognizant about balancing the responsibilities and the planning process in such partnerships.

We . . . were hosts. . . [of] a workshop here. . . . The [feedback from] participants said it didn't meet their needs. . . . There were different expectations. . . . on [the part of] a lot of different players. I guess it just reminds me of, as we keep forging these new partnerships, is to really be clear about the goals [of] being partners instead of letting . . . one institution take more part in the planning than the other. We sort of just said, okay . . . and we saw what happened (Hes 1st, 1433-1451).

Some of the social interaction linked to learning involved people connected to post-secondary institutions through museum projects and university affiliation. A few of the respondents discussed the continued influence of people connected to their graduate school studies, people with whom they have maintained long-term contact and who provide alternative perspectives.

We work with [a] University . . . Engineering Department, and they look at a lot of biological systems to help them answer some very computer or technological-based problems. They'll look at butterfly scales, and see how they absorb heat and transfer heat, and that can help you address, things on microchips. . . . Now I can get excited about that, you know? Whereas, if you were to say, you know, we have a problem that these microchips overheat, I could care less. But, [you can] . . . hook me with that angle (Lod 1st, 269-281).

We had deans of different schools [at that institute]. [One] dean of engineering, . . . came to the conference, and we heard him talk, and he is very inspiring [and]

very passionate about how everyone should be doing engineering (Hes 1st, 1400-1409).

We are part of the university, so we often have expertise that we can call and meet with, or set up a professional development session here (Pob 1st, 1930-1933).

[A] couple of my colleagues from graduate school, and a professor and colleagues, you know, I still need to have contact with. We're able to talk about things . . . very different sorts of things (Lig 1st, 780-784).

Listservs, Web Chats, and E-mail

Attitudes toward using electronic resources or communications appears to differ among respondents. For some, it is very important and it is viewed as their link with the rest of the informal education community. A number of people in smaller institutions discussed viewing the listservs as a tool toward a “virtual” expanded institution. It provides them with a wider range of day-to-day colleagues who serve as resources, through electronic contact. For a few of the respondents, listservs are less important and more peripheral in their professional learning. A couple of respondents indicated the time constraints involved made it difficult for them to follow a listserv.

I can't live without that listserv. That's my hotline every day. I would go stale, I would go dead without that. . . . I need that constant contact with colleagues. I need the brainstorming. I need to know what other people are doing. It's my gateway to find out, fast, what other people are doing. . . . This has expanded my resources. . . . it has expanded [my institution]. I'm not in a big place anymore. . . I get very passionate about this (Rab 1st, 2070-2084; 2022-2062).

I don't tend to be the kind of person that follows a particular listserv all the time. . . . I mean, I do go on and off listservs. I like listservs but they take a great deal of time (Kol 1st, 1843-1845; 1829-1830).

Respondent views about “electronically” related support for learning seem to connect to learning and work styles/preferences. Most of the respondents reported using the Internet and email extensively. Uses of e-mail and the Internet included follow-up communications after a professional development institute, email as a way of passing on information about upcoming professional development events, participating in chat-rooms focused on topics associated with the content of one's work, and doing general research work.

[After attending an] Institute . . . they had the Listserv, and it was just this wonderful thing. You kept in communication (Lod 1st, 703-730).

I actually found a palontology chat room on AOL one night, and got in there and said, "Hey, I don't know anything about this stuff, can somebody help me?" And I must have gotten fifty e-mails, and for the longest time, those people had put me on a dinosaur . . . news group, and . . . I still get a regular e-zine from this company called "Dinosaur News" (Jem 1st, 1350-1362).

The Internet has been just fabulous for me. Lately, within the past couple of years, because you have that ability to just go in there and not know anything at all, not know anyone, not know any organization, and just put in things to search for, like visitor research, and you learn about all these journals, and organizations, and resources that are there (Jog 1st, 599-607).

Many of those who were dedicated to following listservs discussed their delight in finding out how sharing people can be, and that in turn this observation made them want to be responsive as well.

Because I've had good experiences with people offering me information, because initially I was asking questions it seemed like the right thing to do, like you reap what you sow? If you helped make this a good listserv; if you helped provide information, you're hopefully going to find that when you need information in the future, they'll be someone who's willing to help you (Jog 1st, 1222-1229).

Participation in Review Process and Advisory Boards

One respondent discussed learning through serving on proposal review panels and advisory boards. These activities involve considerable social interaction in terms of dialogue. The respondent described it as a pleasurable process and a learning experience.

Serving on juries and panel advisory boards, and things like that has also been a great way to learn here. I've had the pleasure of working on a number of them (Mod 1st, 1200-1204).

LEARNING THROUGH READING AND OTHER MEDIA RESOURCES

Museum educators use literature and other kinds of media as tools and resources for their learning and research. These include seeking specific kinds of information and/or knowledge in terms of content and methodologies; investigating and browsing in a more

general exploratory fashion; picking up on recommendations suggested or offered by others; and revisiting old standby resources.

Most museum educators interviewed use literature and media of all kinds to access and acquire the accumulated thinking relating to their work. This use of literature and media appears to be both a search for what “the experts” have to say, and a tapping into what others pursuing similar goals have to say. The printed word was the primary mode cited but a few people mentioned watching professionally related videos/films or television.

Reading for museum educators comes through several modes. Respondents cited accessing traditional paper publications along with electronic media. Electronic media includes items available on the Internet, as well as communiqués from others. Those interviewed cited reading professional level literature such as journals and newsletters, as well as children’s literature.

The use of children’s literature was frequently mentioned. For those without a formal science background, this reading appears to offer a basic, straightforward opportunity to learn basic science content knowledge through nontechnical language. Several respondents pointed out that books targeted for a youthful audience contain science-related activities that museum educators find useful in program development.

I never think of doing anything without reading up a little bit about it. That’s just the way I start, and often I start in the children’s section, because I need the basics to start out (Mod 1st, 418-425).

Respondents discussed reading, viewing, and listening due to a specific “need to know.” This kind of reading generally involved assignment to a particular project, where the content was unfamiliar or went deeper than their prior knowledge. One respondent described using reading in conjunction with “fiddling” with something, employing a back-and-forth procedure between hands-on experience and then referring to what the experts have to say.

I went to Borders, I went to Barnes & Noble. Bookstores would let me read. I didn’t have a lot of money, so I didn’t buy a lot. I looked on the Internet, and looked up specific points, and if something was too complicated an explanation, I just didn’t look at it. I went until I found an explanation that I could understand (Jem 1st, 286-293).

I see something that I want to learn about, and then I go read about it, and then I’ll go back, or if it’s something hands-on, I might fiddle with something, and then I’ll go read about it, but I can’t just do something. I want to read. I want to see what the experts say about that. . . Generally, I will be intrigued by

something I've seen or done, and then need to rely on the experts (Pob 1st, 964-979).

Many reported that reading was a starting point for their research on a topic, and it offered the convenience of fitting within their own time frame, something that more formally scheduled activities don't always offer.

I'm definitely a reader, and I think reading works well for me, because this job is very time-intensive, and even though I'm interested in going to a workshop or a conference, a lot of times I can't work it into my schedule. If I can find a book, an article, if I can e-mail somebody who's a presenter, and they can provide me with materials that will be handed out and covered in the workshop, that seems to work out well for me, because I can do it in my own time (Jog 1st, 733-742).

Choices of professional literature varies according to current needs and focus.

Respondents reported reading literature that was necessary for working effectively with a particular audience, and then shifting their reading habits as their job descriptions changed.

"Science and Children" I read religiously, because I was teaching Saturday classes to five and six year-olds for years. I was looking for every good idea they had. Now, I might take up a "Science and Children" two or three times a year (Kol 1st, 1852-1855).

I will now look at different publications that I didn't look at before, like ENC, [from Eisenhower National Clearinghouse], for example, that has a lot of this stuff (Hes 1st, 841-848).

A less focused, more exploratory way of reading, viewing, and listening, appears to be employed by museum educators as a way to fill in professional knowledge gaps, generally in a particular topic area. Although much of the time museum educators appear to do this kind of reading in self-defined areas of interest, respondents also discussed a somewhat different kind of reading: a general browsing of literature in a more open-ended search for ideas, connections, and serendipity.

[I select what I read] by topic. If I'm interested in something, if I'm curious about something, if I'm dealing with a project that I need to learn more about (Rab 1st, 1304-1309).

I think I'm more of an intuitive educator really, and . . . I read . . . do a lot of searching for ideas, and then I call people up (Lig 1st, 825-865).

Several respondents described having an “aha” moment when within the course of their reading, they discovered clarification of ideas or terminology with which they had been grappling.

Years later, it suddenly hit me like a ton of bricks. . . . all of this stuff was constructivism. . . . It wasn't until I left that job that I sort of discovered all of this literature, that I said “Holy Cow. I understand this stuff. This is what I've been doing all of this time,” but couldn't attach a name to it (Rab 1st, 360-367).

[There was a] buzzword . . . going around, and I think I came across it in a science teachers' journal, it was on that topic, so I was able to read that article and figure it out (Dib 1st, 1443-2447).

Museum educators use their reading as a springboard for dialogue. For one respondent, reading provides a pathway to a preferred learning style, that of having a conversation around the topic.

I do a fair amount of reading, but. . . . I learn through talking about things with people. . . . You know, I do a ton of reading, but that's not really what I learned. What I do when I read is I come up with something interesting to talk to someone about (Kol 1st, 1830-1833; 2286-2291).

Museum educators read, view, and listen to obtain general news, and current topics. A few respondents discussed often reflecting on how this media information relates and connects to them professionally.

So it's finding resources – you know, I can look at “The [Boston] Globe” and I can rip out three articles almost every day that are relevant to something that's going to happen here in the next few weeks. And that's kind of fun, to share that with whoever is going to do it (Lod 1st, 1712-1719).

Museum educators most frequently cited locating resources in bookstores, catalogues, museum and local libraries, newsletters, book fairs, and the Internet. Bookstores, public television, and catalogues provide opportunities for purchasing professional resources, and many museum educators reported purchasing these materials with their own dollars.

I always go to the children's section of bookstores and look for the nature information. . . . The NSTA . . . on one of the back pages of their newspaper, they . . . tell you about the new publications that are coming out in different areas (Dib 1st, 1127-1134).

I [find out] about [resources] . . . there are always the catalogues. I've got the AAM [American Association of Museum] bookstore's catalogue. I've got the ASTC (Association of Science-Technology Centers) bookstore [catalogue]. I cruise bookstores. . . . My house is jammed with stuff (Rab 1st, 1313-1317).

[To locate resources] sometimes I look at a bibliography if it's a book that I'm reading. I just try to acquire a few basic books on the topic through the Net or library to see what's available. Usually my public library. Or if it's something that relates to work (Pob 2nd, 50-53).

Institutional libraries, personal professional libraries and periodicals, and institutional subscriptions were cited as an important way of accessing resources. Some resources new staff members "inherit" from previous staff; others are part of personal collections. As previously discussed, there is a strong culture of sharing among museum staff. Consistent with this culture, personal libraries often become resources for others, especially when housed on site. Museum staff often make copies of useful resources and distribute it to their colleagues.

[That periodical] was just sort of coming here when I started, and I just kept the subscription going. And we have a library here, so I read a lot of publications that come in, and I also read newsletter from other [organizations]. . . . I try to look at them as they come in, and see what's of interest (Lig 1st, 822-823; 841-846).

Most of us have to buy our own books, our own journals, and everything else. But just having [those available], you're appreciated for doing that; that makes a very rewarding environment to work in. . . . [We] share resources all of the time. I mean, I have books that I trade off (Ked 1st, 1796-1804).

We have a very informal . . . museum way of when you see an article that's interesting to you, or looks like it would be interesting to a colleague . . . we tend to copy things and put them in each other boxes or nowadays with e-mail, you know, create that link to go check something out on the Web (Kol 1st, 1832-1841).

Museum educators often select resources through the assistance of, and at the suggestion of others. Respondents sometimes rely on what others with differing specializations have read and seek their advice in terms of appropriate literature. Such resources can ignite strong interest in a topic for museum educators and infuse their work. Museum educators report that colleagues at professional events often recommend helpful resources.

There's [a staff member] here who is very knowledgeable on history. And I go to him and ask what's the best thing I can read on this topic. He's already done all the reading, so he can tell me (Pob 2nd, 53-56).

I started working with some fire personnel, . . . and they gave me a really great book called "America Burning," which was just a life changer for me. . . . When I got through with that book I was so impassioned about the dangers of fire, . . . I was instantly converted to this as a piece that needs education. This is where we can educate a community (Mod 1st, 378-397).

When you go to these [professional] meetings, . . . before the seminar starts, . . . you just talk with your colleagues and they'll mention some tool that they have just heard about or some Web page that they have heard about (Dib 1st, 1135-1140).

Museum educators sometimes rely on highly influential favorites and old standby resources. Several museum educators discussed special books that had had a profound influence upon them that they frequently refer to and revisit in their work.

[A book that had a] big influence on me [many years ago] – I was at a huge book sale at the Boston Public Library, and I picked up a nineteenth-century museum educator's book. . . . I was just starting out . . . It was a lucky chance to have found it, but it gave me some ideas about what my predecessors were doing and what was valuable about it, and what have been the continuities (Rij 1st, 1151-1156; 1817-1824).

I've got two or three books that I like, and one of them is way off the beaten path. It's called "The Web of Life," . . . it's probably thirty or forty years old, and [it's] basically is a primer on ecology. . . . very simple, . . . you go back to them; I go back to them. I'm always looking for the book (Rah 1st, 1388-1411).

Several respondents explained that family members and friends of museum educators provide support and resources, such as clipping and sending them pertinent articles.

[My] father, [who] lives in [another] area, . . . is always clipping things from the newspaper that he thinks apply to my job. . . . and so he is always supplying me with things that – actually I can use a lot of his ideas, you know. So that is an outside source I have of information (Dib 1st, 1329-1338).

LEARNING THROUGH INVOLVEMENT WITH SUPPORT ORGANIZATIONS

Networks and support groups become new communities with which museum educators identify. Membership in these groups offers an extension of one's professional universe. Respondents identified both local and national organizations and agencies from which they received support for their learning. Organizations most often cited by respondents include Museum Institute for Teaching Science (MITS), the Association of Science-Technology Centers (ASTC), the New England Museum Association (NEMA), the Visitor Studies Association (VSA), the Massachusetts Environmental Education Society (MEES), the Massachusetts Science Teachers Association (MAST), and the National Association of Interpreters (NAI).

MITS is a small group of lead educators from all over. It's smaller, it's more intimate; you really get quality interaction with other people who are trying to do the same thing that you're trying to do, and you don't get that level at a conference, or a one-day seminar, or anything like that (Pob 1st, 1078-1084).

I would forgo any other conference for the rest of my life for the chance to just go to ASTC every year. . . . Because it is broad enough, everybody goes. It's the best bunch of people I've ever seen. You can share like crazy (Rab 1st, 1208-1217).

In addition to professional associations, one respondent pointed out that funders such as the National Science Foundation and the Howard Hughes Medical Institute provide technical support as well as financial support. These funders assist in the learning process by guiding the "how to do and what to do"; stimulating foci on special audiences; acting as coordinators for professional learning across multiple institutions; and becoming partners in the ongoing process of project development, assessment, and revision.

The funders themselves sometimes have been a source of how to do, what to do, because the priorities that they're setting – the National Science Foundation, . . . set priorities for involving minorities and girls in science, you know? So, they also show you how, because they show you who else they funded, and what they did, and you learn from that. A funder like Howard Hughes Medical Institute – they're great learners; they're willing to fund you on a project, and then actually endure the process with you, and change as you go (Mod 1st, 1159-1171).

PRESENTING AND WRITING AS LEARNING

Both presenting and writing professionally are viewed by respondents to be associated with their professional growth.

A number of respondents view the process of planning to teach and/or present something as a good way to motivate research, clarify their conceptual understanding, and organize their ideas.

Every single public speaking opportunity that I get; every single theatrical experience that I get contributes to my professional growth in museums, because it teaches me to communicate better; it teaches me to pay attention better to what I say. It helps me to be a better study; exercises my mind (Jem 1st, 1873-1879).

If I'm going to do a presentation. I have to research the material, organize it in a way that makes a lot of sense to me, that makes it absorbable; so it's the same thing as writing. It's an excellent way for me to learn something. That's why I always say to my students, there is no better way to really get familiar with the material than to have to teach it (Ked 1st, 857-867).

Writing about things also assists the learning process. Museum educators explained that writing articles and writing proposals were good ways for them to clarify ideas they need to articulate.

Writing about things helps me. So if I have to write an article for a newsletter, or a magazine, or something like that, then what I do is I take all this information, and I try to make it so well organized that it can be absorbed very simply, and in doing that process, prioritizing, organizing the information, I learn very well that way (Ked 1st, 833-840).

I had to write for them why I thought [this professional development activity] was important, which was a good way for me to work through what it was I was planning to do, and hoping to get out of all this (Kol 1st, 1619-1623).

EFFECTS OF PHYSICAL SPACE ON PROFESSIONAL GROWTH

One of the areas of inquiry during the interviews was to assess whether the physical environment within which museum educators did their work had, if any, a particular impact on their learning process. There are strong data indicating a significant influence on learning in terms of office arrangement, office location, and related communication systems. Also, another category relating to physical arrangement is the influence of

institutional atmosphere upon professional growth in terms of the facility itself, its surroundings, and associations.

Office Arrangement, Location, and Communication Systems

Respondents discussed the pros and cons of various office arrangements. There appears to be a fine line between the benefits of togetherness and the need for more privacy. There is a strong connection between office arrangement and the social interaction that is associated with museum educator learning. Additionally there is a relationship between the office arrangements and working styles/preferences.

Most museum educators had positive things to say about the ease of interaction provided by working in close physical proximity to each other. All of the people who have experienced this kind of working arrangement explained that it generated both a special kind of collegial energy, as well as a nurturing atmosphere. Being close to one another encouraged a “think tank” atmosphere that everyone described as very stimulating. Mixing of specialties within work stations was cited as very helpful as it brought together a variety of expertise. Another benefit of being close to coworkers is the informal flow of information, such as hearing phone conversations etc. Museum educators get to know what’s happening simply by being there, observing, and listening. This allows them to respond to situations quickly as they already have a basic awareness of what’s occurring.

We’re physically on top of each other. . . . The ideas that bounce off one another is just phenomenal and I think that chemistry and the synergy that happens is so magical (Lod 1st, 1586-1593).

[It was an] exciting arrangement for offices, because we had all of these program managers all in one big space, plus. . . . the evaluator in there too, which made . . . a lot of sense. We had the offices. On the outside of the office was a secretary in the middle, and we all came out of our offices to kick ideas around, and there was an enormous amount of brainstorming. It was like the classic bullpen that you find in an ad agency, so that was incredibly exciting (Rab 1st, 1534-1543).

We’re right next to each other. And that’s helpful, because, heavens, if we waited for a meeting to talk about half the stuff that goes on here, it would never get solved (Mod 1st, 1313-1339).

I think the physical space is important, really important to just how we interact, so that I have very much thrived on having the ability to share my space with other people, and having people within carshot. . . . [In this office setup] I can basically pick up on when somebody else is having a problem, and . . . need[s] help. . . . It’s nice to be able to anticipate, sometimes, what’s about to happen so

that you can get that key piece of information to the right person at the right time (Lig 1st, 1131-1136; 1158-1163).

Some museum educators who prefer to work on their own find the social elements distracting or inconvenient. Several people who now work or have worked in more private spaces, expressed their comfort with this arrangement, as they have the ability to close their doors when needed.

I started out on the other side, and shared an office, and I found it for me personally, very distracting. I'm a much more focused, efficient worker. Not that I close my door, but having my own office space, has really been important (Pul 1st, 1328-1335).

In this space – I'm lucky, I can close my door. I don't often do it, but I get out and about a lot, I also have taught in all the teaching spaces here in the museum, and I've done some public programs with live animals; and some physical science stuff, so I've had a variety of places in which to do my work (Rah 1st, 1201-1206).

Some respondents who had worked in more solitary office set-ups in the past discussed finding that arrangement lonely, and explained that at those times they tended to seek out others in common spaces. An office set-up that one of these respondents explained meets both a need to be social and still offer privacy is an arrangement that offers a combination of ways to use the space: both a means to isolate oneself when needed and a way come together to work collaboratively.

When I worked [another] museum . . . I had a basement office, because the Education Department was downstairs. And because of the exhibits and so forth, we were all kind of spread apart, and it was kind of lonely. And so oftentimes our best thinking was [when] we'd get together in the library at the museum, because we were too isolated. . . . And this place is great, because you can have just enough privacy to get your work done, but you can also hear ideas . . . There is a lot of sharing that goes on here (Ked 1st, 932-940; 976-982).

Needing to cover distances to see coworkers appears to be a personal preference. One found traversing even small distances to communicate with others an inefficient arrangement. Another respondent felt differently, and pointed out that walking to see others had benefits, such as the serendipity of running into people and exchanging information.

Now I have to walk down the hall and talk to my staff person. . . . it doesn't seem like that should make that much of a difference, walking two minutes, but I think sometimes the immediacy – by the time I get down the hall, someone else has stopped me with a question, and we need you to sign off on this, and I'll walk in the office and I'll go, "I'll be back when I remember what the question was" (Jog 1st, 983-991).

[Having to walk a bit to visit other departments] also allows you to run into people that you wouldn't run into and exchange some information. It's just a friendlier kind of atmosphere; . . . we . . . often combine it with something else, and like going to the fax machine or . . . or the mailbox, and all of that sort of thing (Lig 1st, 1224-1231).

A number of the museum educators interviewed have been at the same institution through a rearrangement of offices, or through new construction. They discussed how these settings contrasted with the old, and how the change has influenced the working climate, even though much of the same staff continue at that institution. Museum educators who had been moved from spaces where they worked in closer proximity or with more people explained they now missed the atmosphere that the more crowded conditions conferred, such as being more involved with and aware of other's activities. One respondent's move isolated his department from the institutions main exhibits, a situation that reduced interaction with many other members of the organization.

I kind of miss having been in a bigger office space with cubbies, where you could almost feel what was going on with a large number of staff. You knew who was having a bad day from a distance . . . We were able to look out for each other. It was more of a community. . . . Now, you'll see the greatest collaboration, and most interesting discussions happening in the hallway area. You know. . . . talk[ing] . . . around the water coolers, that idea (Kol 1st, 2034-2065).

[Our offices] were removed from the main building. . . . So, we were taken outside of where everything – we were taken outside of the heart and soul of the institution, which is its exhibits. . . . I no longer had daily, hourly interactions with the people who are responsible for the exhibits and the visitor experience (Rij 1st, 1565-1574).

Placement and position of a museum educator's office can connect to one's perception of their status and how they are valued by the organization.

Several museum educators mentioned the feelings associated with the Education Department "being in the basement" as a subtle (or not so subtle) message as to organizational importance. This was most often mentioned by those who now worked, or

had worked in larger institutions, where the departments are more isolated due to their wider distribution in the facility. This physical placement also appears to inhibit interaction with people in other departments of the institution.

There are certain parts of the building, if you have an office down in the basement, it doesn't feel as good as, you know, you are not in the main thoroughfare and you don't have as many opportunities to talk to people unless they come down to your office (Hes 1st, 1266-1292).

When you're a large museum . . . and you start with the Board of Directors, and you come through . . . Administrative Personnel and, you know, Education is in the basement, I've always wondered what kind of message that sent, but there you're . . . a small fish in a big pond, and here I'm the larger fish in a smaller pond (Pob 1st, 1284-1292).

Within departments, the position and arrangement of one's office space can be associated with one's status. As one respondent explained, this is particularly true when there is a contrast among office arrangements for those on the same rung of the hierarchy.

But when I was out on the floor, there really wasn't the kind of separation as there was between the people who had the offices along here. . . I . . . am at a position at the same level [as others in offices and I] am out there in the corner surrounding by cubes with no privacy or anything like that, and I think that that kind of sent a subtle message of lesser stature, lesser currency (Pob 1st, 1247-1260).

Sometimes people work too close to each other. Although the majority of people working in more social office settings felt that this arrangements had major benefits, there apparently is a point where crowding becomes too intense for effective working conditions.

We have a project coordinator now who works part-time. [We] don't have a desk for her. So she shares a desk with someone else. So many a time I don't even have my own desk or my computer. I share my computer. So those little things, . . . can send you over the edge because you're just always working on limited resources of space, and no privacy. . . I think we would lose something if we had much more privacy, but . . . we've become a little too many rats in one cage, . . . for being healthy, you might say (Lod 1st, 1949-1962; 1985-1988).

Respondents discussed ways in which they coped or adapted to the constraints of their office arrangements, placement, or lack of available institutional space. Several need to

find a quiet time and place to concentrate, meet with others, work uninterrupted, or have professional phone conversations. Ways that museum educators adapt to their physical space conditions include working during hours or days when fewer other staff members are present; working at home; explaining their need for privacy to other staff members; and developing a tolerance level for working under frustrating and/or chaotic conditions.

Also, physically, when it comes to writing or focusing on something, it's challenging to be in that physical space with so many interruptions. . . . And I find what I've been doing lately is I don't go out to lunch because that's the time when the office is empty. . . . I'll be alone (Lod 1st, 1756-1759; 1994-1996).

The conference room, which is our main meeting room, is also where the staff eats lunch, or we have tanks in there that we're cleaning, so it does sort of set up some friction at times . . . you're trying to get your office work done, or answer the phone, and we've just brought in 25 kindergarten kids that aren't necessarily the quietest of people as they come through. So, you have to learn to adapt and to look at the situation (Sut 1st, 1712-1721).

Offices placements can be as a result of organizational planning. For one respondent's organization, these arrangements included objectives such as facilitating the formation of working teams and encouraging staff to observe visitors and exhibits. In another institution, the planned creation of a common lunch area is designed to encourage more departmental informal interaction.

This museum has spent a lot of time thinking about what's the most productive way to place people. Sometimes it just gets to be a practicality, but . . . we did some thinking about putting people together . . . who could stimulate one another; that was one way of thinking. Another way of thinking was to put the people in the middle of the exhibit, so that they could keep an eye on it. So, we sort of have both things going on right now, . . . we have to walk through these exhibits all the time in order to get to our own offices (Mod 1st, 1310-1325).

So, [with the office shift] now we're now closer to other people in the programs division. . . . part of it is they set up a big lunch room, which we've never really had, so we can . . . kind of have lunch together, and be able to talk to each other, and interact that way (Pul 1st, 894-900).

Location of one's office permits or encourages observations that other placements would not otherwise engender. As one respondent reported, a view of the parking lot gave rise to understanding institutional parking needs and issues. Proximity to exhibits appears to affect one's professional influences in terms of the people and things with whom/which they do, or do not, observe and interact.

I overlooked the parking lot, so . . . I learned a lot about parking by looking out the window. I learned how many parking spaces you really need. Ironically I also learned . . . where you have to place, and how many spaces for handicapped parking by looking out the window. . . . [When I was in another office] . . . there were no windows in the basement of [that] building. All you had to do was open the door, and the public was out there, so it was literally in the middle of the gallery (Rab 1st, 1525-1528).

[I worked in one museum where] I had an . . . office [that] was right on the exhibit floor, and so much so that people thought that my office was part of the exhibit (Jem 1st, 1743-1747).

Atmosphere of Physical Context and/or Culture of the Context

Museum educators experience the impact of their physical surroundings, in terms of culture, objects, aesthetics, institutional size, and degree of modernization.

Working in a facility with authentic collections or facility appears to affect museum educators' attitude about their institution. For several museum educators, working in a beautiful or tranquil setting connects to their attitudes about their work. Working in a new, state-of-the-art facility is also satisfying. As one museum educator pointed out, the facility itself provides an example of current thinking in the field.

This place has been interesting and exciting, because it's a real place; it's a real place where real history happened. And that's exciting. . . . [In another museum where I worked] you could go to collections . . . I . . . like going down there and seeing the real [objects.] (Pob 1st, 1195-1212; 1178-1180).

Oh, it's very enriching, just . . . driving up the road coming to work, that little narrow road is so beautiful through the forest, and I often just turn off my radio and take a deep breath and say, okay, now you are going to work. . . . It is almost like, now you can relax, because you are coming to work. [I] don't have to get all worried, it's a nice place to be, to just get out (Dib 1st, 876-884).

From an overall facility standpoint, the fact that this facility is brand new and is really state-of-the-art, I think, is helpful to me as a teacher, so instead of talking about how things should be in zoos. . . . I can talk about how things are in good zoos (Jog 1st, 1001-1007).

Thinking about changes in the physical environment triggers museum educators' reflections on how their physical space arrangement influences their work. One respondent discussed concerns about expansion (a possible solution for overcrowded office conditions), in that expansion would take away some of the positive aspects that being a closely knit culture affords.

We've talked sometimes about expansion, you know, what if we bought a house and our offices were in the house? Yes, that would be okay, but then again, you would lose so much of what you have here (Lod 1st, 1867-1870).

Physical space is connected to a change in organizational vision and direction. Museum educators' work space is affected when the organization changes priorities and foci.

As the Museum takes on this new initiative . . . we don't know what is going to happen and we are still looking at space really carefully around here. . . . we have a nice kind of . . . space, a workshop area, to set up, store materials, and things like that, and it is very well organized, but I am thinking that we might lose it as our efforts switch to more outreach programs and they need more space (Hes 1st, 1317-1326; 1303-1309).

INFLUENCES OF LEADERSHIP STYLE AND ORGANIZATIONAL PHILOSOPHY ON LEARNING

Leadership and organizational structures and styles emerged as a topic related to professional growth as some organizational structures serve to motivate and support learning. Respondents discussed how particular leadership styles and organizational climates appear to be more congruent with the learning and working styles of museum educators.

There was very strong evidence in data that the majority of respondents interviewed prefer leaders who give them autonomy in their work. They discussed responding positively to managers who first present them with their responsibilities, and then provide them with the space and time to carry them out. Most respondents spoke favorably of enjoying opportunities for creative freedom and innovation.

When you have a micro manager, to me, in the museum field, that's a person that's always losing staff, because people in the profession like doing things their own way. . . . Managers that basically say "Look. Here is the organizational mission. Here's a couple of specific things I just need you to take care of" and then step back, are very much appreciated (Ked 1st, 1771-1775; 1786-1789).

I think that in museums it mostly has to do with the people on the upper levels, and if they want to bring you along or not . . . If you have a director who wants to see people move forward, and who wants to motivate people to do more, to do bigger, to do greater, then those people will, . . . expand, and their horizons will expand and their knowledge base will expand. . . . A good director will . . . let you grow your own sort of way of doing things; your own path; your own flavor for something (Jem 1st, 482-484; 457-465; 942-944).

[My former director] allowed me [and] then she also encouraged me to work independently, which suits my style, and be creative (Pul 1st, 1206-1216).

Along with allowing for autonomy, most respondents interviewed explained that they work most effectively and enthusiastically in an atmosphere that encourages risk-taking. They associate this working atmosphere with their professional growth as it allows them to stretch and explore and learn within the comfort of knowing that the organization and leadership supports their doing so. Organizations viewed as risk-takers were highlighted as influential toward museum educators' attitude about risk-taking.

There is an atmosphere here that really encourages and nurtures . . . risk-taking and trying things out (Pul 1st, 265-267).

My director . . . basically said, "Do what you need to do. And, you know, if you fail, fail. But try not to fail." (Jem 1st, 788-792).

. . . an answer to what in particular about the organization associates with professional growth, one thing that came to mind was the museum had some courage about risk-taking, in particular in the topics that have been chosen to be exhibited (Mod 1st, 1816-1836).

Some of those interviewed described how changes they'd experienced in organizational leadership and structures provided opportunities to reflect upon organizational climate and on their own work.

Changes in leadership can influence professional growth by offering points of contrasting leadership styles. Respondents discussed the changes they'd observed under new leadership. They reported noticing the alternative tone a different leader can engender, and its influence on staff morale and/or feelings of support in their work. One respondent discussed how effective leaders can alleviate the anxiety sparked by change, through communicating that the organization encourages change but still validates the older successful ways.

We happen to have a really energetic and insightful director who has really brought us together as a group. And when I first came, it was a different director, not a people person at all . . . And there was such a different feeling (Dib 1st, 486-492).

There was no interest or awareness, or very little, in education at that time, among the power structure at the institution. . . . It changed dramatically when [a new person was] brought on to be the president. . . . He was artistic . . . and creative . . . [and] from an educational perspective (Rij 1st, 831-847).

. . . maybe that's just a good management technique that our executive director employs, that puts a lot of trust in the people . . . when new people come in there isn't this expectation that there's going to be an immediate change from what has happened before. And part of that is because we've been very successful, and so we don't have to change something that's not working (Lig 1st, 522-534).

When a new leader has different realms of experience, beliefs or priorities from those of the museum educator, an atmosphere of friction can arise. The dialogue or reflection that ensues from this friction motivates museum educators to conceptualize, clarify, and articulate what is involved in their job.

I see this in a number of organizations. More and more, the CEOs [being hired] are moving away from museum or education background to a business background. As a result, there can sometimes be internal friction between the business and the education aspect. The new person that may not understand that a four-hour workshop involves time for planning, preparation, cleanup, and reflection on the workshop. You look back and reflect on what your job is, and what goes into the workshop, the time frame involved. In explaining it, it educates him (Sut 2nd, 23-34).

Organizational restructuring can provide new understandings about how the organization works. One respondent explained that the old structure didn't offer visibility in terms of the way things "fit together." In that respondent's opinion, knowing how things fit permits more effective implementation of one's job. Additionally, the restructure of that organization provided greater accessibility to science content expertise, and hence has enhanced that museum educator's ability to access information when needed.

[Before the reorganization] I had no idea of how the financial stuff worked. I could have done my job so much better if I understood that, and not just the financial, but how the whole [organization] fits together. Now we're much more aware of it, because we've gone through the strategic plan. . . . and the structure's changed. . . . [Also], now . . . we have a way to tap into the science, and make sure that what we're putting out is good science (Pul 1st, 1289-1298; 971-980).

Organizational support for staff professional development is a factor in museum educator professional growth. Some of the institutions where respondents work have put staff orientation and professional development initiatives into place. According to members of one larger institution, this involved forming a staff committee, assessing staff attitudes toward their own professional development, and setting up structures that encourage and support staff to pursue professional development. Another large institution has a fund available for staff tuition reimbursement for professionally related coursework.

[The museum] had very carefully thought out a couple of months of training for me to prepare me, and to initiate me into the culture of the [museum], and get to know people, . . . So, I had a wonderful grounding of the [museum's] culture with a very supportive group of mentors before I was on my own in the program (Rij 1st, 482-490).

The museum philosophy is to tell you what you are expected to do and then say "Go do it and we will support you." . . . it's now become part of everybody's job description - . . . to address their own professional development goals. . . . A certain amount of funding has been made available to permit people to take advantage of these opportunities (Rah 2nd, 52-76).

I started going to the ASTC [conference]. . . . It was like my world had literally opened up because [my museum] had the funds to do this (Rab 1st, 1192-1196).

For respondents in smaller institutions, there is organizational support for staff development philosophically, but pragmatic issues intervene. As previously discussed, in many of these smaller institutions, time and program coverage are priority considerations, and funding is not always available.

When staff at the same institution share the same professional development experience, it appears to coalesce staff toward similar perspectives. One small institution sponsored a professional opportunity for the entire staff that was an efficient and effective approach for staff development. The respondent explained that this approach permitted a more local focus to the issues included in the professional development. However, this respondent pointed out that although this practice was useful, it should not be used as a replacement for staff attending professional development activities outside the institution.

We did bring someone in to cover Visitors' Services issues. . . instead of sending out seven, eight, nine, ten people, we had someone come here and give a presentation, and sort of address the big issues for us, which I think was efficient and effective for our staff people. . . . I think sometimes people do need to go out to conferences and there are things that you get from a conference that you don't get from bringing in someone, but I think especially from a Visitors' Services

perspective, everyone in the institution needs to be on the same page (Jog 1st, 1084-1107),

GAINING SELF-CONFIDENCE, ASSESSING, AND GAUGING ATTAINMENT OF EXPERTISE

Achieving expertise or mastery is defined in a very personal and context-based manner. Self confidence is associated with one's self-assessment of attained expertise. There appears to be a continuum: buildup of confidence leads toward self-acknowledgement of having achieved an increased level of ability. The particular point on a scale of ability that one self-assigns to *being an expert* is a personal one, as each individual has unique values and assessment criteria.

The concept of attainment of expertise for museum educators includes:

- How abilities or knowledge are perceived by others
- Reassessment of mastery when entering a new teacher education playing field
- Confidence from seeing applications of one's professional philosophy transfer to other settings
- Gauging of what one actually knows and reaffirmation of expertise
- Researching on one's own
- Reaching a self identified point on a continuum of learning
- Getting support from others who have confidence in you, despite one's own feelings of lack of expertise
- Confidence fueled by success and from mastering aspects of their jobs.

Perception of one's abilities through the eyes of others appears for several of the respondents to be an influence on their personal assessment of what they know. Positive feedback seems to serve as an external grading tool.

And you're going to think, my God, that is a lot of hard work, and a lot of effort, . . . What's in it for you is whatever you will take away from it, and people will begin to think of you as the expert. . . . Then -- that's where you find -- you know, that's where you find the meat in whatever it is you're doing, . . . that you can take home at night and enjoy (Jem 1st, 2333-2337).

A number of the more experienced respondents discussed reassessing their level of mastery when entering a new teacher education playing field. New projects, new ideas, and new ways of working with audiences seem to stimulate a reassessment of what they know, what they need to know, and how they might need to modify old ideas.

I felt really confident going into this project because I felt as though, gee, I have been doing professional development for over ten years. I was selected as one of three people because of my experience in working with teachers . . . I found quickly that I was in a whole different arena, a whole different group in perspective in looking at professional development (Hes 1st, 679-696).

. . . and then . . . my job changes so dramatically, that really when I get to the place where I think I've mastered something, or got pretty well a hold of it, there's . . . a really new challenge, . . . but it's a good challenge (Kol 1st, 2165-2163).

Another confidence-building component appears to arise from seeing the application of one's professional philosophy transfer effectively into other work settings. Several respondents explained that their ability to transfer knowledge acts as a real-world test of whether their approach is effective because of its locale or its universality.

[My ideas about teaching] transferred here extremely well, and it really got back to the [goal I had when I came to the museum] "Will this work somewhere else?" (Rah 1st, 654-656).

I found that working in [another state] helped me realize that what I believed would transfer into a different setting. I was worried what teachers in [that state] would be like. It was amazing that they were the same out there as they are here (Hes 2nd, 103-106).

For a number of respondents, opportunities to gauge what they actually know and can do serves as a tool for testing out their personal mastery. Watching others present things that they also present allows museum educators to reflect on, and compare to their own practice. Returning to do things that one hasn't done in a while can reaffirm one's abilities.

I watch[ed] that, and [said], I like certain ways that they do it but, you know, the way I do it [also] elicits this response. And so [that produces] a feeling of more confidence in your own ability at judging things and evaluating how things are going (Lod 1st, 1404-1415).

[When we offer classes here] I'm acting a little bit as a host, but then I sit in . . . in addition to the learning, that also helps me gauge what I know and what I don't know. So, a lot of times I'll realize, oh, yes, I really do know all this stuff (Lig 1st, 621-629).

I enjoy that opportunity [to do workshops] every summer, when I work with that group of teachers. I can choose the topic, and do the planning, and I am as scared

about it as I ever was, and I think that that's probably a good thing, because it's always in the back of my mind, "Can I still do this?" . . . Because I don't do it very often (Pob 1st, 1859-1868).

Confidence also arises from doing one's own research study relating to a topic.

It's having probably personally having researched and played with the stuff myself, and the ideas, and done some book background [that] I feel there are so many neat ways that this can go (Lod 1st, 1036-1040).

Reaching a self-identified point on a continuum of learning is associated with expertise. Knowing they know more, as a result of strengthening and codifying their knowledge through experience, provides an augmented level of confidence.

You just do it by doing a little bit at a time, and getting a little better and a little better. . . It's the same analogy as [learning to drive] a car . . . You have no confidence, and you're constantly looking for reassurance. That describes me almost to the letter when I started in museums coming up to where I am now, and . . . Eventually, though, after you do it a while, you get a little more confident, . . . you have . . . a couple of fender-benders, and then you go, all right, well, I've got to watch that from now on. And eventually . . . you get to be a darn good driver just from doing it over and over and over again (Jem 1st, 804-844).

I think that when you take a formal course to get your degree, there are all these rigors designed in there, so when you get to the end of the course, you know and the world knows that you did that learning. When you take an informal route in a learning process, that may or may not end up as being as rigorous. The measurements are internal, and the places where you start to have confidence . . . [are when] you hear a speaker talking and you see a connection to something you've done or come to understand (Kol 2nd, 39-49).

I am not an expert and [don't] pretend to be an expert, but I feel like I know a lot more now, content-wise, and have had a lot more experience in teaching about rocks and minerals, so when I came back to the museum here in '96, I proposed doing this earth science summer content institute, and felt confident that we had the resources and other people who could help make that happen here in the museum (Hes 1st, 302-311).

A number of respondents discussed the confidence-building aspect of getting support from others. Despite one's own feelings of lack of expertise, this support appears to have urged them on as they ventured into areas of perceived inadequacy.

One of my first mentors helped me gain the confidence to work with these teachers even though I wasn't certified, because that was something in my mind that always set me apart from being a part of a teacher group (Hes 1st, 881-892).

Respondent confidence is also fueled by success and from feelings they'd mastered aspects of their jobs. Seeing how their labors have borne fruit was cited as corroboration of their efforts, and sanction for them to move forward in their professional work.

Having those experiences that have been positive, you gain the confidence in doing it again, or doing it a little differently. You knew that it was successful because it did all the things that you hoped it would do (Hes 1st, 1472-1487).

I do think I'm getting to the point in this job where I really have mastered a lot of the basics. It's not as though they are easy – any easier, but I just sort of know what they are, and feel confident. It still takes work to complete the basics of the job, but I do feel like I probably will fairly soon be ready for something within this organization, or within my position here – some new direction or project that I am able to sink my teeth into (Lig 1st, 1660-1670).

DISCUSSION AND IMPLICATIONS

This study illuminates the practice of museum education, including why people work in the field of museum education; what keeps them in the field; what they consider important to know in order effectively to do their work; and how they access and acquire knowledge and skills needed to practice museum education expertly.

The core ideas that run through the findings are interrelated and encompass attitudes, styles, motivators, influences, and learning theories/frameworks that relate to the phenomenon of building expertise within practice. A number of bodies of research – including situated learning and cognition, adult learning, experiential learning, understanding of practice, professional development of teachers, and sociocultural studies – provide theoretical constructs through which to view and compare the learning process of museum educators within practice.

The professional growth process of museum educators can be considered from three points of reference: the individual museum educator, the community of practice of museum education, and the ecosocial system within which the community of practice of museum education is situated (Lemke, 1997; Wenger, 1998). First, this discussion will review the phenomenon of building museum education expertise within practice, and do so from these three points of reference. Second, it will consider the concept of “expertise” in relation to this phenomenon. And last, it will propose avenues for future research relating to museum educator professional growth.

BUILDING MUSEUM EXPERTISE WITHIN PRACTICE – THE INDIVIDUAL MUSEUM EDUCATOR PERSPECTIVE

Self-Directing the Learning of Museum Education

Merriam and Cafferella (1999) define self-directed learning as “a process of learning, in which people take the primary initiative for planning, carrying out, and evaluating their own learning experiences . . . this form of learning can take place both inside and outside institutionally based learning programs . . . [B]eing self-directed in one’s learning is a natural part of adult life” (Merriam & Cafferella, 1999, p. 293).

Museum education work is often self-directed, and museum education requires a certain ability and comfort with working in a self-directed manner. Thus, each person is an active part of, and often the central driver for, the learning that takes place. The individual him/herself is critical to the *what*, *how*, and *when* of learning.

This interest in self-directed learning is consistent with much of the research literature on adult learners. Knowles (1993) states that mature adults are self-directing human beings. Adults like to plan and arrange their own learning activities. Tough (1971) identified thirteen steps in self planned learning projects. A number of these steps are described by the museum educators interviewed: identifying detailed knowledge and skills needed to learn; identifying and accessing the activities methods, resources, or equipment required for learning; deciding where and when to learn; estimating the current level of knowledge and the learning goals; reflecting on barriers to learning; and finding the time for learning (Merriam & Cafferella, 1999; Tough, 1971). Museum educators continuously analyze their learning needs and seek out ways to obtain the needed skills and knowledge.

The on-the-job self-directed learning of museum educators is informed by their constant interaction with the people, places, objects, and phenomena associated with their work. Through this interaction, these educators build and reconstruct their ideas and frameworks about the learning process, their audience, and the content knowledge applicable to their work. This finding is consistent with theories of learning developed by Jean Piaget who posited that learners were active and critical participants in their own learning process (Crain, 1992; Elkind, 1996; Piaget, 1959).

Self-direction in learning museum education involves responding to the social and practical situations that one experiences. Response can be varied, and is affected by a complex integration of the personal, social, and physical contexts. This experience can be compared in many ways to the visitor experience in the museum, something that also arises through an integration of these contexts (Falk & Dierking, 1992; Falk & Dierking, 2000; Falk, Donovan, & Woods, 2001). Jarvis (1987) addresses this idea of response to experience. His model of adult learning posits that all of life can be viewed as a continuum of social experiences (Jarvis, 1987). It is at the beginning of the learning process that experiences “call for a response.” It is at this point that the individual can take a variety of paths, some of which do not result in learning and others that do (Jarvis, 1987, p. 63; Merriam & Cafferella, 1999, p. 283). Paths of contemplation, reflective practice, and experimental learning represent higher levels of learning (Jarvis, 1987). Museum educators follow this pattern. Sometimes the environment encourages or permits a particular response; at other times it appears to inhibit a particular response.

Attention is an aspect of self-direction in learning. The locus of work responsibilities may focus a museum educator upon particular interactions, but it is the individual him/herself that selects, directs, and shapes what is attended to and what is learned from these experiences. Learning is a constructive, active, self-directed process (Fosnot, 1996; Hein, 1998; Kolb, 1984). The human brain filters incoming sensory information with information already stored in the neural networks, and this process determines the things upon which we focus our attention (Wolfe, 2001). As Kolb (1984) states, “Appreciation is largely the process of attending to and being interested in aspects of one’s experience. We notice only those aspects of reality that interest us and thereby ‘capture our attention’” (Kolb, 1984, p. 104). Self-direction in museum education is therefore about perception of, and subsequent selection from, our experiences. This process can be driven by a variety of motives, but in the end it still comes down to self-direction in choosing to learn (Brown, Collins, & Duguid, 1989; Falk et al., 2001).

Guglielmino (1977) has provided a definition of readiness for self-directed learning. She posits that it involves a complex mix of attitudes and values that are indicators of a person’s likelihood to successfully self-direct his/her learning (Guglielmino, 1977; Merriam & Cafferella, 1999). Museum educators have many of the indicators Guglielmino identified for successful self-directed learning: independence, acceptance of responsibility, self-discipline, high degree of curiosity, enjoyment of learning, goal oriented, and the ability to view problems as surmountable challenges. This suggests that their apparent success with their self-directed learning is upheld by their attitudes and values.

Motivation to Learn and Do Museum Education Work

Findings show a number of things serve to motivate learning museum education work: doing, increasing expertise, and remaining in museum education work.

MEETING PROFESSIONAL ASPIRATIONS

What motivates museum educators to learn stems from a need to develop the abilities that will allow them to meet professional objectives. Museum educators interviewed were able to articulate what, in their perspective, were the skills and knowledge required for museum education work. These include knowledge about teaching and learning; program and exhibit development skills; presentation skills; content knowledge in science; knowledge about the culture and needs of their audience(s), and in particular

about the formal school community; organizational, management, and problem-solving skills; and knowledge about the specific context and culture of their institution.

Knowles (1973, 1993) states that readiness to learn is connected to the developmental tasks of one's social role and is internally motivated (Knowles, 1973, 1993; Merriam & Cafferella, 1999; Nevills, 2003; Zempke & Zempke, 1995). Cyril Houle (1964) found that adult learners were primarily goal-oriented learners (Houle, 1964; Merriam & Cafferella, 1999). Knowles (1973, 1993) also states that adults are primarily task or problem-centered learners, and their learning is centered on their need to find immediate applicability for their learning in terms of their needs and/or goals.

Museum educators show evidence of this kind of internal motivation and problem solving. For example, one of the challenges in museum work arises when museum educators, anticipating a positive audience response (based on their prior experience), encounter an audience that is not engaged or enthusiastic. This challenge appears to be a strong motivator for museum educators to identify the root of the problem and resolve it through developing the knowledge, skills, empathy, insights, and understanding necessary for engaging, exciting, and meeting their goals with this audience.

ATTITUDE OF SOCIAL RESPONSIBILITY

These individuals show a clear sense of commitment to doing work that “makes a difference.” They do what they do because they believe in it, and they see a connection to the common good. For many of them, being an educator and a science educator is “who they are.” They have followed this path because it felt good, natural, and meaningful. They seek to engage, inspire, inform, and communicate their values and passions to members of their audience. Many have come to do this work by selectively choosing this path, and for some, this has meant compromising other things such as financial compensation. These findings are consistent with those of Daloz et al. in their work examining the lives of people with a strong sense of social responsibility. People's commitment comes from an internalized belief that we are all bound to one another (Daloz, Keen, Keen, & Parks, 1996).

OPPORTUNITIES FOR LEARNING

Museum educators show a high level of curiosity and eagerness to learn new things, a property they share with adults in general (Knowles, 1993; Merriam & Cafferella, 1999; Sachattello-Sawyer et al., 2002).

VARIETY IN WORK

Museum educators interviewed show a predilection for unstructured and changing working situations. The majority appear to welcome change, and although shifts in their world and work appear sometimes to cause stress, the general finding is that this climate of change is their preference in the long run. Some directly expressed the need for a changing work environment, and working in this kind of environment appears to be one of the reasons they continue in this professional work. An ability to adapt to (and perhaps prefer) change appears to be related to personal styles. Carolyn Mamchur (1996), in her discussion of teaching styles and the work of Isabel Myers (1962), posits that educators who favor changing circumstances have a personal style that is reflected in their approach to classroom situations. This style is characterized by tending to accept or welcome change and preferring a flexible situation (Mamchur, 1996; Myers, 1962).

Job-Embedded Experiential Learning

Not only do museum educators perceive that they learn through experience, but many also expressed a preference toward learning experientially.

The interviews revealed several categories of experiential learning such as *trial and error learning*, *learning to swim by being thrown into the pool*, and *seat-of-the-pants learning*. These represent degrees and shades of variation in the experiential learning process. Differences among the context and content of the experience, personal attributes of the learners, and the sociocultural dynamics all serve to affect the situations described. As John Dewey puts it, “Every genuine experience has an active side which changes in some degree the objective conditions under which the experiences are had. . . . The word interaction . . . assigns equal rights to both factors in experience – objective and internal conditions. Any normal experience is an interplay of these two sets of conditions. Taken together . . . they form what we call a situation” (Dewey, 1938 /1998, p. 34, 38-39). David Kolb (1984) reiterates this idea and emphasizes its transactional dynamic. He states that it implies “a more fluid interpenetrating relationship between objective conditions and subjective experience, such that once they become related, both are essentially changed” (Kolb, 1984, p. 36). Museum educators learn as a direct result of the environmental dynamic. Presenting a teacher workshop, for example, is an opportunity for a visceral-level learning, where museum educators are exposed to teacher learning through the primary source: they live this event.

Museum educators survive, develop, and flourish through reshaping their ideas, their environments, and their relationships. David Kolb posits that through adaptation we create and form the world in which we live and work. We are increasingly learning how to reshape our environment and do so through our accumulated human experience and the communications we share with other humans about our experience (Kolb, 1984).

Museum educators' learning includes their perceptions of their professional learning experience as being cyclical in nature, where experiences and events inform and build upon one another. There is a quality of continuity to the job-embedded experiential learning of museum educators. Some of these instances are observed as basic professional growth over time, and others have a more "transformative" character. The transformative character is especially notable in situations that demand critical reflection, where museum educators are exposed to entirely new approaches and considerations for their work, or are dealing with new leadership.

This perception by museum educators is consistent with theories of Dewey and Mezirow. Dewey cautions that not all experiences educate, but those that do, have a sense of continuity and transaction. As he put it, "Every experience takes up from what has gone before, and modifies in some way the quality of those that will come after" (Dewey, 1938 /1998, p. 27; Falk & Dierking, 2000; Hein, 1998). This idea was also put forth by Jack Mezirow in terms of how adults interpret their experiences. They use prior interpretations of experience to develop a new or revised interpretation of the meaning of their experiences in order to guide future action. This learning, according to Mezirow, can be *transformative* if it involves "critical reflection on one's assumptions, discourse to validate the critically reflective insight, and action" (Merriam & Cafferella, 1999; Mezirow, 1997, p. 60).

Neuroscience is beginning to provide some insights and understanding into the importance of experience in the learning process. Evidence for the effects of experience on brain development currently include:

- The brain and mind depend on and benefit positively from experience in terms of their functional organization
- Development is an active process that derives essential information from experience
- Some experiences have the most powerful effects during specific sensitive periods, while others can affect the brain over a much longer time span (Bransford, Brown, & Cocking, 2000, p. 126).

The features of just what constitutes an "experience" appears to be undergoing some revision based on brain research. What the brain registers as an "experience" can include

not only direct experience, but also one's own mental activities (Bransford et al., 2000, p. 125; Schacter, 1997). This brain research holds some pertinence toward how museum educators learn. If it is the case that the brain includes thinking about things not directly experienced, as an "experience," this suggests that perhaps the act of sharing of experience offers an augmentation to one's personal direct experiences, and subsequent professional growth. This idea presents an avenue for future professional development research to examine its connection to activities that promote collegial sharing.

Many findings associated with museum educators' learning through experience relate to their experimenting on the environment, or what a number of people referred to as learning through "trial and error." Their personal ruminations, their verbal and written interactions with colleagues, their writing and presentations, and their exchanges with their audiences also all provide a platform for turning abstract thoughts and feelings into clearer statements. This process of experimenting, and reflecting, revising, and taking action appears to be key to their conceptual understanding. To connect experience to understanding, the learner utilizes the reflective process to make meaning of an experience. We form hypotheses and test out our hypotheses in a process we call *inquiry*. Reflection can stimulate us to take action upon the experience and do some more experimentation. Inquiry is multimodal and involves psychological, physical, and social interaction (Dewey, 1910, 1938 /1998; Roschelle, 1995). This study shows that museum educators use inquiry in order to learn through/from their experiences. Inquiry takes several forms. It can be a performance-based inquiry process, testing out methods and materials with their audiences, or it can be a personal inquiry process associated with testing out functional systems such as: creative development, management, and logistical activities.

The cyclical quality of learning by museum educators identified in this study, is consistent with David Kolb's (1984) experiential learning model, his *cycle of learning*. Kolb posits that the learner is continually making a transition from the mode of actor to observer. He moves from a position of direct involvement to a position of stepping back to analyze. One dimension of learning incorporates active experimentation and is contrasted at the other extreme by a dimension of reflective observation, where our inward considerations helps us to formulate the thoughts that precede our articulated statements (Crain, 1992; Kolb, 1984; Merriam & Cafferella, 1999). The assumptions that ground the process of reflective practice include: a commitment to problem finding and problem solution; making judgments to select actions; taking action (Merriam & Cafferella, 1999; Schon, 1983, 1987). This museum educator study provides strong evidence not only of museum educators' perceptions that they learn experientially, but also that their process of learning follows Kolb's model described above. The respondents recounted many instances of professional activity followed by reflection and

analysis on these activities. They described how their reflections (both articulated, and/or internalized) informed their subsequent plans and further actions.

The fact that museum education professionals have learned much of what they know on the job means that the context, communities, and cultures of their jobs are influential in their learning process, and perhaps also upon their learning styles. Thus, it may be that the culture of museums attracts experiential learners, but it also may be that museum educators' professional mentality fosters this kind of learning. This idea is supported by Kolb (1984) who posits that a professional mentality results from socialization into a profession. He explains that this socialization process includes: standards and ethics; the appropriate ways to think and behave; the criteria by which one judges value; identifying what is good or bad, and learning style (Kolb, 1984, p. 182). These ideas concerning the development of a professional mentality are consistent with ideas surrounding how one becomes acculturated into a community of practice (Lave & Wenger, 1991; Wenger, 1998).

Apprenticeship and Mentoring Opportunities

APPRENTICESHIP

Apprenticeship learning has also been identified as learning-in-practice and assumes that knowing, thinking, and understanding are evolved within practice and in situations whose specific characteristics are part of practice as it unfolds. As Jean Lave puts it, "Apprentices learn to think, argue, act, and interact in increasingly knowledgeable ways, with people who do something well, by doing it with them as legitimate, peripheral participants" (Lave, 1990/1997, p. 19).

Many of the descriptions of learning to do museum education work reference opportunities to work alongside those with more experience. Although no one actually used the term "apprentice" in the course of the interviews, much of what they described is consistent with research findings and theories of apprenticeship in learning. For example, when museum educators present workshops with partners who are more expert than they are, this relationship offers some of the attributes of apprenticeship learning. It permits these educators to observe models of practice and to eventually take on increasing levels of responsibility in the work.

In an apprenticeship experience learners are provided with a support structure, or scaffold, that is adjusted as the learner achieves increasing levels of expertise. Research studies have shown that this scaffolding is not always obvious either to the expert or to

the novice, as both appear unconscious of the process in which they are involved (Greenfield, 1984). This is consistent with findings on museum educators' reflections about working with experienced individuals, and their perceptions of the substance these experiences offered. A number of museum educators commented that insights about learning from more experienced colleagues were only realized in hindsight (and in some cases only realized as a result of reflecting on the questions posed in the research interview for this study). "Scaffolding" arises from the theories of Vygotsky, who explained that learners often require the assistance of those more knowledgeable to bridge what he called the Zone of Proximal Development (ZPD) (Crain, 1992; Fosnot, 1996; Vygotsky, 1978).

Apprenticeship offers opportunities for museum educators to observe their practice in its entirety, by working initially at the edges of activity without holding the full responsibility (Lave & Wenger, 1991). It permits them a view of the gestalt of what occurs in projects and programs, and where the pieces of the whole fit (Hutchins, 1993). Apprenticeship learning is available through a number of circumstances, including experts within one's own institution and with others from outside their institution – such as project partners or consultants (Chesebrough, 1998; Dierking et al., 1997; Fischer, 2001). Apprenticeship opportunities are available to museum educators at many points within their career cycle, and in conjunction with acquiring a range of skills and knowledge.

This practice contrasts with typical apprenticeships in the field of formal education, where the practice of "student teaching" or "practicum" is primarily carried out only during a preservice period, and in many cases for a short period of time. Museum educators have multiple opportunities to apprentice as their job activities evolve. For example, becoming involved with exhibit development is not necessarily where museum educators begin their professional work, but it can be something they enter upon at a later date. In such instances, working near to (or in the accompany of) experienced exhibit developers gives museum educators perspectives on the issues and values with which this community of exhibit professionals grapple.

Opportunities for novices to work alongside others more experienced or knowledgeable, a familiar concept in the museum field, is beginning to be embraced by the formal education community. This trend is evidenced in the revisioning of preservice education that includes the concept of Professional Development Schools (PDS). In PDS, novice teachers work in school settings with more experienced teachers, while these more expert teachers are given opportunities to hone their craft by serving as mentors, university adjuncts, and teacher leaders (Darling-Hammond & McLaughlin, 1995).

MENTORSHIP

Being mentored or serving as a mentor holds some similarity to the apprenticeship experience, but it differs in its features. Research findings on the mentor process in the museum field reveal that it has long been an informal tradition and that it involves considerable time and commitment on both mentorship partners (Matelic, 2001). The time and commitment required for mentoring in the museum community may be one of the factors that characterize the differences between apprenticeship and mentoring in that community. It is not uncommon for museum educators to apprentice as a preparatory step to moving into a position of responsibility in the same area of work. Hence, apprenticeship is often a structured arrangement and embedded into their normally scheduled work responsibilities. In mentorship in the museum community, the relationship tends to be informal and voluntary: one of general support, inspiration, and guidance that is entered into through an (often) unspoken agreement. It appears to be driven by an affinity and connection between mentor and mentee. A mentor's support can lead to learning specific knowledge and skills, but mentors also appear to serve as general guides through the idiosyncratic museum community of practice. The overriding characteristics of the mentoring relationship are great respect for their mentor, (on the part of the mentee) and a commitment to the support and development of the mentee (on the part of the mentor).

Many of those interviewed referred to bosses or directors as having “mentored” them. It suggests that those leaders who are considered as mentors are those who believe and act upon developing the personal mastery of those they supervise (Senge, 1990/1994; Senge, Kleiner, Roberts, Ross, & Smith, 1994).

The concept of mentoring in the formal education community contrasts with that of the informal community. Mentoring new teachers has become increasingly more formalized over the last twenty-five to thirty years. Ganser (2002) posits that mentor programs in schools are “an example of contrived collegiality and quite different from naturally emerging mentoring relationships” (Ganser, 2002, p. 32). New trends in mentorship programs in schools have gone beyond informal pairing of new and experienced teachers toward one that includes allocation of resources to mentoring programs; goal-driven mentoring that goes beyond increasing teacher comfort level to increasing “teacher effectiveness” and meeting external standards; and providing ongoing support and formal training for mentors (Ganser, 2002, p. 28). Issues currently arising for school mentoring programs are aligning the mentoring process with the school culture; addressing the changing image of the beginning teachers; evaluating mentoring programs; and keeping the “soul” in mentoring (Ganser, 2002, p. 32).

Museums considering implementing more formalized mentoring might look toward programs in schools for examples on how this process has evolved in that community. However, museums thinking about mentoring must keep in mind the distinct differences in culture between the formal and informal communities, and consider the relative values of formalization of a practice that is currently a naturally occurring one.

BUILDING MUSEUM EXPERTISE WITHIN PRACTICE – COMMUNITY OF PRACTICE OF MUSEUM EDUCATION PERSPECTIVE

Situated Learning

Part of the complexity of looking at learning in practice is the multidimensional and multidomain aspects of how, when, and where learning in practice actually occurs. The threads of respondent discussion weave in and out of the various times, places, spaces, events, people, and things that make up their lives in ways that do not always follow a chronological (or even traditionally logical) fashion. What happens in people's learning is very personal, yet it is affected by the learning and experiences of all those other persons, situations, and contexts that touch their lives.

Ideas about situated learning support the findings of this study of museum educators. Those who seek to move away from the Cartesian separation of mind from body, society, and nature have worked to resituate ideas about cognition and learning. Their work has redefined "mind" to include its connections to the larger universe in which individual minds reside (Brown et al., 1989; Kirshner & Whitson, 1997; Lave, 1991; Rogoff, 1997).

Museum education learning is undoubtedly a situated process. Its locale extends to, and includes, all components of each educator's universe of experience.

Importance of Context

This study of museum educators focuses on their learning as it relates to their practice. Thus, consideration of the context of their practice is crucial. Since a general and overriding finding emerging from this research is that the practice of museum education is in itself a learning situation, one must conclude that the context of museum work is a learning context.

An increasing body of empirical studies discusses social activity and work in real world settings (Chaiklin & Lave, 1993; Engestrom & Middleton, 1998b, Fuhrer, 1993; Goodwin & Goodwin, 1998; Lave, 1993; Scribner, 1984; Stamps, 1997). Although it appears that all of this research comes from fields outside of museum work, these studies are pertinent to an examination of museum educators' job-embedded learning. As Engstrom and Middleton (1998) explain, research of work practices crosses discipline boundaries. This has influenced the shift away from focusing on the content of the work, toward an interest in the "societally located and socially intelligible actions of reasoning and communication" (Engestrom & Middleton, 1998a, p. 3).

The context of learning has been shown to have considerable influence on the learning process. The holistic nature of activity can be observed more clearly in the context where the cognition takes place - it is within the context that it becomes more apparent how the setting, activity, community culture, resources, and language – mutually create and change each other (Heath, 1991; Lave, Murtaugh, & de la Rocha, 1984; Moll, Amanti, Neff, & Gonzalez, 1992). Context affects goals and motivation, both through differences in available tools (i.e., language, objects, and activity structures) and because of the different mental strategies people apply to the goals specifically connected to the context (Martin, 1996; Rogoff, 1984; Wertsch, Minick, & Arns, 1984).

Context can be critical to our ability to articulate certain ideas. Before museum educators would provide data relating to how they learn, first they had to discuss *what they do* and *what they have learned*. This pattern is described by Hutchins, who points out that it is very difficult for people to describe how they do what they do because it may be necessary to be within the context of performance to give an account of a task; and a mediating structure (and memory of it) might be necessary to provide a report of how the activity took place (Hutchins, 1995).

Museum educators learn museum education by practicing it in the multiple contexts in which it occurs. They need to think on their feet; use the tools and activity structures of these environments (i.e., the language of each community, exhibits, classroom environments); and directly interact with community members in those contexts. For example, museum educators who work with teachers learn through the teachers who have come into the museum context, or learn while doing outreach work in schools. All of these activities involve a cultural interplay. To effectively transcend cultural differences, museum educators are motivated to learn about the cultures and communities of practice involved in these contexts. While applying this knowledge directly within these contexts, they are in an excellent position to observe how it is received by its members and also to observe the influence of the context itself. Depending on the reception, what they do is

either validated or marked for revision. Hence, context is an important component of shaping museum educators' learning process.

In their self-directed process of constructing an understanding of their work, museum educators navigate through the conditions and situations provided by the museum environment and culture and where they are able, shape and modify them to meet their working and learning needs. Findings from this study indicate that museum educators will affect their contextual conditions if they are able to do so, if and when they find that changing them is necessary to reach their stated purpose and objectives. For example, if they require more privacy, they will adjust their work times. This finding supports the research studies of Garrison and Danis (as quoted in Merriam & Cafferella, 1999, p. 299-300) who suggest that learners take control of and shape their contextual conditions, to maximize the probability of successfully reaching their goals (Danis, 1992; Garrison, 1997; Merriam & Cafferella, 1999, p. 299-300).

Context is also an important consideration for verbal communication. Cultural considerations color meaning; the immediate environment influences meaning; and personal world views and prior experience affect meaning (Crain, 1992; Pepper, 1942; Rogoff, 1995; Vygotsky, 1978). As museum educators come into contact with words in all formats (spoken, written, electronic etc.), context is always a critical aspect of how words are perceived, used, and interpreted. For example, in this study one museum educator with a strong science content background explained feeling at home using scientific terminology with other scientists. There is also evidence that many museum educators have become sensitized to how their words affect others. In another example, museum educators show evidence of an increased consciousness of the language/vocabulary they use with teachers in addressing sensitive issues such as aligning museum programs to the Massachusetts high-stakes testing.

Finally, the physical working spaces of museum educators exert considerable influence on the learning process. Findings from one research project focusing on work environments in museums support the conclusions from this study of museum educators. In examining the influence of office arrangements on the development of relationships in museum organizations Stephen Brand (2002) reported: the power informal/impromptu meeting locations such as hallways; the influence of candy to encourage interaction; the effect labeling spaces has on social interaction; the influence of the position/placement of the office in the building; and the impact of the "look" of the space (Brand, 2002). Research on understanding working environments in arenas other than museums also supports this finding (Chaiklin & Lave, 1993; Engestrom & Middleton, 1998a, 1998b; Hutchins, 1991; Starr, 1998; Suchman, 1998). Physical comfort, physical atmosphere, physical influences on social interaction, and compatibility of working spaces and

working styles appear to be strongly associated with museum educators' learning. Further inquiry into these ideas would be beneficial to the field.

Communities of Practice as Learning Contexts

Theories of how one gains membership into a *community of practice* (CoP) provide a useful construct to view how museum educators build their expertise (Lave, 1990/1997, 1991; Wenger, 1998). Museum educators enter the CoP of museum education at its peripheries, and gradually become integrated into that culture through their participation. Sometimes this happens through an apprenticeship process where they learn from experts, but not all participation in museum education can be characterized as an apprenticeship. Learning in this field also comes from direct experience where they are more on their own as they learn. In these instances, museum educators have to construct their own learning with little support from local experts. But whichever form of participation takes place, the support networks that arise through colleagues, peers, and working cohorts are key to both learning the practice and gradual identification of oneself as a member of the CoP of museum education.

Once museum educators begin to interact with others in the museum profession (both within and outside their own institution), the community itself sustains them and helps integrate them into the community of practice. As Wenger posits, *collective learning* is key to helping people cope with their jobs on both explicit and tacit levels (Wenger, 1998). Collective learning and its associated coping process is a major component of how museum educators learn.

Wenger theorizes that membership in CoP is a component of identity building. There is strong evidence from this study that museum educators identify with their roles both as museum people and as educators. Beyond these particular roles, each holds identity in a number of related communities of practice (scientist, small museum professional, environmentalist, former schoolteacher, etc.). Learning museum education work is both shaped and defined by people's identification with these communities. Among the things that relationships with multiple CoPs appear to do for museum educators is to:

- Engage their learning
- Stimulate and help them make connections among ideas
- Permit and facilitate dialogue with its members
- Help them to define what they do and believe
- Provide support
- Give them access to a shared repertoire of practice
- Allow them to contribute to the community's evolution (Wenger, 1998).

Collaborative Work

Museum educators in this study show strong preference for what Howard Gardner labels *interpersonal intelligence* – a strength for developing relationships and working collaboratively (Gardner, 1993). They assign a high value to working in concert with others, appear to enjoy interacting with people, and show a capacity for understanding their needs. Daloz et al. found that people who have a social commitment have a preference for collaborative work environments and place a high value on “mutually nurturing relationships with others” (Daloz et al., 1996, p. 206).

Collaboration in museum work occurs on several levels. First is the personal collaboration people have with other staff members as they carry out their work. These opportunities permit sharing of tasks, techniques, and ideas, are described by many of these educators as very pleasurable, and critical to their learning process. Peers work together within practice; they share experiences and construct meaning about their practice – and in doing so, they learn from each other (Scribner, 1984). Two of those interviewed referred to this as “horizontal learning.” These kinds of situations are where styles, techniques, perspectives, and approaches are communicated and exchanged. Horizontal learning appears to be a very critical form of learning in museum education. The organizational structure of museums often permits this kind of interaction. In the literature, this experience is sometimes referred to as “peer learning,” “peer learning partnerships,” or “reciprocal peer learning” (Boud, 1999; Eisen, 2001a, 2001b).

Mary-Jane Eisen (2001b) explains

Peer learning partnerships are voluntary, reciprocal helping relationships between individuals of comparable status, who share a common or closely related learning/development objective. Particularly for adult learners, who bring their life and work experience to any learning activity, this strategy holds significant promise because it leverages each participant’s existing storehouse of expertise (Eisen, 2001b, p. 32).

This contrasts with formal education institutions, where conditions and context are less advantageous toward collegial interaction and peer learning partnerships.

Second is the collaborative nature of the organization as a whole. In many cases, museum educators describe a “collaborative” environment, and explained finding this to be a positive climate in which to work and learn. Organizations with a collaborative culture appear to be cultures that nurture museum educators’ learning and professional

growth. The museum environment is often a group learning environment and may in many cases be described as *a learning community*. Learning in a group context allows the complex network of experiences that each person brings to the mix to enrich the learning environment. A community of learners is created “whenever a group engages in a process of learning that interactively draws from the knowledge and experience of the participants” (Baldwin et al., 1990, p. 8). This opportunity to build knowledge and experience together changes what was at first a loosely connected set of individuals into a learning community (Baldwin et al., 1990).

Ideas about distributed cognition are relevant to this study (Clancey, 1997; Hutchins, 1995; Wenger, 1998). When respondents were asked about their personal learning, many exhibited a thinking and speaking pattern that referenced group learning as opposed to individual development. They viewed themselves as part of a team and/or community of learners. This concept of shared thinking is supported by Senge’s (1990) theories about team decision making. He posits that increasing team alignment is a product of a growing commonality of vision. The shared goals become an extension of personal goals (Senge, 1990/1994). Distributed cognition is a characteristic of many real-world situations. Hutchins discusses the shared decision making process in naval navigation where a *community of systems* reaches equilibrium when all members of the group have the same access to information (Hutchins, 1991, 1995).

Third is the collaboration that occurs when a CoP works in partnership with other groups – either within their institutions or with outside groups. This kind of collaboration appears to be a powerful vehicle for museum educator learning, as it provides direct experience with other communities, cultures, and contexts.

The boundaries of CoP are locations where practices can affect each other. Holding membership in multiple CoPs allows people to serve as liaisons or brokers among those communities (Wenger, 1998). Museum teacher educators hold membership in the museum education CoP and, to varying degrees, membership in the community of formal education practice. What museum educators learn and know about the culture of schools and needs of formal educators permits them to serve as brokers between those two communities of practice, schools and museums.

Collaborative relationships, projects, and partnerships in which museum educators engage offer opportunities for broadening their understanding and conceptualizing issues related to their work. This finding has support from other studies relating to collaboration in museums (Chesebrough, 1998; Dierking et al., 1997; Khalsa, Steuert, & Sykes, 1999). Research into collaboration and partnerships among human service, government, and community organizations, identified a number of factors that correlate

with successful collaboration. These include a history of collaboration; mutual trust and benefits; sharing of process and outcome; open and established formal and informal communication; clear goals; and shared vision (John-Steiner, Weber, & Minnis, 1998; Mattessich & Monsey, 1992). Many museum educators report successful collaborative projects, and referenced experiencing one or more of those factors.

This collaborative nature of museum education work is apparently part of what sustains these professionals' commitment to their work as well as their desire to learn. These museum educators have sustained their interest and commitment to museum education work. Collaboration is integral to their learning and integral to the satisfaction they report in their work. Other research has found that sustained commitment is directly correlated to connecting with others who share similar aspirations, and that collaborative learning structures tend to sustain motivation to learn (Daloz et al., 1996; Garrison, 1997).

Dialogue

Museum educators relish opportunities to discuss their professional experiences with others. Many of these professional conversations were of an extended nature, characterized by exchanges of views, ideas, and stories. Museum educators are engaging in *dialogue*, a process that Vygotsky considered critical to development (Fosnot, 1996; Matusov & Rogoff, 1995). Museum educators reported that dialogue serves to inspire, renew, enhance, support, bond, inform, stimulate, and offer them alternative and broader perspectives.

Several researchers supported these findings. Kurt Lewin discovered, through his work with adult training programs, that there was considerable benefit for participants who had a post-experience opportunity to reflect and analyze their concrete experience through discussion removed from the actual experience (Bradford, 1964; Kolb, 1984; Lewin, 1951). In the view of Daloz et al., dialogue is the central dynamic for human development where "the habit of dialogue enables the voices of others to enlarge the self and opens the way for the practice of perspective-taking" (Daloz et al., 1996, p. 111). Senge et al. in their book about building *learning organizations* explain that dialogue encourages "a new mode of paying attention" (Senge et al., 1994, p. 359). Dialogue creates a setting where conscious *collective mindfulness* can be maintained (Bohm, 1985; Senge et al., 1994).

As museum educators navigate through their often self-driven learning process, they make a deep investment in engaging in dialogue relevant to their professional issues. An

interesting example of this is the kind of dialogue that museum educators reported conducting on listservs. Many of these educators proactively seek specific answers, participate in discussions in areas of particular interest, and invest precious time in these forums. Their reasons for doing so appear to range from a desire to explore pragmatic issues to engaging in more theoretical discussions, all of which can be considered to fall under the larger category of professional growth. This aligns with the research of Bradford (1964) who posits that the essence of social learning is the active creation by the learners of situations that meet their learning objectives. Their investment in influencing learning situations, helps to determine their return (Bradford, 1964).

The ability of museum educators to discuss their professional experiences (initially abstract activities) permits them to articulate and clarify not only the pragmatic, but also the bigger ideas relating to their work. Such articulation provides a vehicle to reflect upon their activities with colleagues and peers, and perhaps step back from it and see where it fits into the bigger scheme of things. Researchers examining dialogue from this perspective explain this process as the active exploration of the personal, experiential meaning of abstract concepts through dialogue among equals (Freire, 1974; Mezirow, 1991, 1997).

The actual language used among museum educators as they dialogue is also a component of their learning process. Particular groups and particular social settings often originate and utilize characteristic language (Resnick, 1991). Using this language encourages them to speak through the voice of that group and/or culture. As they use it, the speakers employ a process Bakhtin termed *ventriloquation*. By making this language their own, people influence their identity with the social practices of these groups (Bakhtin, 1986; Wertsch, 1991, p. 95). Within the museum, dialogue among museum staff helps them to construct an understanding of, and identity with, their particular museum culture.

Dialogue with other communities beyond their own institution, such as the formal education community, increases museum educators' vocabulary and language to include that of these other groups. As they use these systems, informal educators develop and internalize insights to the formal education culture.

Organizational and Leadership Influences

Museum educators described organizational influences on their learning. The findings from this study further the idea that institutions that nurture and support learning communities facilitate museum educators' learning process. The organizational learning theory known as "learning organizations" supports ideas surrounding learner-centered designed learning. It incorporates a philosophy that views learning as a central, valued, and integral part of organizational life (Senge, 1990/1994). Key to this kind of organization is that all members of the organization at all levels think about their organization in a systemic fashion, suspend prior assumptions, and approach their work with an emphasis on collective inquiry, problem solving, dialogue, and action. This approach to organizational development generates a learning community in which change is accepted as the norm and innovative practices are embraced (Merriam & Cafferella, 1999). In such an organization, job-embedded learning is honored and supported (Peterson, 2002; Senge, 1990/1994, 1992, 2000; Senge et al., 1994).

Museum educators appreciate an organizational culture where they were given the space, support, and permission to be autonomous and self-directed. When self directed learning isn't supported, a tension ensues and influences work performance. Two characteristics of a positive organizational culture are that it values professional development and supports it (DuFour & Eaker, 1998; Peterson, 2002). This finding suggests that museum leaders need to foster a culture that supports self-directed learning and professional growth.

The emotional climate of the workplace is a factor in on-the-job learning. Goleman et al. posit that to advance a positive organizational culture, it is critical that leaders have, or develop, an "emotional intelligence" (Goleman, Boytzis, & McKee, 2002). An organizational philosophy that incorporates "emotional intelligence" takes into account the relationship of the organization's parts to the whole system and incorporates an empathy for how actions taken will affect all the individuals involved (Goleman et al., 2002; Senge et al., 1994).

Museum educator learning is facilitated by a leadership able to engender and effectively manage the emotional climate of the workplace, such as generating an environment that supports risk-taking, trial-and-error, and self-directed learning – processes that findings indicate are common within the museum educator's learning experience (Goleman et al., 2002; Merriam & Cafferella, 1999; Sprenger, 1999; Weisinger, 1998).

BUILDING MUSEUM EXPERTISE WITHIN PRACTICE – THE ECOSOCIAL SYSTEM PERSPECTIVE

Jay Lemke (1997) posits that a useful way to look at the human experience is in terms of being a participant in “an ecology of people, meanings, and things” (Lemke, 1997, p. 38). Models of participation of *communities of practice*, according to Lemke, provide the beginnings of the model of learning as participation, but he argues that these models require augmentation to include how and where we participate (Lave & Wenger, 1991). Lemke suggests not only looking at what kinds of learning can take place wholly within a single community of practice, but also what kinds of learning require journeys into other communities. For, as Lemke reminds us, there are communities of practice; there are networks of interdependent practices and activities; and there are continuities and trajectories of practice, development, and learning (Lemke, 1997, p. 38). He refers to the human community as an *ecosocial system*, a term that goes beyond just thinking about the community in terms of “us and our things” (Lemke, 1997, p. 38, p. 40).

It is of interest to examine how these museum educators use various aspect of the entire “ecosocial system” for learning (Lemke, 1997, p. 40). Findings show they both connect to networks of activities that are interdependent with their work (such as structured learning opportunities), and also to those less obviously connected (such as coaching a softball team), in the process of building their professional expertise.

Structured Learning Experiences

Museum educators also learn through formalized structured learning experiences. They access professional development offerings provided by their institutions, support organizations linked to their local communities of practice, and the postsecondary community (Association of Science-Technology Centers, 2002; Davis, 2002; Irvine, 2002; Leichter & Spock, 1999; Museum Institute for Teaching Science, 2002; Newbery, 2002; Nichols, 1989, 2000; St. John & Hennan, 1997; Stapp, 1999; Suchy, 2002; Sutterfield & Middlebrooks, 2000; Sweet, 1984; Weil, 2002). Museum educators’ participation in structured learning appears to be ancillary to the totality of museum educator learning. Structured learning serves as a stimulus to help them make meaning of their work experience and provide new and alternative perspectives and methodologies. It offers scaffolding experiences, where development of their own conceptual understanding is facilitated through interaction with those more experienced or expert (Crain, 1992; Fosnot, 1996; Vygotsky, 1978). It can also serve to fill gaps in museum educators’ knowledge base. These structured learning activities are voluntary. Museum educators pursue these opportunities on their own, sometimes with support and

encouragement from their organizations, but not (at least not within the respondent sample) ever made compulsory by their organizations. This contrasts with structured professional development in the formal education community (i.e., teacher professional development workshops), a highly formalized system often prescribed and/or mandated (Frechtling, Sharp, Carey, & Vaden-Kieman, 1995; Loucks-Horsley, Hewson, Love, & Stiles, 1998).

Resources and Support Organizations

The transmission of knowledge is facilitated through the tools and practices created by society. One way that experienced members pass on ideas to those with less experience is through the use of tools and sign systems such as speech, the written word, and images. Use of these tools extends the reach of one's experience to a level beyond the immediate context, time, and circumstance (Rogoff & Gardner, 1984; Vygotsky, 1978). As museum educators utilize these signs, they are participating in what is known as *mediated behavior*: behavior influenced not just by their environment, but also by tools and signs (Crain, 1992). Key to these theories is the examination of the point where the individual meets his/her culture (Belenky, Clinchy, Goldberger, & Tarule, 1986; Cole, Engeström, & Vasquez, 1997; Martin & Kelly, 1996; Vygotsky, 1978; Wertsch, 1985).

Museum educators often seek out resources to enhance their learning process. These fall into several categories, such as written material, media resources, and networks and organizations that facilitate access to information and knowledge. Resources are the reifications, or articulations, of the communities of practice with which museum educators interact. As Wenger (1998) explains, reification is the documentation and articulation of the ideas, thinking, and belief of our practices. Participation shapes our experience, and reification presents its expression. Resources supporting practice make available to members (or potential members) a vocalization of what is meaningful to that practice. Be it a written, spoken, or dramatized format, these resources support the sustaining of practice and serve to clarify and instill ideas of practice among members and other interested parties.

The museum CoP continues to make these reifications of their practice available through such vehicles as conferences and seminars sponsored by support organizations; publishing; professional resource catalogues; Internet resources accessible through online searches and listservs; and word-of-mouth referrals (American Association of Museums (AAM), 2003; Association of Science-Technology Centers, 2002). In acquiring these resources, findings indicate, museum educators open themselves to the reification of ideas put forth by their own CoPs and others related to it (Wenger, 1998).

Collaborating with the Formal Education Community

Through their work in teacher professional development, museum educators have become deeply aware of the current theories and thinking surrounding teacher professional development. There is evidence that this awareness of teacher professional development theories has influenced museum educators' own professional growth. "Professional development" is the term most associated with the inservice activities provided to teachers and other educators in the formal education community (Bransford et al., 2000). Professional development for teachers is currently undergoing considerable change in terms of approach and policy (Darling-Hammond & McLaughlin, 1995; Loucks-Horsley et al., 1998).

As the professional growth of the museum educator offers a multi-situated model of professional learning, with deep emphasis on learner-directed activity, there may be components of the museum educator learning experience that can inform the formal education community. Interestingly, the literature on professional development of teachers gives strong indications that the field of formal education is moving toward a philosophy that supports the kind of job-embedded learning similar to what museum educators experience. Teachers' classrooms are being considered appropriate contexts for their professional development; and some researchers posit that looking at a range of approaches and contexts for teacher learning holds promise for fostering change in teacher's practice (Anderson, 2001; Darling-Hammond & McLaughlin, 1995; Putnam & Borko, 2000).

Some guidelines for more effective professional development for teachers align with findings about how museum educators build their expertise within practice. These guidelines for teacher professional development include:

- Engages teachers in concrete tasks that illuminate the processes of learning and development
- Is grounded in inquiry, reflection, and participant-driven experimentation
- Is collaborative among educators and teachers' communities of practice
- Is connected to and derived from teachers' work
- Is sustained, ongoing, intensive, and supported by a methodology that uses modeling coaching, and collective problem solving
- Is connected to other aspects of school change (Darling-Hammond & McLaughlin, 1995)

Since much of the work of museum education involves an interface with the formal education community, such partnerships provide an excellent vehicle for a two-way dissemination and cross-pollination of professional growth knowledge between the formal and the informal CoPs (Wenger, 1998).

ATTAINMENT OF EXPERTISE

The museum education community defines what it considers to be a competent participant. As Wenger (1998) posits, “A community of practice acts as a locally negotiated regime of competence” (Wenger, 1998, p. 137). In order to achieve the competence demanded by the community, participants transform their experience until it fits with that of the regime. Newcomers go through this process of transformation and so do more experienced practitioners. Newcomers need this for full membership, and experienced museum educators need it to evolve in synchrony with the evolution of the practice.

Many museum educators show evidence of reaching a kind of understanding and savvy in practice that indicates they have identified critical learning roads as well as roads less critical to their professional growth efforts (Wenger, 1998).

Achieving expertise is about having well-organized knowledge that affects what one notices and how one represents problems. Experts appear to recognize meaningful patterns of information, and they “chunk” information differently and organize their knowledge around big ideas and core concepts (Bransford et al., 2000; deGroot, 1965; Falk & Dierking, 1992; Miller, 1956). Research in the field of education examining teaching expertise has reached similar conclusions. Expert teachers recognize and conceptualize patterns and events occurring in classrooms very differently from novice teachers (Bransford et al., 2000; Sabers, Cushing, & Berliner, 1991).

Studies on knowledge retrieval show that experts retrieve in a manner that appears to be effortless. They use a process that identifies which pieces of their accumulated knowledge are relevant to the task at hand (Bransford et al., 2000). An additional aspect of expertise is the ability to be flexible and adaptable (Bransford et al., 2000).

Expertise in teaching requires a combination of content knowledge and a strong grasp on knowledge about teaching and learning process. If both of these strengths are not available, formal educators may have difficulties. Experts may be less able to recognize learning problems that novices to a content area may experience (Bransford et al., 2000; Cognition and Technology Group at Vanderbilt, 1997). This research supports findings

from museum educators. Many museum educators with strong content expertise but less knowledge about teaching and learning discussed their struggles to put aside their own understanding of science content so they could better relate to how their audiences were trying to understand this content.

Expertise is often a self-defined process in the case of museum educators. Their continuous process of on-going diagnosis in their on-the-job situations provides some evidence from which they assess their expertise. Additionally, their interactions with others provide feedback and/or allow them to make comparisons between their own skills and knowledge and that of others.

CONCLUSION

This discussion has considered the core ideas surrounding the professional growth process of museum educators from three points of reference: the individual museum educator; the community of practice of museum education; and the ecosocial system within which the community of practice of museum education is situated (Lemke, 1997; Wenger, 1998). There is no question that these points of reference are all interrelated, as there is much overlap and connection among these ideas. However, this construct offers a vehicle through which to gain insight into the complex process of learning within practice.

In summary, findings from this study of how museum educators build their expertise within the context of their practice indicate that this happens through:

- Self-direction in learning
- High motivation to participate in and learn museum work
- Job-embedded experiential professional learning
- Apprenticeship, mentoring, and peer learning opportunities
- A community and culture that values and supports the social, contextual, and collegial aspects of learning;
- Organizational structures and leadership that support professional growth and are attuned to its experiential and sociocultural aspects
- An interrelated network of communities of practice that provide support for and access to resources.

There has been limited research on museum educator professional growth to date (Bailey, 1998, 2001; Blackmon, LaMaster, Roberts, & Serrel, 1988; Elshtain & Turner, 1999; Khalsa et al., 1999; Leichter & Spock, 1999; St. John & Hennan, 1997). It is hoped that

this current research study will not only add to what has been previously done, but also open up other lines of inquiry for further research.

There is much to be learned from taking both a deeper and broader look at the museum educators' learning experience. This study has provided a phenomenological examination of the learning-in-practice experience of fifteen people in science institutions in the Commonwealth of Massachusetts and in the process identified the key ideas associated with their learning experiences. These findings may be considered an overview of this phenomenon. Future avenues of research exploring some of these individual findings more deeply could give further insight into their properties, correlations, and implications. Further research exploring how findings from these respondents correspond to findings from other kinds of institutions and in other regions would inform the question more broadly. Additionally, there is much to be learned from research examining museum educators' learning experiences through site-based research conducted directly within the context of this learning.

In terms of existing structured professional development opportunities for museum educators, further research is needed to evaluate these activities so that effective practices can be identified and refined.

Finally, the field would greatly benefit from research that seeks to examine the organizational structures of museums to see how these interface with how museum educators build their expertise within practice. This study has brought to light some of the influences that organizational design and leadership styles have on the museum educators' learning process. To maximize the on-the-job learning potential within museums, we must know more about how organizational structures align with the staff learning process in museums. This knowledge could greatly inform the actions of those who lead museums and define their policies.

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APPENDICES

PROTOCOL

INFORMED CONSENT LETTER

RESEARCH PERMISSION AND PUBLICATION WAIVER

PROTOCOL

Dissertation Protocol January 27, 2002 Version

*Name:
*Museum:
*Title:
*Date:
*Time:
*Notes:

1. Please tell me how you came to do museum education work.

Did you work elsewhere prior to coming to the museum? If so, please tell me where and what kind of work you did.

What was your formal education focus?

2. Please describe your current position at the museum, and what it involves.

Has your work focus changed since you first came to the museum?

3. When did you first begin to work with teachers?

4. In your opinion, how did you learn to do your job(s) here at the museum?

5. What, in your opinion, is the most effective way for you to learn the things you need to know in order to do your job?

6. Can you discuss other experiences that you feel have contributed to, or were barriers for, your professional growth?

7. Have there been particular individuals or groups of people that have helped you learn about your work?

8. Is there anything in particular about your organization that you associate with your professional growth?

9. Is there anything about the physical arrangement and the context in which you work that has affected your learning?

10. Have any other experiences inside or outside the museum contributed to your professional growth?

11. Is there anything that you would like to add?

INFORMED CONSENT LETTER

Elsa Bailey
132 Morrison Avenue
Somerville, MA 02144
Home telephone: (617) 629-3021 e-mail: ebbailey@earthlink.net

Dear _____,

I am writing to you in connection to my dissertation research. In a previous conversation at the NISEN conference last September, you expressed an interest in participating in an interview to provide data for this research. I am now ready to conduct these interviews and am contacting you in anticipation of setting up an interview appointment.

To give you a fuller understanding of my purpose in conducting this particular research study, the following presents information about: my professional background; the focus of this research study; a description of the interview process; and a clarification of the research process I will be using.

A snapshot of my professional background

I am an educator. My experience has ranged from teaching young children in the New York City Public Schools, a variety of roles in museum education, and at present working as a research associate and program evaluator for Lesley University's Program Evaluation and Research Group (PERG). In my seven years at the Miami Museum of Science, my most recent position there was Director of Teacher Education.

I am currently a doctoral candidate in Educational Studies at Lesley University in Cambridge, Massachusetts. My area of study has been the *Collaboration Between Museums and Schools*. A particular focus in my studies has been to examine the role museums play as providers of professional development for teachers. I also have a great interest in the professional growth experience of museum educators.

The research project

My research question is: How do museum educators who work with teachers, build their professional expertise within the context of their practice?

This dissertation research focuses around the situated, on-the-job learning process of museum educators who work with teachers. There has been very little research done in this area, and more is needed. My goal for this research is to gain an understanding of the processes and influences that come into play as museum staff go about doing their day-to-day work. I would like to explore

how they actively engage in their work, and how they gain the knowledge and skills they need to have in order to do their jobs.

Since I believe the best way to learn the answer to my research question is to ask the museum educators first hand, I am interviewing about 15 museum educators for this research. All the people I'm interviewing: (1) work in science related institutions in the Commonwealth of Massachusetts; (2) have worked in informal science institutions for at least 5 years; and (3) have a sizable percentage of their work focus devoted to working with teachers in the formal education community.

The interviews

We will set up mutually convenient interview appointments through telephone and/or email communication. If at all possible, the interviews will be held face-to-face at the interview participant's institution/ workplace. If it is not possible to conduct the interview face-to-face, we can arrange to do the interview over the telephone. The interviews generally last for about an hour. They are designed to be pleasant, reflective, open-ended, exploratory, and conversational in nature.

Each person I interview will receive a copy of the interview questions at least one week prior to our interview appointment. This will allow people to think about the questions, and provide focus for the discussion. The interview questions are intended as a guide, but are not "written in stone." It is acceptable for our discussion to diverge from the original set questions, if a change seems to serve the research focus. Each interview will be audio-recorded and subsequently transcribed. (My plan is to record simultaneously with two tape recorders to account for possible tape recorder difficulties.) I may take some handwritten notes during the interview to help me recall things I want to ask people later. The interview questions are designed to encourage people to reflect on their practice and explain, (from their perspective), what activities, events, beliefs, relationships, and forces are/were connected to their development of skills and expertise. As each individual is unique and has a unique story, the interviews will be individualized and open-ended.

It is possible that I will have additional questions as I conduct and analyze these interviews, and would like to be able to come back to the people I've interviewed to ask some follow-up questions. These follow-up questions can be asked via telephone.

How the information from the interviews will be used

A professional transcriber will be used to transcribe the tapes. I will analyze the transcripts/tapes, and use my analysis to develop a narrative on the way museum teacher educators go about learning their practice. As the interview data will be stories from authentic museum educator experiences, the discussion will incorporate and reflect the voices of practicing museum educators.

An exploration such as this one can further our comprehension of the complexities involved in the field professional development for informal educators. It is my hope that by researching these issues, the informal learning community will benefit; and the research findings can inform future professional development projects, practices, and organizational approaches to supporting staff job-embedded learning.

Confidentiality and Anonymity

All information obtained through this research will be held in the strictest confidence. I am interested only in identifying the issues linked to professional growth of museum educators and will not attach names or locations to these issues. Pseudonyms will be used in all written or discussed material.

This research uses a qualitative methodology process, and as is common in this approach will use direct quotations from interviews in order to present "the story" through the voices of those that live it. *Segments of this data may eventually become a part of my dissertation or subsequent published work. Therefore, interview participants should be aware that I will be using excerpts from the interviews in the form of direct quotes in my presentation of the data. These quotes will not be identified with any particular individual or institution.* Interview participants will be given the opportunity to review the transcripts before I analyze them. This review will provide interview participants a chance to check transcripts for accuracy, and offer them an occasion for further reflection. According to the guidelines of the Lesley University doctoral program, prior to the interview process, interview participants will be asked to sign a form that gives permission allowing the information to be used in this dissertation research and possible future publication.

Would you like to participate?

I know how valuable your time is and I appreciate your statement of interest in being part of this study. I will be in touch with you to confirm that you still are able to, or interested in participating in this research concerning the professional development of museum educators. If you wish to contact me prior to my calling you, I can be reached at my home number (617) 629-3021. If I am not in, please leave a message indicating the best time and place for me to reach you. Or you can send an email to: ebbailey@earthlink.net.

Thank-you in advance for your engagement with this research project. It is my hope that its findings will further knowledge in the field of informal learning and by consequence make your own special contributions all the richer. I am looking forward to speaking with you.

Yours truly,

Elsa Bailey

RESEARCH PERMISSION AND PUBLICATION WAIVER

Date:

In according to the guidelines of the Lesley University doctoral program, I _____ agree to participate in this dissertation study on the professional development of museum educators being conducted by Elsa Bailey, doctoral candidate. I give my permission for the information obtained during the data collection process to be used in this dissertation research and any possible publication of this research. I understand that the interview will be audiotaped, transcribed, and analyzed. All information will be held completely confidential and anonymous.



FOR REFERENCE

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