EPISTEMOLOGY OF INCIDENTAL LEARNING

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Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Human Development

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October 1, 2007

Falls Church, Virginia

Keywords: Incidental Learning, Workplace Learning

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Abstract

The study explored incidental learning in the workplace. Three research questions guided the study:

1. What is the nature of incidental learning in the workplace?
2. How does professional context impact incidental learning?
3. How do incidental learners know they know in the workplace?

A series of three interviews were done with seven human resource professionals and with seven engineers following Seidman's phenomenological interview protocol. The first interview focused on the participant's life history concentrating on the context of the participant's early learning experiences and their professional choices. The second interview provided details of the participant's current incidental learning experiences as well as an example of their current professional tasks. The third interview provided an opportunity for the participants and me to explore the meaning of their experiences.

Analysis of individual experiences was done via profiles, and an analysis of thematic findings was done across all participants.

Findings showed that in the "lived world" the experience of the participants and the nature of incidental learning is mediated by the individual's conception of learning and by the individual's learning style. At a professional level, frames and reflection-in and on-action further guide the focus of and validation of the incidental learning. For the researcher – and perhaps for co-workers or for participants' themselves – incidental learning is easy to overlook; lessons learned often appear to be simply common sense after the fact. This may, in part, be due to the fact that the stories of incidental learning ultimately had successful outcomes. This study confirmed and expanded the importance and impact of context on incidental learning, showing how the elements of an individual's personal and professional context also impact incidental learning.

Recommendations for future research covered both process and content areas. Content recommendations include the replication of the study to explore incidental learning in more professions and an exploration of the impact of formal higher education on incidental learning. These studies could explore the frames of these professions and confirm or disconfirm the general findings from this study. Process recommendations include studying incidental learning as an adjunct to other studies of organizational learning and as a part of an action research project. The former method allows the researcher to approach the construct indirectly; the latter method allows the researcher to explore incidental learning as it happens. Both methods may provide more opportunity to identify missed opportunities for incidental learning.

DEDICATION

This dissertation is dedicated to the members of my two virtual dissertations groups. Their time, energy, and support was critical to the completion of my dissertation. Moreover, my time spent in these groups rendered my most valued incidental learning – I learned about the energy and motivation that one can achieve from someone else's success. I hope to carry this lesson with me long after new research has advanced our understanding of incidental learning.

ACKNOWLEDGEMENTS

Most of the dissertation process feels like a solitary endeavor, but when the time comes to write acknowledgements, it is clear that the support of others is critical to the success.

First, I would like to thank Dr. Jamie Callahan. She was instrumental in bringing me to Virginia Tech's doctoral program -- and in ensuring that I made it through successfully. Throughout that period, I enjoyed some of the most intellectually stimulating discussions I have had in my formal education. I am indebted to her for her continued support, encouragement, and mentoring.

No dissertation is possible without the support of the committee. In my case, I was fortunate to have a supportive committee who provided a cross-section of theoretical and practical perspectives. Special thanks to co-chair Dr. Bert Wiswell for his thoughtful feedback throughout the process and for inspiring my selection of the topic during one of his courses. Thanks to Dr. Bill Combs, the only hearty sole who stayed on my committee from doctoral orals through the defense. His questions were always insightful, and his enthusiastic attitude was a motivating force. Thanks to Dr. Jon Boyle for his responsiveness and for his fresh perspective that helped me hone my thinking.

Many other friends, colleagues, and passing acquaintances were critical to the success of the dissertation. A joyous drum beat to Jerri Shankler – I now know what it means to say that the right person came into my life at the right point in time. Thanks to Gina, my fellow tortoise, and to the rest of the KTM team -- Takiko, Janet, and Laurie -- for the laughs, cheers, and guidance, and for keeping me connected to the dissertation when life interfered. Thanks to Janet Slack for level-headed guidance to keep me focused on the goal, and for Lisa, Terri, and Jan who helped me to celebrate my successes and who believed in my research from the start.

Many members of the team are more hidden from view, but are equally important. Thanks to Michele Eldredge for her support in navigating the process, particularly during the final weeks of the process. Thanks to the Virginia Tech library for their excellent resources and excellent staff support over the years.

Last but not least, I thank my husband Chuck Rexroad for his financial support that allowed me to live comfortably while completing this study, and for his long-standing attempt to be patient over this extended process. At times, the arduous nature of a dissertation is harder on the one who is in the passenger seat. The passenger, along for the ride and impacted by the journey, is asked to give support with limited access to the controls, and – at times – not evening having a clear vision of the destination. In return for your efforts, I pledge to provide a clearer vision of future goals.

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Chapter 1 Nature of the Study

Context of the Problem

> "Professionals are called upon to perform tasks for which they have not been educated, and…even if the professional knowledge were to catch up with the new demands of professional practice, the improvement in professional performance would be transitory" (Schön, 1983, pp 14-15).

Recurring organizational change has been with us for several decades and the pace of change continues to accelerate. Change is brought about by globalization, technical advancement, and the rise of the service culture. E-government, e-business, blogging, webcasting, e-learning, 24/7 jobs, and knowledge-based firms continue to gain prominence. Downsizing, outsourcing, mergers, and private-public partnerships are the language of today's organizations. CEOs, managers and organizational consultants struggle to learn how to operate in this new environment. Employees are told to manage complexity, handle ambiguity, think outside the box, and embrace change. Most employees and managers are likely to be struggling to keep pace with the new environment.

We now have experts who provide advice for handling virtual teams or designing e-programs. We can attend training on handling a multi-cultural work force or developing a data mining system. Many of these programs provide valuable skills for succeeding in the new workplace. However, the changes have not stopped. Our task is not to clean up the aftermath of one tsunami, it is -- as Vaill (1996) puts it -- to learn how to survive in whitewater.

Continual learning is required to handle the whitewater environment. As Marsick and Watkins (1990) note: informal and incidental learning [is] needed most when individuals experience a situation as non-routine" (p. 21). At the very least, employees must be able to learn

and react to the changing environment -- to keep pace and avoid being overtaken by others. To truly excel, individuals, teams, and organizations will need to hone their proactive learning skills to enable them to plan the course they will take and their method of moving forward.

Vogt states that: "in the Knowledge Era, how individuals learn (the process) and why they learn (the context), may be more important than what they learn (the content)" (Vogt, as cited in Chawla, 1995, p. 295). An understanding of how individuals do (or do not) learn and an understanding of the context in which they do (and do not) learn is central to this study. In particular, I have focused on incidental learning, the learning that has been defined as the "natural" form of learning (e.g. Rogers, 1997).

Incidental learning occurs as the byproduct of some other activity. It occurs informally and is unplanned. We are often most aware of the incidental learning that occurs in young children. Games often provide an excellent opportunity for acquiring knowledge or learning social norms. However, studies have shown that we all continue to learn incidentally throughout our life. What current studies do not explain is the nature of incidental learning.

Rogers contends that while incidental learning may come from a wide variety of experiences (such as observing, hearing, reflecting), incidental learning occurs only when the learner does not intend to learn and when the source does not intend to promote learning (or the learning is unrelated to the source's intent). There is often a bias given to learning that occurs in formal educational settings (e.g. Holzinger et al.,, 2001), and some consider incidental learning to be prone to error (e.g. Marsick & Watkins, 2001). While incidental learning may be subject to flawed mental models (e.g. Ford & Herren, 1995; Rieber, 1991; Wilson as cited in Marsick & Watkins, 2001; Wiswell, 1987), it may also be impacted by honed intuition and professional

expertise (e.g. Dreyfus & Dreyfus, 2005) or it may be an outcome of a cultivated and constructed ways of knowing (e.g. Lave & Wenger, 1997).

The study of incidental learning dates back to 1942 (McGeough as cited in Bova & Kroth, 2001; Watkins & Marsick, 1992). Incidental learning has been studied by experts in many fields including of psychology, linguistics, education, management, and computer science. The nature of the research and the conceptualization of learning varies. Much of the research related to incidental learning in the workplace has been done in the last ten to fifteen years. Marsick and Watkins did seminal work on informal and incidental learning in the workplace and numerous researchers have based their studies on this research or extended the research. Marsick and Watkins (1990) define incidental learning as "a byproduct of some other activity, such as task accomplishment, interpersonal interaction, sensing the organizational culture, trial-and-error experimentation, or even formal learning." (Marsick & Watkins, 1990, p. 12)

The research on incidental learning appears to be somewhat contradictory. In some cases, studies show that incidental learning arises from a "tough love" environment characterized by having many problems and risks and much uncertainty (e.g. McCauley et al. as cited in Woodall, 2000; McCauley et al., 1995). In other cases, incidental learning is said to thrive in an organization that is open and accepting, where there are opportunities for sharing and reflection (English, 2002; Marsick & Watkins, 1997; Mealman, 1993; Woodall, 2000).

Researchers studying incidental learning struggle to understand the extent to which incidental learning is tacit and pre-conscious or explicit. By looking at the research of Marsick and Watkins – and those who have extended their research – it appears that incidental learning can occur along a tacit-explicit continuum. In some cases, our incidental learning is tacit and needs to be surfaced in order to evaluate it, share it, and use it most effectively. In other studies,

incidental learning occurs at a conscious level. In either case, Marsick and Watkins (1990, 2001) suggest that reflection – initiated by an internal or external trigger -- is an important part of the incidental learning process.

Studies of incidental learning in the workplace incorporate a variety of definitions of learning. A few studies conceptualized learning as the acquisition of factual information. Many studies focused on interpersonal and attitudinal learning. Incidental learning was found to occur as individuals interacted with experiences, with other individuals, with experts, with a particular work project, or with the context in which they lived or worked.

Thus far, much of the research on incidental learning is contradictory or inconclusive. Moreover, research results resemble the fable of the blind feeling the elephant. Each study appears to focus on a different part of the elephant, providing a broader understanding of the concept, but no study provides a complete picture of how all of the parts fit together. As incidental learning is a learner-initiated and learner-evaluated form of learning, a phenomenological study adds valuable insights into the nature of incidental learning. By taking a phenomenological approach, I have explored the meaning of the incidental learning experience to the learner, placing an emphasis on how individuals learn and why they learn (as Vogt, 1995 recommends). The findings from this study offer a new perspective on incidental learning, and provide some breadth to the body of research.

Many researchers agree that context plays an important part in shaping the incidental learning. Context has been defined as a particular experience (Marsick & Watkins, 1990; Cseh, Watkins, & Marsick, 1999), as the larger socio-economic, political, and cultural context (Cseh, 1998), or as the structural context (Ellinger, 2004; Ashton, 2004). This study of incidental learning explored the issue of context in greater detail. As I explored the individual's experience

of incidental learning, I placed it in a context of their general perceptions and experiences of learning. Another aspect of context is the individual's occupation. Each occupation provides different forms of training, different norms and mental models, different opportunities, and different priorities for learning. As I examined the types of incidental learning experiences an individual has in the workplace, I can begin to explore the relative importance of occupational context.

An understanding of the influence of occupational culture on incidental learning is critical to the study of incidental learning in the workplace. Organizations are often studied at the macro level or at the level of the individual. While a study of the organizational culture highlights the meaning that a person's work has for others in the organization, the study of occupational culture highlights the meaning of work for those who do the work (Van Maanen & Barley, 1984). Van Maanen and Barley believe that it is important to do more research at the level of occupational community because it emphasizes "what people at work do all day (or would like to do)" (p. 350).

A focus on occupational culture is particularly important in the study of incidental learning in the workplace. Each occupation has a certain way of framing a problem. There is some evidence that the way problems are framed has an impact on incidental learning; each profession's "frames determine their strategies of attention…[and] the values which will shape their practice" Schön (1983, p. 309). In fact, some theorists believe that a central part of the process of becoming a professional is the employee's ability to gain more intuitive and explicit knowledge of the ways of framing and approaching problems (e.g. Lave & Wenger, 1997; Wenger, 1998; Trice, 1993; Van Maanen & Barley, 1984).

Moreover, some of the research (e.g. Callahan, 1999) provides some preliminary findings that one's profession may impact their incidental learning. In this study, I explored how the individual came to be employed in a particular occupation and how the occupation impacts the individual through exploring the meaning of the occupation to the individual. Ultimately, I will be looking to see if there are links between the individual's ways of knowing they have learned incidentally and their occupational culture.

Central to this study was an exploration of how individuals know they know when they learn something in an incidental manner. No other research has explored this critical concept. Findings from this analysis provide insights into why some individual's learn in a given situation while others do not.

Studies of epistemology have shown that individuals vary in the methods used for making meaning or "coming to know" information. For example, some individuals rely solely on external authorities while others rely solely on their personal experience. While formal learning is measured using formalized tests, papers, and grading systems to identify whether the individual has learned, and informal learning typically uses the learner's success in achieving their goal to determine if the individual has learned, what criteria is used to determine that incidental learning has occurred? How does the individual know that they have learned something? Is there a connection between the individual's incidental learning and their epistemology?

Studies of epistemology focus on four categories of information:

- the source of information (where does new information come from),
- beliefs in the nature of knowledge (what does it mean to know the truth)
- access to new information (how do we apprehend new information), and the

- generation of knowledge (how is new knowledge created)

As I considered how individuals know that they have incidentally learned something, I explored the connection (if any) between the individual's epistemology – the way they come to know information – and the nature of their incidental learning. I also looked to see if the individual's ways of knowing comported with the norms of their occupational culture. Ultimately, I looked to see if there are links between the individual's ways of knowing they have learned incidentally and their occupational culture.

Problem Statement

Incidental learning is unique in that it is "spontaneous and unstructured learning" (Coombs as cited in Merriam & Brockett, 1997, p. 171) that is evaluated by the learner. In formal, informal, non-formal, and self-directed learning, the learning process is identified in three phases – the objective, the process, and the evaluation. Incidental learning does not clearly fit into this model, although – by definition – all phases of the learning process are controlled by the learner. Thus far, most research on incidental learning at work has been conducted using the Critical Incident Technique to "gather important facts concerning behavior in defined situations" (Flanagan as cited in Cseh, 1998, p. 52). This research has focused on the type of incidental learning that occurs in pre-defined workplace situations. However, there is no phenomenological research exploring the nature of incidental learning entirely from the learner's perspective of the experience. As a learner-initiated form of learning, it would be useful to understand the meaning of incidental learning to the individual and to explore the ways in which a learner determines that they "know" something when they have learned it in an incidental manner.

Furthermore, research on incidental learning in the workplace has suggested that context impacts the incidental learning process (Cseh, Marsick, and Watkins,1998, Marsick & Watkins,

1990; Ellinger, 2004). However, there is no research exploring how – or if -- the life history of the individual, including their perception of learning and selection of an occupation, is related to the nature of the individual's incidental learning experience. By exploring the nature of incidental learning from the learner's perspective, we can begin to explore the impact of the learner's professional culture on incidental learning.

In Figure 1, the circles (labeled jointly as context) refer to some of the existing research on incidental learning in the workplace (Callahan, 1999, Cseh, 1998, Marsick & Watkins, 1990). The squares represent the focus of this phenomenological study, focusing on the learner's perception of the incidental learning experience as a way to explore the nature of this unique form of learning.

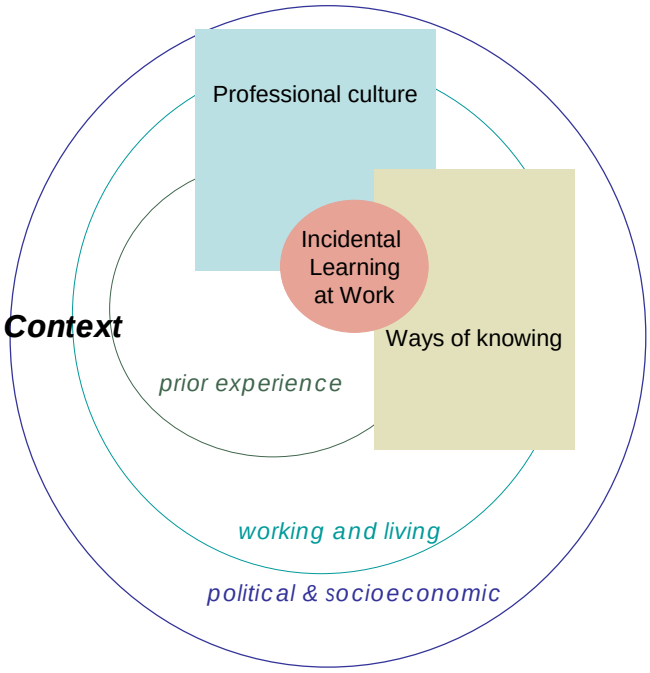

Figure 1 How this study fits in with existing research.

In Figure 1 the circles, jointly labeled context, illustrate the existing research on incidental learning. The squares represent the focus of this phenomenological study.

Purpose of the Study

The purpose of this study is to explore how incidental learning functions in the workplace as a first step to developing a stronger link between incidental learning and operational requirements within organizations. As one of the few studies focusing exclusively on incidental learning in the workplace, it is hoped that the results from this study will allow managers, leaders, and HRD professionals to gain a greater understanding of this natural form of learning. Studies have suggested that our inability to clearly conceptualize this form of learning has made it difficult for leaders to know how to nurture, assess and validate incidental learning (Slotte, et al., 2004). So while many believe that natural learning is one of the most important forms of learning in the workplace, it is clear that we need a greater understanding of incidental learning, from the learner's perspective, in order to be able to use this as a real resource for moving the business forward.

While research has shown that adult learning occurs when individuals see the need for what is being taught (e.g. Knowles, 1998), most firms still see learning as standardized training and information delivery, whether it is offered in a traditional classroom or via e-learning software. Brown and Duguid (2000) suggest that organizations need to switch from this supply-side perspective to a demand-side view of knowledge creation, provoking employees to search for and create new knowledge. In order to create an atmosphere that will encourage and support employees natural learning, we need to gain a better understanding of the ways in which employees engage in incidental learning activities and the ways in which they determine that they have learned in these situations.

Today's work is often described as messy or uncertain and many workers continuously encounter wicked problems (Conklin, 2003). These problems lend themselves to informal and

incidental learning. Lohman (2000) concluded her study on informal [and incidental] learning[1] by noting that we need to understand the types of informal learning activities that employees engage in and we need to understand what influences their learning if we are going to be able to promote the type of informal learning needed to handle these demands. By focusing on the nature of learners' incidental learning experiences -- and how this learning is impacted by their ways of knowing and personal history – I have been able to provide some of the insights into factors that may promote or limit different types of incidental learning. Moreover, as Lohman suggests, this study explored the potential impact of the individual's context on incidental learning.

Using Seidman's protocol for the study provided a framework for in-depth interviews that delved into the experience of the interviewees and the meaning that they make of those experiences. A phenomenological approach provided an opportunity to "explicate the meanings [of experiences] as we live them in our everyday world" (van Manen, 1990, p. 11). Interviews were conducted with representatives of two professional associations. Findings were shared in two ways: individual profiles and thematic connections (see Seidman, 1998). Individual profiles provide a way of understanding the individual's incidental learning within the context of his or her own experiences, providing a more holistic, in-depth understanding of the incidental learning. Thematic analysis explored the commonalities and differences between participants and across professional groups.

[1] Lohman uses the term informal learning to refer to both incidental learning (unplanned and unanticipated) and other types of planned, informal learning.

Research Questions

The purpose of this study is to explore the nature of incidental learning in the workplace. The following questions will guide the research:

- How does professional context impact incidental learning?
- How do incidental learners know they know in the workplace?

Significance of the Study

Incidental learning is one of the least-understood types of learning. Most of the studies that mention incidental learning combine it with informal learning during the course of the research, making it difficult to parse out the antecedents and impacts unique to incidental learning. Therefore, this study expands the research exclusively focused on incidental learning and, in the process, our general understanding of incidental learning.

This study focused on incidental learning in the workplace, building on the seminal work of Marsick and Watkins (1990, 2001) and Cseh (1998). Their research focuses on an aspect of organizational learning, namely informal and incidental workplace learning. Ideally, findings from this study can be translated into information that is useful for management, human resources, and organizational change consultants in their attempts to develop a more competitive workplace. Moreover, implicit in the effort to develop a workplace that facilitates incidental learning is an effort to create a more holistic and humanistic workplace. Therefore, our effort to more fully grasp and develop this naturalistic form of learning was undertaken in hopes that the findings will be able to be used as part of a more general plan for creating work settings that nurture the abilities of the workers.

Scope and Delimitations

As noted earlier, the purpose of this study was to explore the meaning of incidental learning to the learner and to investigate how the learner knows they have learned something when they learn in an incidental fashion. The goal of the research was to explore the *process* of learning, not to evaluate the validity of the learning. While it is clear that all types of learning – formal, informal, and incidental – can be fraught with error, this study was based on the assumption that incidental learning can often be valid, informative, and constructive.

This study was based on the belief that incidental learning can be made explicit by the learner during the learning process or upon reflection of an experience. No attempt was made to identify learning experiences that the learner is not aware of. Further, the study was designed based on an understanding of the importance of context to incidental learning. In fact, the study was explicitly designed to expand the exploration of the role of context in incidental learning.

Incidental learning occurs in all aspects of our life. This study was limited to a study of incidental learning in the workplace. Moreover, the study was limited to an exploration of two to three occupations in an effort to explore the role of occupational culture. Finally, this study added another dimension to the literature on incidental learning by focusing on the phenomenological experience. This also delimits the study by focusing solely on the nature of learners' experiences.

Chapter 2 Review of the Literature

Introduction

The chapter provides a review of the literature relevant to the study. The conceptual framework for the study was based on an analysis of the general literature on incidental learning. The first section of this review highlights the findings of this research. Findings from the literature review on incidental learning also reveal that no one has explored how the incidental learner determines that he or she has learned something new. This information is central to this study. The second section reviews the literature on ways of knowing. While findings from this meta-survey provide evidence that context – such as, prior experience, work conditions, and socioeconomic conditions -- is important, there is little research on the impact of professional culture on incidental learning. The third section reviews the literature on the professional culture, looking specifically at how professional culture impacts sensemaking and learning.

Figure 2 depicts how these various concepts are linked. The circles (labeled jointly as context) refer to some of the existing research on incidental learning in the workplace (Callahan, 1999, Cseh, 1998, Marsick & Watkins, 1990). The squares represent the focus of this phenomenological study, focusing on the learner's perception of the incidental learning experience as a way to explore the nature of this unique form of learning.

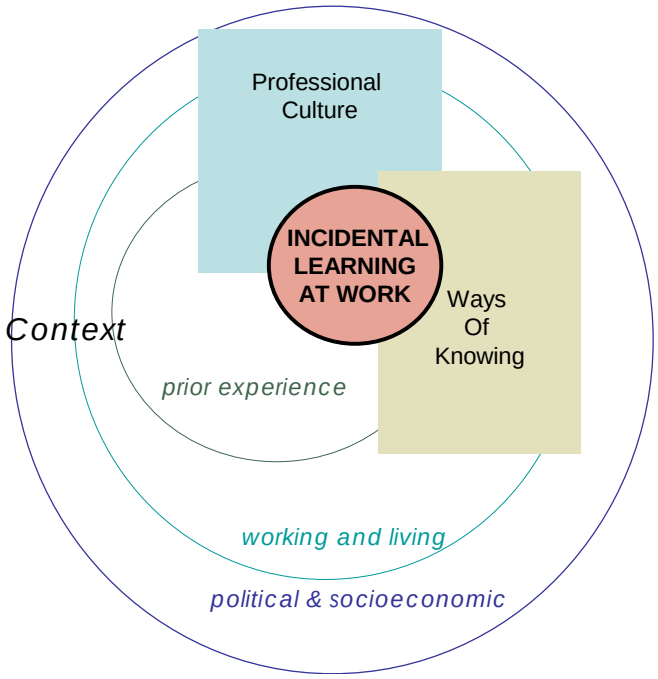

Figure 2 Relationship of the concepts in the literature review with an emphasis on incidental learning at work

Incidental Learning

> Many people are of the opinion that unless learning is planned, setting out to learn something specific, one really hasn't learned anything. Worse, many people believe that unless learning opportunities are offered by some institution, the learning is either of lower quality or, possibly, not learning at all. (Holzinger et al. 2001, 778)

It is generally agreed that incidental learning is learning which is the byproduct of some other activity. This is a fairly easy definition to understand for both the practitioner and academic communities. However, attempts to further clarify and delimit the definition become difficult. Research on incidental learning in organizations is sparse, and the construct was not applied in a consistent manner. In an effort to get a better understanding of the concept, I extended my research to representative readings in non-organizational settings. By coming to

understand how researchers have studied incidental learning in multiple settings, using a variety of techniques, I had an opportunity to gain a deeper understanding of the construct.

Early in my research I was struck by the number of studies that had incidental learning as a key word or title word, but only made reference to incidental learning once. While the reference may have been made in the body or the conclusion of the research, the concept was never defined either directly or by use of other terminology. This research was not incorporated into this study. There were also a number of studies that used the concept of incidental learning as an integral part or focus of the study, but never made any attempt to define the concept. This research has been included in this study because there is sufficient context in the article to get some understanding of the author's conceptualization of the term.

One of the more perplexing findings was the frequency with which incidental and informal learning were carefully and separately defined, only to have the research merge the concepts in the research or in the discussion of the findings (e.g. Keeping & English, 2001; Marsick & Watkins, 2001). In these instances, I was able to draw a definition of incidental learning from the research, but it is difficult to build on the research or to really gain any additional understanding of the *specific* concept of incidental learning. Of course there are other studies which simply differentiate formal learning and a broadly defined notion of informal learning, that others would say encompasses incidental learning.

In a theoretical piece on learning, Rogers (1997) takes into account both the intent of the learner and the intent of the source of information. According to Rogers, while opportunities for incidental learning come from a wide array of activity (observing, hearing, reflecting, and one's experience or daily life), incidental learning occurs only when the learner does not intend to learn and when the source does not intend to promote learning. If the source intends that others

should learn (i.e. advertisements) then the learning that occurs, according to Rogers, is substantively different and outside the definition of incidental learning. None of the research reviewed considered the intent of the source of information, but it may be worthwhile to incorporate this distinction in future studies to see if it offers any additional insights.

There is a heavy value-laden component in many of the studies of incidental learning. In the past, learning was considered to take place in childhood, primarily in formal school settings. Many still hold this bias that valuable and valid learning occurs only in formal settings under the instruction of a teacher. Incidental learning, therefore, is often considered to be flawed, prone to error and akin to "folk learning". Many others, particularly in the field of organizational learning, go to the other extreme, extolling the virtues of incidental learning. Rieber (1991) is one of the few authors who clearly recognizes the benefits and drawbacks of incidental learning. However, even in this study there is no attempt to explore these differences.

The notion of incidental learning dates back at least to 1942 (McGeough as cited in Bova & Kroth, 2001; Watkins & Marsick, 1992) with related concepts dating back much further.[2] Many of the studies in this area, particularly as incidental learning relates to the workplace, were done in the last ten to fifteen years with approximately one-fourth of the referenced works being completed since 2000. Some of this interest comes from the computer field. Incidental learning is being studied by many in the computer and technology fields, particularly as it relates to surfing the world wide web or learning how to use new technology. Many of the new studies are broader in scope, however, and are focused on the social learning or on aspects of learning that is difficult to measure and evaluate and so has previously gone unnoticed.

[2] See Merton & Barber, 2004 (references to the origins and original definitions of the term serendipity from 1754) and Dewey, 1938/1997 (reference to collateral learning) for example.

Before discussing the existing research in detail, I will look at various conceptualizations of learning and summarize some related, but distinct, learning theories. This should help inform and clarify the analysis of incidental learning. The literature on incidental learning has been divided into the following categories:

- Incidental Learning as a Means of Acquiring Information,
- Computer-related Studies of Incidental Learning,
- Incidental Learning in Formal Educational Settings,
- Marsick and Watkin's Work on Incidental Learning in the Workplace, and
- Incidental Learning in the Workplace.

Finally, I will briefly mention two closely related concepts: collateral learning and serendipity.

Types of Learning

In Theories of Human Learning (2000), LeFrançois defines learning as "all relatively permanent changes in potential for behavior that result from experience but are not due to fatigue, maturation, drugs, injury, or disease" (p. 5).

He goes on to show two different examples of this type of learning. First, acquisition of information is an obvious form of learning. If I learn that deer feed in the evening then I know when to go out and look for them. If I tell you that the bird in the tree is a robin and you identify another bird as a robin, you have learned a fact and it has caused a change in your behavior.

His second example of learning describes an experiment where police recruits looked at brief "neutral" and "violent" images (one in each eye) before and after their police training. After the training, they saw significantly more violent pictures than neutral pictures. While he didn't speculate further, it is possible that their mental models changed causing them to change what they focused on (and what they chose not to focus on), or they might have learned keener

observation skills that allowed them to pick up more subtleties. In any case, their training caused them to change their behavior.

Learning can be conceptualized in numerous fashions, including:

- *Memorizing* – I must memorize the scientific names of plants.
- *Gathering information* – I have just been told that I have osteoarthritis; I must learn about this disease and the treatment options.
- *Creating and re-creating a schema* – After getting to know the experiences of an Iranian employee in my company, I begin to understand the need for diversity training and the value of equal opportunity programs.
- *Socialization* – When I start my new job at company x, I know I will spend the first few weeks learning how they like to conduct business, handle conflict, socialize, and the like.
- *Discovery (realization)* – I learned that if I tap my drum in this particular fashion, I can "pull" the sound from the drum, drawing a rich sound.
- *Discovery (gain insight into something previously unknown)* -- William Perkin was working in a chemistry lab, searching for a treatment for malaria when he learned a new way to create color and discovered the color mauve. He went on to get a patent and set up a factory to manufacture mauve (the first synthetic dye).

Saljö (1979a) defined five different types of learning from a large study of individuals' conceptions of learning:

- Learning as a quantitative increase in knowledge. Learning is acquiring information or "knowing a lot"
- Learning as memorizing. Learning is storing information that can be reproduced.

- Learning as acquiring facts, skills and methods that can be retained and used as necessary.
- Learning as making sense or abstracting meaning. Learning involves relating parts of the subject matter to each other and to the real world.
- Learning as interpreting and understanding reality in a different way. Learning involves comprehending the world by re-interpreting knowledge

Bateson (1973, as cited in Atherton, 2003) identified 4 levels of learning. Learning at level 0 comes from direct experience, similar to stimulus-response learning. I may "learn" that when the church bells ring it is noon. When it is raining outside, I may have "learned" that I will get wet. Much of our day-to-day learning occurs at this level and is habitual and reactive.

Level 1 learning is a more typical conceptualization of learning where I can generalize from my experiences and develop alternative responses. For example, I can understand that when the stove is turned on it is too hot to touch. I can also determine an appropriate response – such as using a potholder of a particular type to avoid being burned. This learning typically becomes habitual over time.

Level 2 learning (deutero-learning) involves understanding the implicit rules underlying the level 1 learning and placing the learning in context. Therefore, I may become aware that I originally "learned" to stay inside in the rain because I was sick or because it was very cold. I may decide that I like to be out in the rain in warm weather or that I can endure the rain if I prepare for it better. Often, the learning at this level involves may involve deeper or even moral issues where the understanding of one's underlying assumptions and the context of a particular problem become important.

Level 3 learning is often difficult to grasp. It has been described as existential learning. At this level, our learning brings about a whole new understanding of our self and the world. This level of learning is considered difficult for theorists to understand and measure and difficult for learners to achieve.

There is a qualitative difference in the type of learning in the way one learns that occurs between Saljö's type 3 and 4. The skills, interest, and approach to learning will differ between these two types of learning. Some may be better at achieving type 4 learning in one area than they are in another. Similarly, there is a qualitative shift in the type of learning that is occurring Bateson's level 1 and 2.

Most of the studies on incidental learning do not begin by defining the concept of learning. Therefore, studies may be focusing on very different types of incidental learning. As I look at the existing research, I will identify the types of learning being studied in each instance to see what this might offer.

Related Theories

There are many related theories of learning in the adult learning and workplace learning literature that are related to -- but distinct from -- incidental learning. It is useful to understand these concepts to appreciate how they may contribute to our understanding of incidental learning while remaining distinct from incidental learning. The four most important concepts to consider include: informal learning, self-directed learning, experiential learning, and situated learning.

Informal learning.

Different types of learning are typically classified based on who controls the means and the ends of learning. Formal education occurs in traditional college classrooms where the professor designs the means and the goals. The term non-formal education is used to describe

organized, non-credit courses taken outside of academic institutions; the courses typically serve identifiable clienteles and have set learning objectives (Coombs as cited in Merriam & Brockett, 1997). Coombs defines informal education as incidental learning and as "spontaneous and unstructured learning" (p. 171) that occurs naturally in our daily life.

Mocker and Spear (1982 as cited in Confessore & Kops, 1998) have also developed a model of learning, distinguishing formal, non-formal, informal, and self-directed learning. In formal learning situations the learner has no control over the objective or the process. In non-formal learning they control only the objective. For informal learning, the learner only controls the process. In self-directed learning, the learner controls both the goal and the process.

Others have defined informal learning more broadly. Most theorists talk about informal learning as opposed to informal education. Informal learning makes up a significant amount of our lifelong learning. Most agree that informal learning occurs naturally and within all contexts of our lives. Tough's (1971) seminal research on informal learning determined that about 70% of adult learning projects[3] were planned by the learner who sought out help from acquaintances and experts. Marsick and Watkin's (1990) influential work on informal and incidental learning defines informal learning as learning that takes place outside the classroom. They go on to emphasize that it may be planned and intentional.

Livingstone (2001) notes the conceptual problems encountered in differentiating various types of learning, suggesting the following definition for informal learning:

Informal learning is any activity involving the pursuit of understanding, knowledge or skill which occurs without the presence of externally imposed curricular criteria…The basic terms of informal learning (e.g. objectives, content, means and processes of acquisition, duration,

[3] Learning projects were defined as a "highly deliberate effort to gain some knowledge and skill (or to change in some other way)" (Tough, 1971, p. 3).

evaluation of outcomes, applications) are determined by the individuals and groups that choose to engage in it. (p. 4).

Informal learning is often conceptualized broadly. It is typically used in general terms to incorporate all learning that is not formal – including incidental learning. For example, many definitions of informal learning incorporate planned or unplanned learning and structured or unstructured learning (e.g. Ellinger, 2004, Lohman, 2000). Eraut (2000)[4] has made an attempt to differentiate various types of informal learning by identifying them as: deliberative learning (done at a time set aside); reactive learning (unplanned but explicit[5]); and implicit (unintended, unconscious learning with an absence of explicit knowledge). These definitions incorporate the concept of incidental learning. Other researchers distinguish between informal and incidental learning, but conceptualize their study under the more general heading of informal learning (e.g. Keeping & English, 2001, Woodall, 2000).

For those researchers attempting to differentiate informal and incidental learning, informal learning typically refers to user initiated, intentional learning that occurs outside a formal classroom setting. The specific method or course of learning may vary and change, and the size of the project may vary greatly, but the learner's decision to undertake a learning project typically defines informal learning in these circumstances.

Self-directed learning.

> *In its broadest meaning "self-directed learning" describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material*

[4] Eraut prefers the term non-formal learning to informal learning, believing that the term informal is too misleading. However, since the field of adult education typically uses the term non-formal as it was proposed by Coombs in the 1960's, I have chosen to continue the use of the term informal. Eraut uses Reber's definition of implicit learning.

[5] The level of intentionality will vary and future reflection might be needed to be able to fully articulate the learning.

> *resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes* (Candy, 1991).

Tough's study of adult learning projects (1971) has also been described as a study of self-directed learning or as he referred to it – self-planned learning. Self-directed learning is a central element in the concept of andragogy (Knowles, 1998) and it has at least two major components. The first is identified as self-teaching, or the ability for the individual to teach him or herself. An independent study conducted with little assistance from a professor is an example of this. The second is the notion of autonomy (Candy, 1991), where the individual decides what he or she needs to know and determines how to go about obtaining that knowledge. Embedded in this notion is an ability to critically assess the learning (not simply "take in" the material) and to critically assess one's own progress (Knowles, 1998; Brookfield, 1995a; Grow, 1991).

Self-directed learning is not generally considered to be a personality trait. Each of us may vary on our degree of self-direction based on the time, personal life circumstance, environment (workplace or school), or the subject. When we are exhibiting dependent behaviors, our learning may be limited to very specific didactic material (Grow, 1991). Many of the studies that I have examined on incidental learning illustrate people learning skills, knowledge and beliefs that are outside of the material being taught in a formal instructional setting. Thus, in some cases incidental learning appears to have a self-directed element.

Baskett (1993) notes that the concept of self-directed learning becomes more difficult to define in organizational settings, because employees often do not have the necessary control to pursue the learning initiatives. Moreover, he suggests that further research needs to be done to help differentiate self-directed learning in the workplace from informal and incidental learning, suggesting that they may be two aspects of the same concept. (Baskett, 1993, p. 25).

Experiential learning.

Experiential learning is often used to describe active learning techniques that are added to the classroom setting to allow the student to apply knowledge and skills rather than merely thinking about them. Experiential learning also refers to "natural learning" or learning that occurs when one participates in life events. Like incidental learning, this form of experiential learning focuses on the primary experiences of the learner and the context of the experience to help the learner make meaning of the experience and retain the lessons learned.

Experiential learning values knowledge that comes from the "inside out" through intuition and practice (e.g. Hunt, 1987). Dewey (1938/1997) and Lindeman (1926/1989) were two of the earliest proponents of experiential learning, with Lindeman emphasizing the importance of experience in adult learning. "Psychology is teaching us, however, that we learn what we do, and that therefore all genuine education will keep doing and thinking together…Experience is the adult learner's living textbook" (Lindeman, 1926/1989, p. 6-7).

Many theorists have developed experiential learning models which usually include some combination of action and reflection or planning. Kolb's (1984) experiential learning model (based on the work of Lewin) identifies learning as "the process whereby knowledge is created through transformation of experience" (p. 38). For Kolb, learning is not the acquisition of content, but the interaction between content and experience. This conceptualization of learning begins to acknowledge the latter definition of experiential learning or natural learning which recognizes that when adults make meaning of their experiences they are learning from their experience.

Situated learning

The theory of situated learning suggests that learning is a social and contextual process where “it is the interaction with the setting itself in relation to its social and tool-dependent nature that determines the learning” (Wilson, 1993, p 73). Situated learning is based, in part, on the work of Vygotsky (Lave & Wenger, 1997; Schunk, 2004). Vygotsky’s (1999) sociocultural theory of learning claimed that all learning took place within the context of social, cultural, and historical context of the learner. That is, “the way that learners interact with their worlds – with the persons, objects, and institutions in it – transforms their thinking. (Schunk, 2004, p. 294).

To illustrate situated learning, Lave (1988) uses an ethnographic study of math to differentiate a school version of math (learning to calculate math problems) from a real-world version of math where the coupons, store specials, and items became tools of learning and the interactions with other shoppers and employees became the context for learning. Situated cognition emphasizes the interaction among learners, the tools used, the social context of an activity and the activity itself that shapes the learning (Hansman, 2001).

Hansman (2001) also emphasizes that situated learning is different from experiential learning. While experiential learning emphasizes the importance of doing a task to assist with learning (for example, practicing percentages by calculating the sales tax on your purchase), situated learning emphasizes "interaction between the learner and other learners and tools in a socio-cultural context" (p. 46). From this framework, I might join a group of bargain hunters and share tips on price shopping or in an investment group that compares interest rates and studies the time value of money. I will have the opportunity to practice my math skills and I will also have the opportunity to learn from more experienced group members. I may learn the pitfalls of neglecting to consider certain factors or learn tips I can use in the future.

Integral to this learning process is the participation in a community of learners which incorporates certain assumptions, cultural values and rules (Lave & Wenger, 1997). Understanding learning in this fashion may help us to nurture constructive forums for adult learning, such as communities of practice. It can also help to illuminate some of the everyday forms of learning that are naturally occurring in a workplace or community group. Understanding the context of learning in a particular work group (for example) can help us understand the opportunities for and delimiters of learning.

Research on Incidental Learning

Approximately 60 references on incidental learning were uncovered and examined. These included dissertation abstracts and dissertations, empirical research, theoretical research, meta-analyses, and practitioner articles. The references were analyzed in several ways, including an analysis of the conceptualization of incidental learning, the type of study conducted, the rigor of the approach and the thematic focus of the research. Ultimately, the latter approach -- a look at the type of research (e.g. computer studies; workplace learning) proved to be the most informative approach for analyzing the data. The analysis focused on understanding how incidental learning was defined and conceptualized.

Incidental learning as a means of acquiring information.

Studies of incidental learning cover several types of learning. A number of studies conceptualize incidental learning as the acquisition of information, sometimes synonymous with memorization. The research identified in this area did not include a definition of learning or of incidental learning, but focused on memory or information retention. Almost all of the studies were formal experiments, and incidental learning was often viewed as a formal type of learning, not experientially based.

Prior knowledge and a monitoring orientation appear to play a role in gathering incidental information (Williamson, 1998; Sleight, 1994; Giguere et al. as cited in Woods & Daniel, 1998; Stokes & Pankowski, 1988). Similarly, Moffitt found that more incidental learning took place if the information was related to a context and topic of interest (Moffitt, 1989 as cited in Sleight, 1994). These factors may be quite related, as we tend to be more attuned to information that fits in with our prior knowledge and mental models. Further, adult learning theory shows that adults learn and retain when they have a need to know (Knowles, 1998; Fry, 1992 as cited in Woods and Daniel, 1998; Giguere et al., 1994 as cited in Woods & Daniel, 1998). However, if our monitoring becomes too specific (e.g. specific instructional goals are used), then the opportunity for incidental learning is reduced (Klauer, 1984).[6] In general, Klauer's meta-analysis supported a channel capacity model that assumes each person has the ability to cognitively process a certain amount of information. If one's channel capacity limits are not taken up on specified goals then sufficient capacity remains to process and store incidental information.[7]

While incidental learning is typically considered to be a common form of learning in a child's early years (e.g. learning language, learning basic social skills), it may become more complex to isolate the study of incidental learning in adulthood. Many of the studies reviewed seemed to be flawed. In Dollinger's study (2000) he was measuring incidental learning as it related to locus of control. However, he selected the items that the student's were expected to have learned. It is not clear that all items would be considered important (e.g. the professor's wife's first name). Further, other items may be learned (e.g. where the classroom is located)

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[6] This effect was exacerbated when students had longer reading assignments. However, longer reading assignments limited *both* intentional and incidental learning. (Klauer, 1984).

[7] However, in an interesting study done on the effects of age and anxiety on episodic memory, there did not appear to be significant differences in the results when comparing intentional and incidental learning at various ages and anxiety levels, contrary to the researchers' expectations. (Li, Nilsson, & Wu, 2004). As incidental and intentional learning were not a central focus of this study, further research and analysis would be needed to determine what these results mean.

without memorizing the classroom number. Therefore, all Dollinger's study shows is that some students did or did not recall the "incidental" items on Dollinger's list.

Stokes and Pankowski (1988) and Woods and Daniel's (1998) looked into older adults ability to retain incidental information after a one-time exposure to a documentary.[8] Woods and Daniel's did incorporate knowledge of crystallized and fluid intelligence and research on knowledge retention at various ages. In both studies, however, the authors, selected what "incidental learning" they were trying to measure. That is, we do not know what type of incidental learning did or did not take place, we only know the extent to which the participants learned the particular facts identified by the authors. There was no way of knowing which participants had specific interests, background or knowledge of the information presented. Moreover, there was no accounting for why individuals were participating in these activities. Were they there to learn about a particular topic, to socialize, or because a spouse wanted to attend? Without accounting for learning styles, prior knowledge, and findings from adult learning theory it is difficult to determine whether incidental learning took place.

It is interesting to note that these studies ranged from formal to non formal settings. However, all but one (Williamson, 1998) measured learning that occurred in a structured format, and all sought learning that was defined by the researcher as important.[9] In fact, Turner (as cited in Sleight, 1994) considered incidental learning to be unintentional learning that was

[8] Stokes and Pankowski mention that they are only testing verbal memory or the learning from the audio portion of the documentary, although as advertised it appears they showed the video portion as well.

[9] Williamson's study captured some of the complexity involved in the study of incidental learning. She looked at incidental information acquisition in the lives of older people, concluding that "respondents purposefully sought information in response to perceived needs, they also monitored their world, at least to some extent, and acquired information they were not always aware they needed" (p. 35). She noted that the amount of monitoring (for both intentional and incidental information) varied based on numerous factors, including: the physical environment, health, socio economic situations, socio-cultural backgrounds and values, and lifestyles.

neither consistent nor inconsistent with the teacher's intentions.[10] Several studies found that increased education led to increased incidental learning (Jenkins, et al, 1984; Stokes & Pankowski, 1988; Sleight, 1994). This finding may be more related to the structure and boundaries of the study than to the concept of incidental learning, as the authors were looking for evidence of the type of learning that one typically practices in a traditional educational environment.[11]

Like Woods and Daniel (1998) and Williamson (1998), Comstock (1978) also looked at how media contributed to learning. By defining incidental learning more broadly, he conceptualized incidental learning in a much broader fashion. He found that children learned attitudes, behaviors, and values as well as cognitive information as they watch television programs and advertisements.

The types of learning typically addressed in this literature was generally memorization and gathering information, although the latter studies of media did incorporate the creation or re-creation of schema. This equates to Saljö's first three types of learning: learning as a quantitative increase in knowledge; learning as memorization; and learning as acquiring facts, skills and methods. In some instances, this may correlate with Bateson's first level of knowledge (the ability to generalize from experiences) as learners often take the information acquired and apply it to their life decisions.

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[10] Sleight (1994) places incidental learning on a continuum, with concomitant learning (learning unintended by the teachers, but consistent with their intentions) on the left) and antithetical learning (learning opposite the teacher's intentions) on the right.

[11] Although there are other explanations for this finding. For example, Klauer's (1984) channel capacity model may apply in studies related to learning specific skills such as math or vocabulary. The more training one has in that area, the less cognitive attention is needed for the new information, and therefore the more "channels" are available to pick up incidental information. Another possibility is the repetitive nature of some forms of incidental learning.

Computer-related studies of incidental learning.

Another category of studies on incidental learning involves the study of computer-based systems. Computers have been studied in several ways: incidental learning as a means to learn to use computers or computer software (such as the internet); incidental learning in systems designed for instructional purposes; and incidental learning that occurs when using computer applications (e.g. discussion groups; games). This research seems to take a broader look at incidental learning than found in the information-seeking studies. Cahoon (1995), for example, incorporated computer skills learning and development of assumptions, beliefs or attributions that lead to a socialization process. In the first instance, he notes, we may explicitly learn computer skills when we need to perform a specific computer function for a task, or we may implicitly absorb ideas about the computer through observation and repetition. In the latter instances, we may learn that computers are good or bad, a status symbol or a character flaw. Cahoon states:

> Incidental learning episodes, over an extended period of time, appear to constitute a socialization process through which people construct personal identities as computer users. In addition to learning how to operate equipment, and software, becoming a computer user involves learning to see oneself in certain relationships to computers, other users, and organizational environments (p. 48).

Collins and Berge (1996) found that many users of a discussion list learned incidentally or unintentionally and the learning ranged from increased knowledge to changed perspectives and changed attitudes. Holzinger et al. (2001) found that students' incidental learning during an instructional game led them to build a "mind-map of knowledge." Similar to the information gathering studies, Holzinger only tested for increased cognitive abilities.

Cahoon (1995) and Rieber (1991, 1992) both approach incidental learning as both a natural and beneficial process and as a source of errors. Cahoon (1995) largely identifies the

incidental errors with the socialization process; Rieber (1991, 1992) identifies technical errors that may occur. For example, in Rieber's 1991 study using computer animation for lessons on gravity, students received other physics lessons "incidentally" by watching the animation and were able to extract the information appropriately. They also applied the incidental information to inappropriate contexts, however.[12]

Another common theme in this group of studies was the interactive nature of incidental learning. It was the learner's interactions with technology, with other computer users, or with a formal lesson plan that led to the incidental learning. The learning did not spontaneously occur without an implicit or explicit dialectical process. These notions suggest a constructivist form of incidental learning, where learners are constructing knowledge through their interaction with other persons or situations (e.g. Schunk, 2004).

Most types of learning were addressed in this literature including memorization and gathering information, creating or recreating schema, socialization, and discovery (particularly the discovery of computer-related skills),[13] although this body of literature tended to focus on socialization and discovery (realization). There was evidence of Saljö's first four types of learning: learning as a quantitative increase in knowledge; learning as memorization; learning as acquiring facts, skills and methods; and learning as making sense or abstracting meaning. The interactive nature of the computer work seemed to offer a more experiential approach that allowed the learners to do more than memorize data. It also assisted learners in making more

[12] Rieber (1991) did not make any mention as to whether physics students in traditional programs make similar mistakes. He does note, however, that novices tend to solve problems more quickly, using superficial information whereas experts are able to better identify the essential information. He also seemed to imply that there was more information implicitly shared in the animated instruction than might otherwise be made available to the students. Suggesting that this enriched the learning while also providing additional opportunities for developing misconceptions (pp. 325-326). It would be interesting to see if similar errors do occur in traditional programs.

[13] It is important to remember that we are only considering incidental learning that occurred when using computers. Intentional learning projects on computers would likely show more examples of discovery (gaining insight into something previously unknown) and may show less socialization except in situations particularly designed for interaction and collaboration.

theoretical connections and developing new attitudes and beliefs. Once again, these studies showed evidence of Bateson's first level of knowledge (the ability to generalize from experiences) as learners often take the information acquired and apply it to their life decisions. In interactive forums, such as discussion lists, there also were some examples of Bateson's second level of knowledge (deutero-learning). Though not stated as explicitly, it appears that some of what Bateson described as level 0 learning (stimulus-response learning) was occurring as students learned how to use the computer or learned how to use a particular software package.

Incidental learning in formal educational settings.

> "Students may learn incidentally things the teacher or instructional designer never intended" (Sleight, 1994, p. 3).

While formal educational settings are designed to foster learning, tension can arise among all stakeholders when we look into what type of learning should be occurring. Are students to learn according to a defined set of objectives or should the learning environment be flexible, allowing for diversions or examinations of issues relevant to the group that were not on the original plan. How one answers these questions impacts perceptions of incidental learning in the formal educational setting.

While a number of the research studies look at incidental learning in formal educational settings, the focus is often different. Some studies are looking to see what incidental learning may be occurring in the discipline of study. Other studies look to see what learning has taken place and try to determine the relationship of intentional and incidental learning. While some of the research is contradictory or inconclusive, there are some general findings that appear to emerge.

Providing general objectives (rather than specific objectives) seems to enhance incidental learning (Kurtz, 1974 as cited in Sleight, 1994; Mealman, 1993; Klauer, 1984; Lawrence, 2000). Context becomes important here. Studies show that a general, overarching purpose or set of objectives provides a foundation for learning. After that, narrow, specific objectives and questions tend to enhance intentional learning (although study results differ), but often impede incidental learning. The application of these concepts varies substantially as different contextual factors impact the opportunity for successful intentional and incidental learning in a given situation. Some of the factors that have been found to mediate findings include: prior knowledge or skill (Klauer, 1984; Jenkins et al., 1984), cognitive capacity for a particular subject at a particular time (Klauer, 1984), volume of material (Klauer, 1984; Jenkins et al., 1984),[14] and opportunities to interact with others (Mealman, 1993; Lawrence, 2000).

Many studies of incidental learning in formal settings focus on vocabulary. One study by Neuman and Koskinen (1992 as cited in Sleight, 1994) found that when material was provided in multiple formats (such as captioned T.V.) incidental learning of vocabulary was enhanced. This is intuitively appealing and seems to be compatible with some of our general understanding of how we learn. It would be interesting to see additional studies on this.

Other studies on incidental learning showed that opportunity was a key factor in incidental learning. Opportunity for incidental learning can be facilitated by the teacher, the students, the setting or the structure of the program. For example Mealman (1993) and Lawrence (2000) found that having opportunities to interact with one another in small group

[14] In a meta-analysis of research, Klauer (1994) found that students show that extensive readings tended to interfere with both incidental and intentional learning. However Jenkins et al. (1984) and Neuman and Koskinen's (1992 in Sleight, 1994) research showed that providing multiple ways of interacting with material enhanced the incidental learning of vocabulary. Similarly, Mealman (1993) and Lawrence (2000) found that providing multiple informal ways for students to engage with one another enhanced incidental learning of formal materials and incidental learning beyond the course agenda.

discussions, facilitator-led discussions, and in the corridors or informal settings outside of class all enhanced incidental learning. In addition, they found that when students and faculty were open to new information and to exploring material that was not on the original syllabus, then additional incidental learning took place. It is believed that both of these factors contributed to the fact that the two non-traditional adult learning programs being studied became holistic learning opportunities where students experienced significant incidental learning along with the formal course content.

All studies directly or indirectly indicated that sufficient time was a critical factor in incidental learning. Sufficient time must be available for interacting with others or with the study materials in order to provide opportunities for incidental learning. In most cases, additional time is required if students are to accomplish both intentional and incidental learning. None of the studies looked at the other end of the spectrum, however. Does too much time inhibit learning? This would be an interesting area of study. For example, under what conditions might additional time lead groups to lose their focus and inhibit learning? Is it helpful – in reading texts and in facilitated discussions – to have some boundaries to help solidify intentional and incidental learning? This might also be an opportunity to help sift out the antithetical learning – incidental learning that is opposite the intentions of the teacher (Turner, 1984 as cited in Sleight, 1994).

As mentioned previously, context was important in several of these studies. Prior knowledge and course content both influenced the type of incidental learning that occurred. (e.g. Klauer, 1984, Mealman, 1993; Sleight, 1994). Some authors have attempted to turn this around and suggest that advanced organizers be used (perhaps a list of terms, for example). However, most studies appear to show that incidental learning is not as amenable to this technique as

intentional learning is. That is, it is difficult to set objectives for incidental learning. (Klauer, 1984; Ford and Herren, 1995). While we may be able to identify conditions that enhance incidental learning in general, we cannot plan for a particular type of incidental learning. Therefore, if we have a specific goal -- such as increasing student's vocabularies -- then formal or informal plans should be laid out to achieve this goal.

McCafferty, et al. (2001) took a very different approach, using activity theory to study incidental learning of vocabulary or math in formal educational settings. This research showed that incidental learning (conceptualized as information gathering or memory) occurred when the "incidental" items learned were part of a goal-directed action. If the material was an important sub-goal to the task at hand, the material was learned incidentally. In a sense, the examples provided showed a more active relationship with the material learned. When students had to make up math problems or generate interview questions (of genuine interest to them) in foreign languages, they were more likely to remember the numbers or vocabulary involved than when they simply solved existing math problems or wrote an essay using vocabulary offered by the instructor.

Most types of learning were addressed in this literature, with the exception of Bateson's third level of learning (existential learning). While the research included discussions of how learner's acquired additional information (such as career information for adult learners) and applied information learned in the community (perhaps best described as Saljö's fourth type of learning), there was a strong emphasis on the development of schema and socialization in this research. Often, the researchers were looking at how intentional learning interacted with incidental learning, and perhaps identifying cases where an instructor's "theories in action" (Argyris & Schön, 1974) contradicted their "espoused theories" (i.e. their intentional instruction)

and how this impacted the students development of new schema or attitudes. In addition, incidental learning as a socialization process in formal educational settings was a focus of the research.

Marsick and Watkin's work on incidental learning in the workplace.

Marsick and Watkins did the seminal work on informal and incidental learning in the workplace and numerous researchers have based their studies on this research or extended the research. Like others, Marsick and Watkins describe incidental learning as a byproduct of some other activity, as an unexpected discovery. The definition most frequently used is:

> Incidental learning, a subcategory of informal learning, is defined by Watkins as a byproduct of some other activity, such as task accomplishments, interpersonal interaction, sensing the organizational culture, trial-and-error experimentation, or even formal learning….Incidental learning….almost always takes place although people are not always conscious of it (Marsick & Watkins, 1990, p. 12).

and

> Incidental learning is defined as a spontaneous action or transaction, the intention of which is task accomplishment, but which serendipitously increases particular knowledge, skills, or understanding (Marsick & Watkins, 1997, p. 187).

As Wiswell (1987) notes, while incidental learning is a byproduct of another activity, the learning may be instrumental to the task or extraneous to the project at hand.

Many theorists focus on interpersonal learning when discussing incidental learning. Marsick and Watkins (1990) identified a series of studies in the 1970s and 1980s that highlighted the interpersonal learning that occurred incidentally on campuses (e.g. Postman & Weingartner, 1971; Astin, 1977; Cross, 1988 as cited in Marsick & Watkins, 1990). While acknowledging a broad definition of incidental learning, Wiswell (1987) specifically designed his research to

focus on the interaction (interpersonal communication) of employees in the organization. Callahan (1999 as cited in Marsick & Watkins, 2001) found incidental learning in incubators was "bridging learning" that occurred when technical and financial employees had opportunities to observe each other at work and to network in informal situations. The informal nature of the environment defined as "karma in the walls and halls" allowed employees to absorb knowledge needed to move their business forward.

Woodall (2000) observes that the existing research on incidental learning appears somewhat contradictory. In some cases, incidental learning arises from a "tough love" environment that is characterized by having many problems and risks and much uncertainty (McCauley et al.,1995). In other cases, incidental learning is said to thrive in an organization that is open, accepting, allowing opportunities for sharing and reflection. Examples of situations where incidental learning may occur can be loosely divided into these two types of circumstances.

For example, incidental learning often occurs when mistakes are made (Marsick, Volpe, & Watkins, 1999; Wiswell, 1987; Marsick & Watkins, 1990), when one is attempting to cope with a difficult situation (English, 1999, 2002), when one is testing the limits in unknown situations (Marsick & Watkins, 1997), and when one is involved in non-routine, new or challenging projects (Keeping & English, 2001). These situations can be characterized as uncertain and often risky.

Research has also shown that incidental learning is most likely to occur if the organization is supportive, supporting the individuals in maintaining an openness to learning, in disciplined reflection, and in translating learning into practice (Marsick & Watkins, 1990) Networking with peers; debriefing a project (Watkins & Cervero, 2000); and "unpacking

experiences" through storytelling (English, 2002) all offer opportunities for disciplined reflection. Further, many examples of incidental learning may be neutral - occurring even when the environment is not particularly uncertain or open. For example, incidental learning occurs with our day-to-day activity as we learn the organizational culture, as we interact with other employees, and through task accomplishment.

Researchers studying incidental learning have struggled with the notion of whether it is tacit and pre-conscious or explicit. Marsick and Watkins (1990) often differentiate it from informal learning based on its tacit dimension. However, they also note that incidental learning is often recognized through "post hoc reflection" (e.g. Cseh, Watkins, & Marsick, 1999; Marsick & Watkins, 2001):

In incidental learning, people's attention is turned elsewhere. When people stumble onto something they must consciously pursue the discovery to learn from it instead of moving ahead on the task at hand (Watkins & Marsick, 1992, p. 291). Moreover, Marsick and Watkins (1990, 1997), describe incidental learning as being initiated by a trigger similar to the process that occurs in transformational learning. Transformational learning is a theory of learning that leads to perspective transformation: “dramatic, fundamental change in the way we see ourselves and the world in which we live” (Merriam & Caffarella, 1999, p. 318). Mezirow (1994) claims that perspective transformation is often begun by a disorienting dilemma or a trigger. While incidental learning may be incremental learning or transformational learning, Marsick and Watkins believe that it is often a result of a trigger – an indication that the situation has changed and that they must pay attention. The trigger, which may be internal or external, leads to reflection that in turn leads to incidental learning. In this scenario, it appears that reflection is an important part of the process.

In fact throughout Marsick and Watkin's work -- and the work of those who have extended their research -- it appears that incidental learning can occur along a tacit-explicit continuum. In some cases, our incidental learning is tacit and needs to be surfaced in order to evaluate it, share it, and use it most effectively. In other cases, incidental learning occurs at a conscious level. Researching adult learning in African American women's volunteer groups, Ross-Gordon & Dowling (1995) found that learning occurred through both pre-conscious and reflective practices.

One factor that all researchers agree on is the importance of context. English (2002) notes that incidental learning is the interplay of the context, situation, and experience. For Marsick and Watkins (1990) the context of a particular experience delimits the incidental learning. Based on Cseh's research, Marsick and Watkins extended the conceptualization of context to encompass the larger socio-economic, political and cultural context (Cseh, Watkins, & Marsick, 1999). They explain that our worldview impacts what we attend to which in turn influences how we frame a situation or problem. Ultimately, this impacts what we learn from an experience. (Marsick & Watkins, 2001).

Once again, most types of learning were addressed in this literature, with the exception of Bateson's third level of learning (existential learning). While this literature incorporated a very broad definition, there were fewer studies that focused on what type of technical (or factual) information could obtained or created through incidental learning as we had seen in some of the computer studies. Study details tended to focus on more interpersonal or attitudinal research. As a whole, this literature highlighted the importance of context to incidental learning and the interactive nature of incidental learning. Incidental learning has been found to occur as individuals interact with experiences, other individuals, experts, a particular work project, and

the context in which they live or work. A person's individual context and framing of their environment and the socio-political and cultural context were both found to be important.

Incidental learning in the workplace.

There are a number of articles on incidental learning in the workplace that are not based on Marsick and Watkins' definition. In all cases, incidental learning is considered to be spontaneous and serendipitous learning. Beyond this, the conceptualizations vary from viewing incidental learning as unimportant and reactive to perceiving incidental learning as holistic, reflective learning.

Some consider it to be unimportant, referencing the definition of incidental as "an aside," something that is insignificant relative to the task at hand. Dodge (1998) believes that incidental learning has a "positive connotation of knowledge and skills discovered," while "lacking intent and critical reflection" (p. 111).[15] However, he also considers incidental learning to be less important than the main task at hand (personal communication, April 20, 2004). Matlay (2000) looked at the role of incidental learning in small organizations and found that incidental learning was not shared amongst the employees and was typically only used in the immediate situation. These conceptualizations of incidental learning depict it as a reactive form of learning. McCafferty et al. (2001) defined incidental learning as "involuntary memory." Jarvis (1987) defines incidental as non-reflective and reactive emphasizing it as a process by which we learn our societal or organizational culture.

[15] Dodge (1998, personal communication, April 20, 2004) makes an interesting distinction between incidental learning and unintentional learning. He defines incidental learning as individual learning in a situation where the individual has no intention of learning. For example, if I touch the stove I discover it is hot. Unintentional learning could be positive or negative and is a result of an interaction among more than one person, although it may still be unplanned. He uses the example of a lecture on safety where the speaker ignores obvious electrical safety hazards. The students may learn an unintended lesson on the need to follow safety guidelines.

At the other end of the spectrum are those who believe that incidental learning has a reflective component and those who believe that the learner may gain knowledge, skills, or attitudes. Reischmann (1986 as cited in Marsick & Watkins, 1997) considered incidental learning to be "learning en passant." However, that phrase may be somewhat misleading as he emphasized that this learning is identified by reflection, is holistic and builds on previous learning. Australia's national learning initiative (Learnscape, 2000), emphasizes the importance of having a facilitator working on projects to help the individual and the team recognize when incidental learning has happened so that the individuals and the organization can benefit from it. Moreover, they stress that the incidental learning is likely to change the direction of the learning or the project. They recognize a variety of types of incidental learning from technical (learning about computer firewalls) to theoretical (new insights) to affective (new attitudes). While Matlay (2000) found that incidental learning typically was only of short-term value, he recognized that employees were often making a choice between reacting to new situations and reflecting on and incorporating their new incidental learning. An opportunity to reflect on incidental learning could help the organizations benefit from the "just-in-time" nature of incidental learning.

It is difficult to summarize the types of learning addressed in this body of literature as the literature is not a cohesive category. As I look across all the literature that has been discussed, however, it becomes evident that it is much easier to measure incidental learning when it is conceptualized as an increase of facts or memorization. However, this is only a small part of incidental learning. Researchers have also found ways of studying incidental learning as socialization both in children and in adults, although this is rarely identified as incidental learning. Although Marsick and Watkins (1990) identify transformational learning as a

foundational theory of incidental learning, it is more difficult to determine when incidental learning becomes intentional learning when looking at higher levels of learning. In addition, it is more difficult to study incidental learning at a group or organizational level.

Related Concepts

Two related concepts, collateral learning and serendipity, deserve mention. Both concepts appear in theoretical pieces, but neither has been examined through empirical study.

Collateral learning.

Dewey's (1938/1997) brief mention of collateral learning in his book Experience and Education is quoted in many articles. On occasion, it is referenced in relation to incidental learning. As defined by Dewey, collateral learning is the invisible curriculum that we encounter in schools that shapes our attitudes, likes, and dislikes. This concept of collateral learning is very akin to social aspects of incidental learning. It highlights the fact that we learn more than the factual (or even value-based) material that is taught in a classroom. Dewey believes that collateral learning is "fundamentally what count[s] in the future" (Dewey, 1938/1997, pp. 48). However there is very little further investigation of this type of collateral learning by Dewey or others. As presented, Dewey's collateral learning appears to be a subset of incidental learning.

Serendipity.

The dictionary defines serendipity as "an aptitude for making desirable discoveries by accident." Horace Walpole coined the term initially, deriving it from the fairy tale "Three Princes of Serendip." He used the term serendipity to describe "accidental sagacity," noting that it is not serendipity if you discover something you were looking for (Merton & Barber, 2004). Walpole was impressed with both the unplanned, accidental nature of the discovery and the

sagacity required to make the discovery. Many elements of the concept were not explored and this has led to ambiguity in our understanding of serendipity. (e.g. Could the "discovery" have been expected? What type of object was discovered? Was the discovery of any significance?)

Moreover, in reviewing the fairy tale, Merton and Barber note, the princes didn't actually discover anything. The authors go on to show that others who have written about the fairy tale describe the princes as having strong observational powers, keen intuitive abilities, and the ability to make "Sherlock Holmesian insights." Merton and Barber comment that there are other examples in history where one person's exemplification of serendipity, emphasizing the value of the discovery, may be described by another as a negligible event.

"It may depend on the interest of the observer [emphasis added] whether one and the same discovery is described as a retrospective prophecy or a discovery by serendipity, or happy accident….it is such different emphases in description, sometimes ideologically conditioned, sometimes not, that play a considerable part in the receptivity of different people to serendipity, both as a pattern of behavior and as a word" (Merton & Barber, 2004, p. 20).

Brookfield's use of the term serendipity further illustrates the ambiguity of the term. In one instance, Brookfield (1995b) uses serendipity synonymously with fate. Brookfield (1986 in Mealman, 1993) appears to use serendipity synonymously with incidental learning. In one place, he notes that serendipitous learning outcomes are typically considered unimportant. In another place he talks about it as insights of which the student was previously unaware (perhaps alluding to retrospective prophecy).

When we talk about serendipity, it appears that we are talking about a particular discovery – a finding that provides us with new knowledge or opportunity that allows us to move forward. Legend has it that tea was discovered serendipitously when a Chinese leaves fell into

an emperor's hot water. However, when I touch a hot stove and burn my hand, I would be more likely to label this as incidental learning rather than serendipity. Thus there appears to be a difference between the two concepts. Serendipity typically implies an element of good fortune or good luck, while incidental learning is not include a value-laden concept.

The lack of a clear conceptualization of both incidental learning and serendipity make it somewhat difficult to determine whether or not they represent the same concept. Like incidental learning, serendipity is often used in academic research without a clear definition or method of measuring it. As I have found in the research on incidental learning, identification of a serendipitous experience may be in the eye of the beholder. Walpole (see Merton & Barber, 2004) provided us with a word that is intuitively useful, but lacked rigorous analysis and boundaries. It became all the more ambiguous when it appeared that he had perhaps slanted his interpretation of the events in the fairy tail. Both terms need additional study to be fully understood, particularly if the goal is to understand how to nurture opportunities – if possible – for serendipity or incidental learning.

Significance of the literature

As previously mentioned, there are many ways to conceptualize learning. Therefore, it is important to know how incidental learning is conceptualized in the research. The conceptualization of learning used to design the study will impact the result of the study – and our subsequent development of a theory of incidental learning. In my study, I intend to gain an understanding of the learner's conception of learning and their ways of knowing along with their examples of incidental learning. This will provide an opportunity for us to explore the learner's experience; it will also serve as a delimiter of the study.

A second important thread relates to the importance of context. Findings of various studies have shown that the context may impact the nature of what is learned, but that incidental learning can occur in many different contexts. Therefore, results from existing studies suggest a constructivist epistemology is appropriate for studying incidental learning. Studies show that incidental learning occurs in stressful, open and neutral work environments. What appears to be most important is the person's individual context. The experiences that the learner is engaged in, the framing or mindset that the learner has, or the larger culture context. This study will provide an opportunity to extend the examination of context to the sphere of professional culture, an area which has been shown to provide training and cultural norms which impact our ways of looking at the world.

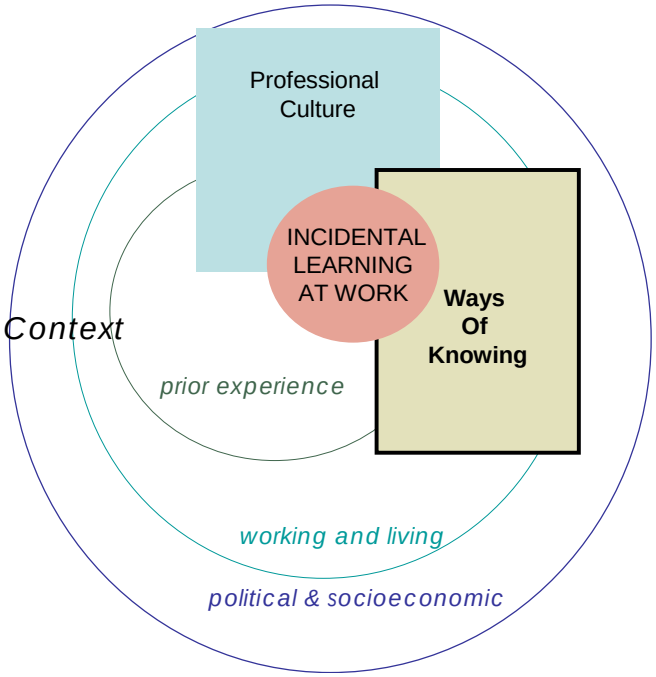

Figure 3 Relationship of the concepts in the literature review with an emphasis on ways of knowing

Ways of knowing: how does it mediate incidental learning?

Central to this study is an exploration of how individuals know they know when they learn something in an incidental manner, as shown in Figure 3. Exploring this may help us determine why some individuals learn in a given situation while others do not. It may also provide some insight into the different circumstances that lead to flawed learning.

Studies of epistemology have shown that individuals vary in the methods used for making meaning or "coming to know" information. For example, some individuals rely solely on external authorities while others rely solely on their personal experience. While formal learning is measured using formalized tests, papers, and grading systems to identify whether the individual has learned, and informal learning typically uses the learner's success in achieving their goal to determine if the individual has learned, what criteria are used to determine that incidental learning has occurred? How does the individual know that he or she has learned something? Is there a connection between the individual's incidental learning and his or her epistemology?

Studies of epistemology focus on four categories of information: the source of information, beliefs in the nature of knowledge, access to new information, and the generation of knowledge. The source of information is depicted as a continuum. At one end of the continuum, knowers believe that information comes from external authorities, at the other end they believe that information is subjective and comes from within. Closely related to the source of information are the knowers' beliefs in the nature of knowledge. For example, knowledge may be conceptualized as dualistic and absolute or subjective and uncertain (see Belenky et al., 1986, King et al., 1989, Perry, 1970, and West, 2004).

A third category relates to how the individual accesses information. Some rely on lectures or receipt of specific written or oral instructions; many receive knowledge through observation, while others rely on experiential, hands-on approaches. Gardner's (1993) seminal work on multiple intelligences highlights the variation in individual's access to information. He not only incorporates some of the "traditional" methods, such as interpersonal, cognitive, and kinesthetic, but he also identifies new ways that individuals can gain access to information, such as naturalistic and kinesthetic.

The fourth category relates to the way that individuals generate knowledge. There are several models of epistemological development that discuss the varied ways that individuals gain knowledge. Perry (1970) and Belenky et al. (1986) provide two of the seminal works in this area. While there are some substantive differences in their models, many authors (e.g. West, 2004) have identified significant overlap. One way of learning is through received knowledge (Belenky) or dualism (Perry). This knowledge is absolute and comes from outside experts. Another way of generating knowledge is through one's personal sense-making, described as multiplicity (Perry) or subjectivism (Belenky). This subjective approach places the individual's personal beliefs above the views of authority figures. Other ways of generating knowledge include reasoned and constructive approaches. Belenky et al. (1986) provides a comprehensive look at these approaches. Reasoned knowledge is divided into separate and connected knowing. Separate knowing takes a doubting stance, requiring proof of any belief and removing the self from any discussion. Connected knowing incorporates inclusionary ways of knowing that include empathy and relatedness and affective experiences. The next type of knowing, constructed knowing, incorporates both internal and external ways of knowing, using both separate and connected procedures. (Belenky et al., 1986)

As I consider how individuals know that they have incidentally learned something, I will be exploring the connection (if any) between the individual's epistemology – the way the individual comes to know information – and the nature of the incidental learning.

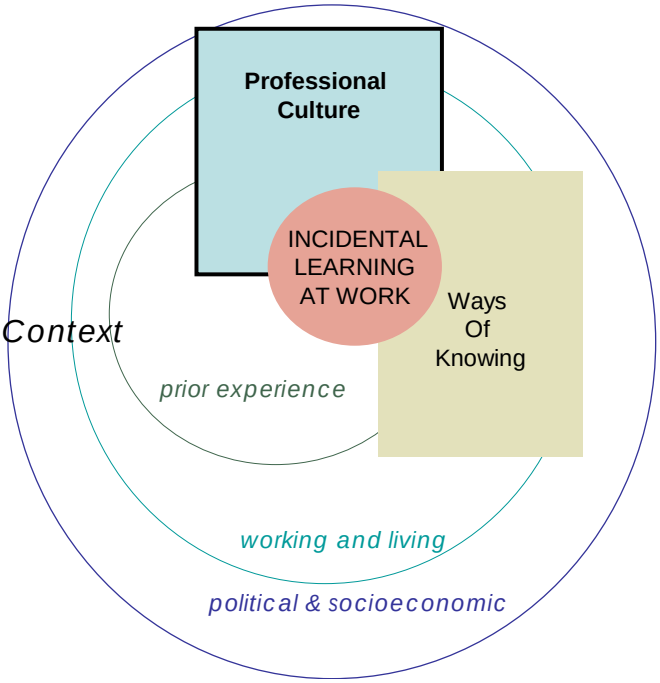

Figure 4 Relationship of the concepts in the literature review with an emphasis on professional culture

Occupational and professional culture

Organizations are often studied at the macro level or at the level of the individual. There is another level that is important to examine (shown in Figure 4): professional or occupational communities. While a study of the organizational culture highlights the meaning that a person's work has for others, the study of occupational culture highlights the meaning of work for those who do the work. (Van Maanen & Barley, 1984). Van Maanen and Barley believe that it is

important to do more research at the level of occupational community because it emphasizes "what people at work do all day (or would like to do)" (p. 350).

Professionalism and professional culture.

Schön and Raelin use fairly formal classifications for professionals. Raelin (1991) describes them as "having superior intellectual training, maintaining their own standards of excellence and success, and being supported by associations that maintain the quality of the profession" (p. 8). Schön (1983) notes that we look to professionals for their expertise and ability to solve social problems in our social institutions and, in return, we grant them latitude in identifying the rights and responsibilities of their peers. In fact, the degree of autonomy or uncontested authority is central to the identification of a professional. (Callahan, 1999; Raelin, 1991). There are few discussions of professionalization that don't raise the conflict between professionals (and there adherence to the larger professional culture) and managers (who are typically more attuned to the organization's bottom line).

Kerr et al. (1977 as cited in Raelin, 1991) reviewed the literature on functional definition of professionals and came up with six characteristics: expertise, autonomy, commitment (to the profession), identification (professional associations and networking), ethics, and standards (policing). In addition, ongoing education, a code of ethics, governmental regulations and licensing are often considered hallmarks of professional status. (e.g. Bloor & Dawson, 1994). Professional groups have particular expertise and training that often leads to a unique perspective, set of values, way of approaching a problem and sense of identity. Moreover, as Schön (1983) notes, practitioners have a repertoire of experience that may include "examples, images, understandings, and actions" (p. 138). Each profession has a certain way of framing problems that brackets the phenomena that they will attend to. "Their frames determine their

strategies of attention…[and] the values which will shape their practice." (p. 309). In fact, some theorists believe that a central part of the process of becoming a professional is the employee's ability to gain more intuitive and explicit knowledge of the ways of framing and approaching problems. (e.g. Lave & Wenger, 1997; Wenger, 1998; Trice, 1993; and Van Maanen & Barley, 1984).

The identification of a professional appears clear – until we attempt to define it. Both the academic and practitioner communities waiver on the definition. Although the Census Bureau – a group that provides basic data used in countless studies and analyses -- uses classifications such as "Professional…," the organization has no definition of professional, a review of its documents shows no definition for how they define the professional. In a discussion with the staff at the Census Bureau, they claim, in a circuitous argument, that they provide definitions of each job and that the category of professional doesn't need a definition because it is simply a roll-up of the categories. In academic circles, some have defined professionals as doctors and lawyers -- those who provide specific services that require an advanced and specialized degree. Others emphasize the "pure" sciences as the true professionals – particularly those who do primary scientific research. There is some agreement that professions begin with abstract knowledge, which professionals control and from which practical skills are developed. By contrast, occupations develop from mastery of strategic techniques and strategies.

Raelin (1991) and Glazer (as cited in Schön, 1983) have created categories to attempt to address the issue. At the top level is the true professional; the example given by both authors is the scientist; Glazer also mentions medicine and law. Schön notes that the criteria for a true professional is the unambiguous end, the stable context and the grounding in scientific knowledge: that is a positivistic model of technical rationality. The next level is the quasi-

professional (Raelin) or the near-major professional (Glazer). Engineers and business are often considered the primary representatives of the quasi-professional groups. These workers have many of the characteristics of professionals, but they are said to have less rigorous educational backgrounds and looser requirements for participation in the "profession." These quasi-professionals may be more pragmatic, less rigid, more attuned to interpersonal skills or other skills outside of those in their profession. Quasi-professional may identify more with their organization and less with the profession. Glazer identified a third group – the minor professionals – that included social work, library work, education, and divinity. Glazer claimed that the education of the minor professions was "hopelessly nonrigorous, dependent on representatives of academic disciplines, such as economics or political science, who are superior in status to the professions themselves." (Glazer as cited in Schön, 1983, p. 23).

Occupational culture

Raelin (1991) sometimes refers to quasi-professionals as emerging professionals. Others, such as Trice (1993), claim that professionals are those who simply claim to have elite characteristics. Trice (1993) notes that occupations are defined and differentiated primarily by the distinctive set of tasks that members of the occupation perform and by its "control over its specific set of tasks and the distinct body of knowledge about how those tasks are to be performed" (p. 10). Van Maanen and Barley (1984) identify an occupational community as a group of people who are engaged in the same sort of work, who draw their identity from that work, and who share a set of norms, perspectives, and values. Occupations each have a unique knowledge base that the members master and put into practice.

Like professions, many occupational cultures exert a degree of autonomy or self-control. The more self-control allowed to an occupation, the more distinct its culture (Lee-Ross, 2004).

For example, in a world that is now reliant on technology, the computer technician is often given the status and deference previously given to a doctor. Occupational groups will differ in the sources they consider authoritative and the rituals they engage in (Pentland, 1995). Occupational groups differ in their language, the way they make sense of organizational events, their domain of substantive knowledge, and their ways of learning (Bechky, 2003). Thus, there are many similarities in the definitions of occupational and professional culture.

As Callahan (1999) notes, the majority of writers use the concept of profession and occupation interchangeably. Moreover, technology is bringing about rapid changes in professions. For example, the internet gives patients much more access to medical information, allowing many to become advocates for themselves. Blogs and interest group web sites are slowly gaining readership, raising questions and debates about who is a true journalist. Software packages provide simple boilerplate contract language, allowing many to draft some legal documents. At the same time, many technical professions are developing more rigorous training and certification procedures and are gaining central roles in organizations.

Conclusion

Prusak (2001), a leader in knowledge management, notes: "we are some distance away from fully understanding the true mechanics of learning. If organizations can manage the learning process better…then clearly they can be more efficient" (Prusak, 2001, p. 1004). Sambrook and Stewart (1999) get more specific, noting that human resource development professionals are focusing more on how to channel learning rather than direct training. Watkins and Ellinger (1998 as cited in Sambrook & Stewart, 1999) comment that the need for continuous learning in the workplace requires us to gain a better understanding of (and then use of) informal and incidental learning. Marsick and Watkins (2001) conclude that incidental learning can be

enhanced by increased awareness of the user and that formal adult learning can be enhanced if educators take note of the lessons learned incidentally.

As many authors agree (e.g. Baskett, 1993; Marsick & Watkins, 2001; Mealman, 1993), additional research is needed to develop a more robust understanding of incidental learning. With the exception of the work of Marsick and Watkins and some of their students, much of the research in incidental learning is segmented. Much of Marsick and Watkins work merges the research on informal and incidental learning. Yet the need for understanding and developing better opportunities for learning from everyday activities continues to grow.

It has become apparent that we need to examine how each researcher conceptualized learning and how that conceptualization impacted the researcher's study. A study of incidental memorization is significantly different from a study of incidental innovation. As incidental learning is unplanned and unintentional learning, it is difficult to prescribe expected norms of what the learner should learn the way we do when we develop a test following the end of a college course. A study that identifies anticipated incidental learning in advance is likely to test how the researcher perceives the situation, not what the learner found to be of interest. In fact, studies show that prior knowledge and, to some extent, current needs frequently seemed to impact the information that was learned incidentally. Therefore, what we really need to be examining is what each individual actually learns incidentally and how they decide that they have new knowledge. How do determine that they know something new?

On a professional level, employees are trained and encultured to use particular ways of knowing. The issue of context, situation, and experience frequently came up in the studies of incidental learning. While the context can range from the sociopolitical system to the particular job assignment given, the professional context of an individual typically provides a powerful

influence in our work lives, impacting not only context, situation, and experience, but cognitive and affective reasoning. One key question remains unanswered – in fact, unexplored. Are learners guided by professional techniques when they learn in an incidental fashion? Or do learners, perhaps, rely on folk learning techniques? Exploring the links – if any -- between individuals' incidental learning, ways of knowing, and professional culture may help provide a more robust way of conceptualizing incidental learning that will help leaders nurture and validate it in the workplace.

Chapter 3 Methodology

This study explored the essence of participants' experiences in incidental learning in an effort to learn more about the nature of incidental learning; a phenomenological approach was used. This chapter begins with an overview of hermeneutical phenomenology. It then provides an explanation of the research design and the data collection methodology. It concludes with a section on the procedures that will be used for analyzing the data. This section includes a discussion on anticipated findings and the validity of these findings.

Phenomenology

Overview

Existing research provides fragmented and often conflicting results regarding incidental learning. Therefore, a phenomenological approach – taking us back to the experience itself – will be used to gain an understanding of the lived experience of incidental learning. Phenomenologically-oriented studies treat topics as "questions[s] that require clarification of its lived meaning." (van Manen, 1990, p. 24). Husserl, often considered the founder of phenomenology, viewed phenomenological research as descriptive and focused on getting to the primary essence of a particular experience. The hermeneutical phenomenology of Heidegger and others also starts with the description of the lived experience, but "hermeneutic research is interpretive and concentrate[s] on historical meanings of experience and their developmental and cumulative effects on individual and social levels" (Laverty, 2003, p. 15).

Hermeneutical phenomenology asserts that there is no such thing as an uninterrupted phenomenon. According to Heidegger, "understanding is not a way we know the world, but rather the way we are" (Polkinghorne as cited in Laverty, 2003, p. 8). Therefore, while it is

important to attempt to understand our biases and pre-judgments, we cannot fully isolate them; everything that we encounter will be referenced to our background and previous experiences. Hermeneutical phenomenologists recognize that two persons can read the same text – or a phenomenon – and come up with vastly different interpretations based on their different historical, cultural, and philosophical perspectives. However, Heidegger believes that we can become more aware of our pre-understanding(s) and account for them as interpretive influences (van Manen, 1990; Laverty, 2003). Critical self-awareness and "genuine openness in one's conversational relation with the phenomenon" (van Manen, 2002) allow the researcher to develop a meaningful understanding. To fully understand the phenomenon requires that we begin by exploring the phenomenon without theorizing or conceptualizing, but merely gathering a description of the actual experiences. The process of gathering and analyzing knowledge is really an interactive process between the researcher and the participant in the form of the hermeneutic circle or spiral where both are: 1) exploring the actual event, without resorting to theorizing or abstractions, and then 2) asking questions, clarifying assumptions, until they reach a "fusion of horizons" (Gadamer as cited in Thatchenkerry, 1992). The "fusion of horizons" will allow both the interviewer and the participant to see the situation from the same context and perspective. Ideally, in the process, many of the prejudices, biases, historical lens, and cultural influences will be recognized and the researcher will gain a fuller understanding of their impact.

Distinguished from other Methodologies

As use of qualitative research methods grow, so does the discussion about the appropriateness of mixed qualitative methods (e.g. Annells, 2006; Baker et. al., 1992; Goulding, 1999, 2005; and Wilson & Hutchinson, 1991). Most researchers agree that there are similarities between various qualitative research methods. Many of the qualitative research methods rely on

interviews and observation for data collection. However, researchers also agree that each method, (e.g. ethnography, grounded theory, phenomenology, ethnomethodology), are based on different intellectual assumptions, have different goals, and require different approaches. Some feel that mixing methods in one study, sometimes referred to as method slurring, weakens the rigor of research (e.g. Baker et al., 1992; Wilson & Hutchinson, 1991). Others feel that different methods can be combined within one study, but that they must be used in distinct phases using different questions and research methods each designed to address the focus of that portion of the study. (Annells, 2006; Wilson & Hutchinson, 1991). Further, if researchers choose to use different research methods for different parts of their study, they should make sure that the methods have the same ontological basis and fit with the researcher's personal epistemological stance. (Annells, 2006; Goulding, 1999).

Grounded theory and phenomenology are two methods that are frequently at risk of "slurring," perhaps because these two methods have a number of things in common: "Both [phenomenology and grounded theory] focus on the richness of human experience, seek to understand a situation from the subject's own frame of reference, and use flexible data collection procedures." (Baker et al., 1992). Both research methods also acknowledge the importance of language, recognize that participants' experiences are formed in the context of their cultural and social experiences, and are based on a fundamental belief that there are few universals – including "truth" claims. (Goulding, 1999). Finally, both research methods encourage the readers to bracket all preconceived notions and suspend all previously studied theories and to base the research on the empirical evidence collected in the current study.

However, phenomenology and grounded theory have different purposes. According to Baker et al. (1992), the purpose of phenomenology is to "discover the essence of a phenomenon"

(p. 1356) and the purpose of grounded theory is "to explain a given social situation" (p. 1357). While data for grounded theory studies comes from many sources, including interviews, documents, observations, among others (Strauss & Corbin, 1998; Wimpenny & Gass, 2000), data for phenomenological research comes solely from the participants' stories of their lived experiences; these stories hold precedence over the existing literature and over the researcher's interpretations (e.g. Baker, 1992, Goulding, 1999; van Manen, 1990). Moreover, the meaning in phenomenological research is the "result of co-creation between the researcher and the researched," (Wimpenny & Gass, 2000, p. 1487) calling on the participant to join the researcher in reflecting on the experience (Seidman, 1991; Wimpenny & Gass, 2000).

The data collection and analysis process also differ. In grounded theory research, the data collection and data analysis phases are combined (Strauss & Corbin, 1998), as the researcher strives to achieve sampling saturation, creates and revises codes, and analyzes the data to determine what data is still missing. Phenomenological research calls for deep reflection, but the data collection and analysis processes are distinct parts of the process; to the extent possible, they are kept separate to avoid influencing the respondents, to avoid putting the meaning of one respondent on another's answer (van Manen, 1990) and to "look at [each person's] experience with wide open eyes, with knowledge facts, and theories held at bay." (Oiler as cited in Baker et al., 1992). The outcome of a grounded theory study should be an "inductively based theoretical explanation of social and psychosocial processes," (Baker et al., 1992, p. 1357) and the outcome of a phenomenological study is "to describe the world-as-experienced by participants…[and to] discover the common meanings underlying empirical variations of a given phenomenon." (Baker et al., 1992, p. 1356).

While each qualitative research methodology provides value to the greater academic community, a hermeneutical phenomenological approach was deemed most appropriate to the research goals for this project. Therefore, a phenomenological research protocol was used.

Research Design

Seidman's protocol

> "At the root of in-depth interviewing is an interest in understanding the experience of other people and the meaning they make of that experience." (Seidman, 1998, p. 3).

Seidman's protocol provides a means for understanding the experience of other people and the meaning they make of that experience. Seidman's unique approach is accomplished with three consecutive interviews for each individual.

The first interview is a focused life history to provide the context of each participant's experience. For this study, emphasis was given to the participant's occupational history and to his or her past learning experiences. The second interview provides details of the individual's current experiences as they relate to the topic of study. This allowed the participant to reconstruct recent incidental learning experiences and share a story of a typical task or project that best represented the type of work they do. The third interview provides an opportunity for the participant to express the meaning of his or her experiences. For this study, the participants explored the meaning of the incidental learning experiences in the context of their life-long learning and their occupation. This interview "address[ed] the intellectual and emotional connections between the participant's work and life" (Seidman, 1998, p. 12).

Seidman believes that the opportunity for the participant to review his or her current experience in depth and in the context of the factors that have brought the individual to their present situation are critical steps in the sensemaking process. Moreover, this protocol offers the interviewer a window into the individual's life which can help them experience the events through the participant's eyes.

These semi-structured interviews included several common questions (see Appendix C). Probes and follow-up questions, where needed, will help keep the participant on track and help to link the three interviews. Seidman recommends that the interviews be spaced approximately a week apart; close enough for the participant to keep the responses from previous sessions in mind and long enough to avoid idiosyncratic interviews that can occur when a participant is having a bad day. Many of the interviews were scheduled one week apart. In fact, with several of the participants we were able to meet for three consecutive weeks at the same day, time, and location. No interviews were scheduled with less than a week in between. There were one or two individuals who had travel or other responsibilities that caused longer delays between interviews. In these situations, we spent a few minutes reviewing at the beginning of the interview reacquainting ourselves and reviewing what we'd discussed previously and the purpose of the interview for that day. Once we began talking about the previous interviews, they seemed to recall the previous discussions readily. Interestingly, and anecdotally, the amount of thought given to my study between interviews seemed to have more to with how interested the person was in the study – and perhaps the volume of other activities they were engaged in – than it did with the length of time between the interviews.

In a keynote address (Amprey, 1996), Seidman stated that the meaning people make of their experience affects future behavior. The ability to understand how the participants

conceptualize and experience incidental learning incidents will help future researchers to understand the role incidental learning plays in the workplace.

Connecting the method with the questions

Qualitative research is not as tightly designed as quantitative design.

> Thinking qualitatively means rejecting the idea of a research design as a single document in an entire advance blueprint for a piece of research. It also means rejecting the idea of a priori strategic and design decisions….because qualitative research is characteristically exploratory, fluid and flexible, data-driven and context-sensitive. (Mason, 2002, p. 24)

Nonetheless, authors agree that an initial research design is important to guide the researcher and to help explain the researcher's thoughts and plans. A critical measure of reliability and validity in qualitative research studies lies in the researcher being able to demonstrate how they arrived at their conclusions (Mason, 2002) – and that process begins with the study design. One important aspect of the design is the link between the research methods and the research questions (e.g. Lindlof & Taylor, 2002; Mason, 2002).

In this study, I had one general research question -- *what is the nature of incidental learning in the workplace?* I also had two specific research questions: *how does professional context impact incidental learning*, and *how do incidental learners know they know in the workplace?*

The general research question, what is the nature of incidental learning in the workplace, provided the opportunity to go back and examine the actual lived experiences of many individuals. A two-step process was used to do this. First, the actual experience was reviewed, and second the meaning of that experience was explored. Identifying commonalities in these experiences – to the extent they exist – provided some fundamental insights into the essence of the experience. Qualitative differences in the essence of the experiences were also identified.

The field of phenomenography (e.g. Marton, 1981) addresses such qualitative differences in people's experiences; much of the study of phenomenography has focused on the area of learning (see the work of Marton & Booth (1997) and Saljö's (1979a, 1979b) conceptualization of learning.

Interviewing a number of individuals using Seidman's interview protocol provided a window into the participant's world. Thatchenkerry (1992) notes that "In hermeneutic inquiry, the primary origin of knowledge is taken to be practical activity; direct, everyday practical involvement with tools, artifacts, and people. Such activity takes place prior to any conceptualizing or theorizing…" (Thatchenkerry, 1992, para. 69). Seidman's protocol also allowed for this two step process, where the focus of the first two interviews is solely on the experience; the meaning making and interpretation comes after the information about the practical activity is completed. Seidman's protocol allowed me to explore the participants' historical experiences with learning as a context for understanding their perception of learning. This helped both the participant and the researcher to see how their view of learning influenced their openness and understanding of incidental learning. An exploration of historicity, which looks at "how [the phenomenon] is understood as a way of our own being in a situation and world" (Nelson, 2001, p. 150), allowed us to explore how the participants' past experiences impact their current perceptions and experiences. By looking across all participants, I was able to identify some core principles of incidental learning.

Two other questions helped guide the research. One, how do incidental learners know they know in the workplace? This question was explored through the general stories shared by the participants and with questions geared specifically to this issue. In some cases, the participant could immediately explain their ways of knowing. In other cases, the participant had

to spend some time thinking about it or talking about it to become more explicit. In a few cases probing questions were be required to gain a better understanding of how each participant determined that he or she had learned something new. During the third interview, when we reflected on the meaning of the experience, there were also opportunities to explore how the learning impacts them or how comfortable they are with this form of learning.

The last question explored how professional context impacted incidental learning. Once again, the data for this question came from the interviews. In this case, participants explored how they came to be in their current profession and what the professional experience meant to them.

Any time that researchers ask questions, they are causing a level of reflection that is not normally experienced by the research participants. Thus, even in naturalistic research, the very process of doing research will impact the "natural" setting. In a study of incidental learning, this becomes a particularly important consideration. As noted earlier, Marsick and Watkins (1990, 2001) – among others – have suggested that reflection is an important part of the incidental learning process. However, since we can only observe limited types of learning, we are compelled to engage participants in discussion, and to some extent in reflection. Nonetheless, Seidman's protocol will help minimize the impact of this issue. The first two interviews focused on reconstructing experiences. The focus of these interviews was on the concrete actions or stories. Participants were not asked to reflect, draw connections, theorize, give opinions, or make meaning of their experiences until the third interview. By the third interview, the participants will have shared the details of their experiences, allowing us to get closer to the lived experience.

Pilot

To test the interview questions, a pilot was conducted. The pilot provided an opportunity for me to try out my interview design and dust off my interview skills. I approached a casual acquaintance who worked as a professional librarian to participate in the pilot. She readily agreed. Interviews were conducted weekly over a three week period. At the end of the pilot, she provided helpful feedback on the process and on the interview questions.

In general, the interview protocol worked well; I gathered meaningful data that addressed my interview questions. In addition to fitting Seidman's protocol, the first interview was successful on many levels. The participant enjoyed sharing her early learning experiences, and became intrigued with the topic. The ability to effortlessly and successfully answer my questions helped to put her at ease. I am truly fascinated by peoples' early stories and with the stories of how they enter their careers; I believe this helps set a positive tone in this interview and in my subsequent interviews. Although interviews are, by their nature, one-sided, I tried to develop an "I-Thou" relationship that incorporated respect for the participant and his or her experiences, "enough distance to allow the participant to fashion his or her responses as independently as possible" (Seidman, 2006, p. 96), and sufficient rapport to put the participant and me at ease, creating a natural conversation. (For an exploration of I-Thou relationships as they apply to interviews, see Seidman, 2006, pp 95-96.) Although the second and third interviews were more thought-provoking and challenging, they were also successful.

The pilot confirmed that the interview length and content were appropriate; it also highlighted a few changes that needed to be made. Based on my observations and input from my pilot participant, I made three changes. First, I altered modified some of the questions in the first interview. Instead of asking for early learning experiences, I bracketed off time frames to

help provide a context for the question. Second, I eliminated the question about the most meaningful early learning experience as it was redundant. Third, I decided to introduce the concept of incidental learning at the end of the first interview. While most of us naturally engage in incidental learning, most people are not familiar with the concept. Few – if any – of us are used to identifying and classifying our daily learning. My pilot participant had suggested that it would be helpful to have a little time to grasp this new concept. I found this also allowed for repetition, as I typically introduced the concept at the end of the first interview and then repeated the description at the beginning of the second interview.

Data Collection

Selection of Professional Associations

Interviews were held with professional employees. Professional status is typically measured by the extent to which occupational groups are able to actively self-police through the use of state and federal licensing guidelines and by the existence of active associations that have guidelines, licensing, codes of ethics, continuing education requirements and the like will serve as the best sources for participants (e.g. Raelin, 1991; Trice, 1993). Three associations were contacted initially: the Society of Human Resource Management (SHRM), the Connecticut Society of CPAs (CSCPA), and the Institute of Electrical and Electronics Engineers (IEEE). Each of these associations met the criteria for professional status described above and each had large chapters in Connecticut. In addition, the three associations covered professions with significantly different skills and responsibilities. I approached members of each association, describing my study and asking for the opportunity to attend a meeting to do a brief presentation on my research and to ask for volunteers. In return, I agreed to provide them with a white paper – oriented toward business – and to be available to share my findings at their meetings if desired.

Although CSCPA was the only association I did not have to contact blind, it was also the only association that had a paid staff. I spoke with their Activities Director. Although we discussed it at some length, she could not see any benefit to the research and declined my requests.

I also contacted the state presidents of SHRM and IEEE. The state president of IEEE invited me to a state-wide meeting. This provided me with an opportunity to socialize with members, describe my study, and get cards from interested members. I followed up with those members by phone and e-mail. Three members agreed to participate. Two other members were referred to me by participants at the IEEE meeting. In addition, I described my project to:

- several students in my college course (after the course was complete and the grades were submitted); these student worked for engineering firms or firms that had engineers on staff, and
- the CT Section head for the American Radio Relay League (ARRL).

I received several referrals from both groups. After follow-up, two of these referrals were interested and fit the criteria.

The state President of SHRM invited me to a State Council meeting; this meeting was followed by a multi-chapter event that included exhibits, dinner, and a speaker. I was given approximately five minutes at the Council meeting to present my study. I shared my contact information and collected business cards from interested Council members. I was also able to informally describe my project to participants at the state-wide meeting. I gave or collected cards from about eight members. I followed up with these members by phone and e-mail. Three members were deemed eligible and interested in participating. The other four study participants were referrals from these members.

The most common reasons that participants did not participate after expressing an interest were: 1) they did not feel that they had time to complete the interviews over the next two or three months, or 2) they were not members of professional organizations.

Selection of participants

Fourteen participants were enrolled in the study, including seven engineers and seven human resource professionals. Nine participants were women and six were men. Four participants were born in other countries. (I didn't ask for current citizenship status.) I did not ask for age, but I would estimate that the ages of participants ranged from late 20's to mid-50's. Ten different organizations were represented. See Table 1 for additional demographics on the participants.

Table 1. Demographics of Participants

	Approx. Age	Minimum of 5 Years in job or firm?	Years in Prof. Assoc.	Size of Firm	Highest Degree	Traditional/ Non-traditional?
Human Resources						
Gina	50 – 65	No	6	>5,000	Bachelors	Non-traditional
Lani	35 – 50	No	15	>5,000	Bachelors	Non-traditional
Mark	50 – 65	No	4	<50	Bachelors	Traditional
Mary	35 – 50	Yes	5	2,500	Bachelors	Traditional
Rasa	35 – 50	No	(10)	>5,000	Graduate Degree	Non-traditional
Sally	35 – 50	Yes	10	350	Bachelors	Non-traditional
Susan	35 – 50	Yes	11	2,800	Undergrad Studies	Non-traditional
Engineering						
Jessica	20 – 35	Yes	5	120	Bachelors	Traditional
Joe	50 – 65	Yes	(25)	(<100)	Graduate Degree	Traditional
Peter	50 – 65	Yes	15	500	Bachelors	Non-traditional
Stan	50 – 65	Yes	20	4,500	Graduate Degree	Traditional
Tony	35 – 50	No	3	350	Bachelors	Non-traditional
Yang	20 – 35	No	6	250	Graduate Degrees	Traditional
Zoe	50 – 65	Yes	25	>5,000	Graduate Degrees	Traditional

(Items in parentheses were not provided; estimates are given.)

While Seidman (1998) recognizes a range of methods for selecting participants, he particularly likes maximum variation sampling.

> "Maximum variation sampling taps into a wide range of qualities, attributes, situations, or incidents within the boundaries of the research problem…the researcher simply seeks to find exemplars of a wide range of characteristics. The purpose of finding and studying these exemplars is to build a conceptual understanding of the phenomenon." (Lindlof & Taylor, 2002, p. 123).

For this study, my goal was to select participants who worked in a variety of organizations and ranged in age, years of experience, gender, and race. My participants ranged in age, years of experience, years with their firm, gender, and ethnicity.

Referencing Lincoln and Guba, Seidman (Lincoln and Guba as cited in Seidman, 1998) suggests that it is also useful to select some participants who are outside the range and therefore may be considered negative cases. I did not include any negative cases in this study. However, two of my participants, one from each group, might be considered slightly atypical cases. In the group of human resource professionals all members fit the formal requirements for the study. One member had been active in the local chapter for several years, and was respected by colleagues. However, during the interview, I realized that this individual had a strong identity in sales and networking – two key aspects of his career. In the group of engineers, there was one participant that was an active member of two specialized engineering associations that had very similar requirements, size, and function. After reviewing the associations' requirements and talking with the individual, I believed that this met the study requirements.

Schedule visits

Seidman's protocol requires three interviews, each approximately 45 minutes in length. The interview scheduling is important to this method. Seidman (1998) recommends scheduling interviews between three days to one week apart. According to Seidman, this is close enough to

keep the connection in the participant's mind and long enough to avoid "idiosyncratic interviews" (e.g. participants having a bad day).

Interviews were scheduled at the participants' convenience. With twelve of the participants, I met them during work hours at their place of work (in conference rooms, offices, or cafeterias); in the case of two of these participants we met during the lunch hour. For two participants, we met him during lunch, but we met at coffee shops. For the remaining two participants, we met during evenings or weekends and we met in the library or in a coffee shop.

Each interview generally took about an hour. Three participants regularly took more than the planned time, talking for 75 or 80 minutes in two or more interviews. Two or three participants gave fairly direct answers, taking about 40 minutes for their interviews.

Interview procedures

The project was explained to the participant in advance of our first meeting; in most cases, I requested permission to tape the meeting during this introductory phone call. In addition, I told participants that I would share the results of the study in the form of a white paper.

At the first meeting, the Informed Consent Form was reviewed. These forms outline the project, covering the procedures, risks and benefits, confidentiality, freedom to withdraw, and participant's responsibilities (see Appendix A). Emphasis was placed on three aspects of the form each time: 1) that the individual had the right not to answer any question, 2) that the individual could choose to drop out of the study at any time, and 3) that there was no payment made for the study. I took the signed copy of the form, and left a blank copy with participants so that they had the details of the contract, including the telephone numbers of my advisor and the Virginia Tech IRB office in case they had any questions or concerns.

Two administrative steps were taken to assure anonymity. First, I created a coding system for labeling folders, documents, and tapes. Each code identified the participant and the interview. For example, the first interview conducted with the first engineer was EIa, and the first interview with the first human resource professional was S1a. Therefore, no names were on the documents I carried to interviews or on the tapes that were sent off for transcriptions. When I was ready to start writing the profiles, I developed pseudonyms for the participants. To the extent possible, pseudonyms were reflected with a regard to age (names that were common in the era of the individual), gender, and ethnic heritage (Seidman, 1998).

As mentioned earlier, each participant participated in three interview sessions. Appendix B provides the guidelines for each of these outlines. For each outline, there is a specific task (or goal), guidelines for accomplishing the goal, and a desired outcome. Appendix C is a copy of the biographical information that was requested from participant at the start of the project, and a copy of the specific forms for each outline, including the general interview questions. Follow-up questions will be asked, as appropriate, during the interviews.

Interview recordings were reviewed between interviews and notes were taken. The recordings or the notes – or sometimes both -- were always reviewed a final time within twenty-four hours of the next interview. This allowed me to get the most benefit from what the participant had to say, as I could hear it in context with the other information he or she had shared. Between the first and the second interview, I reviewed the transcript of the initial interview to insure that I remembered and could address all that we had talked about – including names and places. I also checked to be sure that I had a clear understanding of what the participant had shared and could identify any points that I wanted to clarify. Seidman (1998) suggests that it is best to limit in-depth analysis until all the interviews have been completed to

"avoid imposing meaning from one participant's interviews on the next" (p. 113), and I followed this advice. In addition, I used this as an opportunity to review my own interview style. For example, one participant required long pauses between my questions and his answers – and sometimes during his answer. The pace was significantly different from any other interview that I had conducted. At the beginning of the first interview, I found myself moving on before he was ready. While I recognized this and did better as the interview progressed, the opportunity to listen to the tape allowed me to fine-tune my process. I was pleased to listen to the tape of the second interview and find that I had adjusted my pace to meet his style.

Between the second and third interviews, I reviewed the tapes, notes, and transcripts from the first two interviews. The primary purpose of this review was the development of participant-specific questions for the third interview. In addition, this in-depth review of the information from previous interviews allowed me to verify that I was collecting meaningful data, to continue to review my own interviewing style, to identify areas for further exploration – often points that I hadn't been able to pick up during our initial interview, and to make note of any points that were confusing to me.

Although my focus was on understanding the stories and the content of the interviews, overseeing the process and relationship, monitoring my own interview methods, and – in the case of the third interview – making sure I understood the meaning the *participant* made of the experiences, it is inevitable that interpretations surfaced from time to time. When this occurred, I would note it, bracket it or suspend it, and return my focus to the data.

Interview techniques.

When doing a phenomenological study, the researcher is the instrument – even when following a particular protocol. "Knowledge is situated and contextual, and therefore the job of

the interview is to ensure that the relevant contexts are brought into focus so that the situated knowledge can be produced." (Mason, 2002, p. 63). Numerous factors can aid or abet the process.

The nature of the relationship that is developed is perhaps the most important. "The interaction in the interview takes place within the context of a relationship that is central to what is ultimately created (Polkinghorne as cited in Laverty, 2003). The interviewer wants to set an environment that is open and comfortable, to encourage each participant to relax. This can occur through a variety of means. Ensuring confidentiality, explaining how the information will be used, and allowing the participant to select a safe setting are all important parts of the process.

In this particular study, I found that the nature of the first interview also helped to set the relationship between the participant and the interviewer. During the initial interview, the participant was asked to share recollections of learning stories from childhood. Participants generally enjoyed talking about their childhood learning. They seemed to enjoy recreating stories from the past. Of course, some participants included stories of learning that came from difficult times. However, these experiences did not detract from the relationship, perhaps because they were raised voluntarily, or perhaps because they were events of the past. The participants also shared stories about how they became a human resource professional or an engineer.

During the pilot interview, I discovered that the participant's comfort with the subject and structure of the first interview was helpful to the overall process. Later interviews confirmed this. Researchers must do what they can to put the participants at ease while maintaining sufficient distance to avoid influencing the interview (Lindlof & Taylor, 2002; Seidman, 1998). One way to do this is to anticipate the participants' questions about the process and to be

prepared to answer these questions (Lindlof & Taylor, 2002). A more challenging aspect of the interview is putting the participant at ease with the process while keeping one's distance. The structure of the first interview inherently served this purpose. While the structure of the first interview was designed to elicit certain information, it also established the relationship.

The second interview was the most challenging interview for most participants and anxiety-producing for some. The bulk of the second interview involved participants' sharing stories of recent incidental learning experiences. None of my participants were familiar with the concept of incidental learning prior to this study, and trying to identify their own incidental learning experiences was a challenge. I am convinced that the second interview would not have been as successful had we not set up some rapport in the first interview. Some participants felt that they had some stories to share – or were comfortable sharing the first stories that came to mind. Other participants were much more concerned about precision in their answers. Most participants asked me during the interview if they were providing me with the right information. Generally, they were and I reassured them of this. After the first few times I got this question, I made sure that I regularly gave my participants positive, appropriate feedback and thanked them for their participation before they asked (Seidman, 1998).

In several instances, participants asked me to provide examples of what other individuals said during the second interview. If the participant wasn't having troubles coming up with examples and stories, I would provide a general answer, suggesting that there was such a variety of answers that it was hard to come up with a typical example, and reassure them that their stories were interesting and useful. If the participant was struggling to come up with examples or struggling to understand the concept, I would suggest that other participants in similar situations had found it helpful to share general current learning experiences. This often helped

get the conversation flowing again. In some cases, I would gently re-introduce the concept of incidental learning back into the conversation. In one or two instances, we explored the individual's learning experiences without trying to reintroduce labels. I then selected the incidental learning experiences from the various learning examples provided.

Engaging in active listening can help the interviewee track the interview, focusing on what is being learned and constantly questioning what should be learned next (Lindlof & Taylor, 2002). Active listening also allows the interviewee to identify emotional nuances, inconsistencies, connections, and shifts in the conversation. Perhaps most important, however, is for the listener to be constantly monitoring his or her own reactions in an attempt to be as open as possible to the participants' perception of the experience.

Seidman suggests listening on three levels. First, listen for the substance of what is being said. Is there enough detail? Do you fully understand it? Second, listen for the less-guarded inner voice of the recipient that is more authentic than our public voice. Setting a comfortable environment and an atmosphere of trust are critical for uncovering the inner voice. Providing appropriate follow-up questions and allowing sufficient silence for the respondent to feel comfortable sharing these personal responses are also important elements. Seidman also suggests asking the participant how they would answer the question if asked by a boss, friend, or spouse to change the frame of reference and elicit a more natural response. (Seidman, 1998, p. 71). Third, remain aware of the process. For example, watch the energy level, non-verbal cues, and shifts in subject matter (Seidman, 1998, pp. 63-65).

There are many more subtle factors that will contribute to the context as well. If the interviewer enters the relationship with an authentic desire and interest to learn from and with the participant, that attitude is likely to come through. Being prepared, providing ample time, and

being fully present during the interviews will provide additional support. In addition to paying attention to each of these aspects, I was careful to be mindful of the participant's explicit schedule and pace.

The method of interviewing is also critical to the outcome of the research. The researcher often must handle conflicting priorities. For example, it is important for the interview to flow openly, allowing the participants to raise issues that are important to them. It is always important to guard against guiding the participant to discuss what the researcher deems important. Nonetheless, the researcher must provide sufficient guidance to ensure that the interview doesn't stray away from the topic of interest. Moreover, there are opportunities for the researcher to come back to issues that they feel are important (e.g. Mason, 2000).

In this process, my goal was to have the participant guide the general direction of the interview and to keep it conversational. Clearly, I also needed to keep sufficient focus to gather the information for my study. One way I did this was to provide a mental map up front and at the beginning of each interview about the process that we would follow. At the beginning, I explained we would explore the participant's learning during the first part of each interview, and we would explore the person's profession during the second part. During each interview, I shared what the focus was for the day, shared the specific type of learning question first, and then was explicit about when we were shifting to talk about their professional activities.

Seidman (1998) suggests that the researcher should explore, not probe. "Too much and ill-timed exploration of the participant's words can make him/her defensive and shift the meaning making from the participant to the interviewer." (Seidman, 1998, p. 68). This highlights the interviewer's agenda. However, he goes on to remind us that too little exploration can leave the interviewer confused and may result in too many generalities. The process of the

three interviews naturally solved some of this problem. At the beginning of the third interview, I mentioned that – in addition to learning more from them about the meaning of the stories that I shared – the third interview provided an opportunity for them to correct me if I misrepresented or misinterpreted any information that they had shared with me. In addition, there were opportunities to raise questions during the third interview, to get clarification on facts, processes, and timelines, as well as an understanding of the meaning that these experiences had to the participants.

When discussing the formulation of phenomenological questions, van Manen draws from Gadamer's work (1975 as cited in van Manen, 1990). Gadamer emphasizes the importance of "opening up and keeping open" (p. 43) the question. Conroy's (2003) Principles for Hermeneutic Research (see Appendix D) provide useful guidance for performing hermeneutical research. Two elements of this list are perhaps most appropriate to remaining open to and living with the question:

> Maintain a constantly questioning attitude in the search for misunderstandings, incomplete understandings, deeper understandings (Addison, 1992; Benner, 1994).
>
> Move in a circular progression between parts and the whole, what is disclosed and hidden, the world of the participant and the worlds of educators and researcher (Leonard, 1994).
>
> (Conroy, 2003, p. 11)

In phenomenological studies, it is important not to draw premature conclusions, but to continually ask questions, search for alternative interpretations, and continually evaluate one's own understanding in light of their own background and biases.

I tried to maintain this stance and, once again, I found the three-interview protocol helped me in this regard. Separating the process of relating stories from the process of exploring their

meaning took some discipline. It also reduced the tendency to make attributions, jump to conclusions, and to make assumptions about the stories.

Positionality

> "The problem of phenomenological inquiry is not always that we know too little about the phenomenon we wish to investigate, but that we know too much." (van Manen, 1990, p. 46).

All research is socially constructed. To choose one research question over another – or one set of research participants over another – automatically highlights the role of the researcher in the process. In qualitative research – particularly in phenomenology – the researcher is central to the research process throughout. Phenomenologists recommend two approaches for addressing this issue.

First, they suggest bracketing one's beliefs in an attempt to attain epoché. I found this issue to be an ongoing one. Not only did I take steps to suspend my on judgments and approach each interview or analysis with a focus on what was occurring from the participant's perspective, but I continually challenged my findings to see what underlying assumptions might be impacting my view. Second, phenomenologists suggest the researcher share pertinent biographical material in order to inform the reader about the researcher's perspective. In this section, I provide an overview of how I came to study incidental learning.

I am fascinated by learning. As a child, I enjoyed analytical challenges (although I disliked memorization). As I got a bit older, I enjoyed the challenge of playing devil's advocate to find out what others thought about particular political issues or current events. It helped me to learn more perspectives and hone the boundaries of my beliefs. In my first semester in college I

took a course called “Japan: Inside and Out” and was exposed for the first time to non-western beliefs. I was captivated by the differences. When I graduated from college, I said that would be my last days in a formal education setting, believing that work experience was the most appropriate way to move forward in business. Within a year, however, I was back at school studying electrical engineering and queuing theory (for non-engineers) and SPSS to help me on my job. These courses led to more courses and I ended up getting a degree in telecommunications. This degree was an interdisciplinary degree – as was my subsequent degree in Organizational Learning. My courses have covered a range of disciplines: technology, engineering, economics, informal learning and knowledge management, and experiential courses in appreciative inquiry and chaos theory. My research theory courses have studied research across discipline and methodology.

In retrospect, though, learning was not just something that happened in the classroom, or even in non-formal learning events, like Smithsonian programs. When I took off a year after my first semester of college, I was working in a clerical position in a large insurance company. The company had hired consultants to review our work. I don’t know what came of the study, but it piqued my interest in organizational issues. I began to watch the operations. Perhaps more importantly, I began to reflect on the people, looking at stress, motivation, and group dynamics – although I didn’t have the appropriate terms for these things. On the job, I’ve always been interested in continual learning and improvement. I’ve encouraged cross-functional learning in my departments, along with encouraging continual informal learning and periodic formal learning where appropriate. Again, many of my managerial perspectives were based on an underlying belief in individual and organizational learning, although I only realized that after I

studied organizational learning. Recent interests have focused on interpersonal and experiential learning – honing my "diverging" skills in observing and reflecting (see Kolb, 1984).

In a course on informal learning at Virginia Tech, we touched on the notion of incidental learning. I immediately connected the idea of incidental learning to the learning that can occur in meetings. How is it that a group of individuals can attend the same meeting (or series of meetings) and learn such different lessons? These lessons may be technical, interpersonal, or procedural. It is not uncommon for different participants to come away with different impressions of the same meeting. There are also some individuals who never seem to learn from these interactions. The incidental learning research that I studied seemed to indicate that the construct of incidental learning was the appropriate one, but there was very little research exclusively focusing on incidental learning and no answers to the questions that I raised. Therefore, I became interested in pursing this topic.

Discussions of positionality often focus on the extent to which one is an "outsider" or an "insider." For example, in a study of poor, white, urban children, positionality looks to see if the researcher is a product of a poor, white, urban neighborhood or "an outsider." These distinctions are not always clear, however.

I love learning and have a broad range of interests. I have had the good fortune to do interdisciplinary work and to work with individuals in a wide range of professions. Moreover, I have taken advantage of exploring different professional areas – from disaster planning to environmental issues. When I teach, I am fortunate to work with many adults in a range of professions; they bring their experiences into the classroom and it allows me to expand my professional awareness. This approach helps me understand a wide range of people and professions. In that regard, I am similar to some of my participants, but very different from

others. For example, one of my participants described herself as "learning more and more about less and less," "staying in my comfort zone," and having a very narrow range of interests. However, I've known people who have narrow range of interests, but are fascinated about subjects within their interests, so while this is different than my style, it is not a foreign concept.

Professionally, I was studying engineers and human resource professionals. I am familiar with both professions, but I don't consider myself an "insider" in either group. Thus, I was familiar with some of the concepts that they spoke of, and could address some areas as an "insider" would, but was unfamiliar with other aspects of their work. From my perspective, I believe the biggest barrier to an "inside" status was the nature of the firms. Many of my participants came from industries that I have not worked in – manufacturing, insurance, and power. This gave me the advantage of minimizing pre-conceived notions, allowing me to rely on the participants' understanding of the business, but it also meant that I was clearly an outsider.

Two issues that are often central to positionality are race and gender. While many of the participants were white, middle class Americans, several had grown up in other countries. Coming from the Washington, D.C. area, I found the variations in country of origin to be refreshing; up until this time, most of the persons I had encountered in Connecticut had been white, life-long Connecticut residents. It felt "familiar" to be with persons from a variety of cultures and countries. This did add a level of complexity to the interview, however. In some cases, the complexity came simply from accents. The transcriptionists had some difficulty understanding the accents, and on occasion, I had to listen to the tape several times to understand the speaker. Moreover, with all the current heightened awareness – and my lack of familiarity – with Arab culture, I was curious about the experiences of my Arab participant. I was also aware that I didn't want to ask questions that might offend or might take us away from the focus of the

interviews. I am hoping that this discomfort was mediated by my genuine interest and enjoyment of the interview process. I do not know, however, how those who grew up in other cultures viewed me. Did they consider me an outsider, and if so, did it impact their answers?

I believe that my love of learning was both the biggest driver of the study and the biggest mediator of the study. While I value all types of learning, I know I have a bias for situations that are conducive to learning – sometimes valuing that over efficiency, productivity, and other goals. During my analysis, I attempted to evaluate the data using at least two perspectives: one that gave a preference for the value of learning and one that held learning as a neutral activity.

Data Management

There were three main sources of data for this study. First, there were the three interview tapes and transcripts for each of the 14 participants. Second, there was one biographical form for each participant. Third, there were notes that I took about the interviews.

Interviews

Although I did listen to the tapes of the first two interviews and take notes in preparation of subsequent interviews, I realized early on I that I would need to hire someone to do the formal transcription. The volume of data was simply too large for me to handle. A system was devised to track and handle the data.

All tapes were labeled with the coding scheme that I had devised and tracked on a log. Immediately after each interview, I made a copy of the tape. In addition to having the tapes transcribed, I listened to them repeatedly. By making a copy, I was able to guard against loss or damage. Original copies were sent out to be transcribed. Transcriptions were e-mailed to me on a regular basis. Once again, I stored the original transcription in one location. A copy was

imported into NVivo for analysis. The quality of the transcripts was reviewed by listening to the tapes of the earlier transcripts received.

There was one more step that needed to be taken as I began to create notes, charts, and other analytical documents. I needed to develop pseudonyms.

Biographical Forms

At the start of the second interview, each participant was asked to fill out a one-page biographical form. This form provided basic information on their recent jobs, formal education, and other interests. Respondents typically filled it in immediately, although some filled it in later and returned it during the third interview. Information from these forms was entered into NVivo for analysis.

Notes

I never took notes during the interviews, preferring to concentrate on what the individual had to say and facilitating the process. Immediately after my interviews, however, I often took notes, describing my impressions of the interview, and any questions or thoughts that I had. In addition, I made notes on the context of the interview, and anything else that I thought shed light on the content or the process of the interviews. Key notes were added to NVivo in memo form.

These notes, the biographical forms, and any notes made as I was preparing for the second and third interviews were all kept in folders, one folder for each participant. The original coding system was used throughout the process to track the information. Printed copies of the written transcripts were added later.

Data Analysis

Keeping track of the interview schedule, data, tapes and transcripts for 42 interviews required attention to detail; it also required that I schedule time to review and reflect on the interviews, processes, and questions throughout the data collection process. It was, nonetheless, quite manageable. At each phase of the process, I was working with one individual, one person's stories. When it was time to analyze all the data, I realized the enormity of the process.

I began by reviewing the transcripts, often listening to the tapes as I read them to get the verbal cues, pace, and context of the messages. This process took place over several months. Interestingly, while I would remember the details of each individual as I interviewing that person or reviewing their transcripts, the stories were so different that it took a while for me to feel that I had a firm grasp on the entirety of all participants' stories. Throughout this process, I made notes and highlighted items, but I did not formally code the data.

After I felt that I was fully immersed in the data, I began to start the coding process. While I have coded ethnographic research and interviews in the past, I did not feel like this coding process was successful in this instance. Coding a piece of a participant's incidental learning story without the context from their past or the meaning they gave it in a later interview missed the essence of the process. The coded results were not sufficient. After looking around for alternative methods of analysis, I decided that the most appropriate approach was to write profiles of each participant.

"Reducing the data is a first step in allowing the researchers to present their interview material and then to analyze and interpret it. (Wolcott as cited in Seidman, 2006). The coding process is one means of accomplishing this; creating profiles is another means of doing this. By

creating profiles, I was able to keep the information in context and to keep the participants' voice and meaning.

> We interview in order to come to know the experience of the participants through their stories. We learn from hearing and studying what the participants had to say. Although the interviewer can never be absent from the process, by crafting a profile in the participant's own words, the interviewer allows those words to reflect the person's consciousness. (Seidman, 2006, pp. 119-120)

In developing the profiles, I used a combination of the selective or highlighting approach, identifying statements or phrases that were essential or revealing, and the holistic approach, identifying some of the core essences in each participant's work and learning experiences (van Manen, 1990).

Some interview topics lend themselves to having the profile entirely in the words of the participant; my study did not. However, the profiles were designed to reflect the salient points that each participant had to make and to "share the coherence the participant ha[d] expressed and to link the individual's experience to the social and organization context within which he or she operate[d]." Profiles appear in Chapter 4.

Through the review of the tapes, transcripts, and notes and the creation of the profiles, I began to identify some tentative themes across the interviews. I generally used what van Manen describes as the selective or highlighting approach, drawing from key essential or revealing experiences that were highlighted in the profiles (and some statements identified but not included in the profiles (van Manen, 1990). I explored these themes in greater depth. As Seidman suggests, some themes or categories that seemed promising initially don't hold out, while other themes are strengthened and new categories emerge. It was at this stage of my immersion with the data that I began to look at the nuances in the data. For example, if I noted that several of my participants learned through observation, but questioned whether they were qualitatively

different types of observation. I looked more deeply into the data to see if I could find answers to my questions.

Summary

This study was designed to explore the nature of incidental learning. Using a hermeneutical phenomenological approach, I designed the study to explore the essence of the participants' lived experiences. van Manen notes:

> But the word 'essence' should not be mystified. By essence we do not mean some kind of mysterious entity or discovery, nor some ultimate core or residue of meaning. Rather, the term 'essence' may be understood as a linguistic construction, a description of a phenomenon. A good description that constitutes the essence of something is construed so that the structure of a lived experience is revealed to us in a fashion that we are not able to grasp the nature and significance of this experience in a hitherto unseen way….A phenomenological concern always has this twofold character: a preoccupation with both the concreteness (the ontic) as well as the essential nature (the ontological) of a lived experience.

By using a three-part interview protocol that first identified the actual experiences of the participants in the past and present, and then explored the meaning that the participants' derived from these experiences and the connections between their past and present, I was able to collect answers to the question. By creating individual profiles I was able to share the essence of the incidental learning experience for each individual. By sharing all profiles along with the thematic connections, I was able to provide some insights and answers regarding the nature of incidental learning at work.

Chapter 4 Participant Profiles

Human Resource Professionals

S1 – Gina

Gina is animated when she talks about learning. Whether answering questions about her career or about her learning experiences, all stories are peppered with the phrase "so that was a big learning." Gina takes pride in her achievements and accomplishments. She also speaks fairly openly about difficulties she's faced in her life and how she has overcome them. Her positive affect and determination appear to facilitate her learning, and her ability to find lessons in all her life experiences seem to result in a positive outlook.

Gina says that she learns every day.

> *Learning has been there and in large degree, through situations, through choices that I've made, whether they're positive choices or not so positive after you learn. Learning is very important to me. And I'm a continuous learner.*

When asked about her early learning experiences, she had quick answers and clear stories. When asked about learning in her teenage and young adult years, she explained "*that's when formal learning really kicked in.*" As we discussed the role of learning in her life, she said

> *"I think that's what I've been, a late bloomer. I really do…[My divorce] was the catalyst that pushed me right into reality and learning….I think I learned a lot from other people. I love to watch. I've got to be a better listener as I've gotten older."*

Early Learning Experiences

Gina's earliest learning experiences emphasized socialization:

> *But I do remember going to kindergarten and I remember the teacher. I remember I really liked being with the other kids. Being an only child, I really welcomed that interaction. And learning? Maybe learning about playing and sharing and things like that. Because I didn't have other kids in my house at that time.*

She talked about learning how to play baseball, learning how to roller skate, learning how to play house. She talked about learning teamwork and learning how to interact with "other people your size."

As she got to her teenage years, the social learning continued through high school and community college. Much of her learning came through her participation in clubs, committees and social events. *"I was kind of a groupie."* Gina learned event planning and project management when she worked on the yearbook staff, the junior prom committee and the senior ball committee. She honed her sales skills selling ads for the college yearbook, and planning and marketing skills when she and some friends developed their own sorority.

Her teenage years also brought lessons in self-awareness, learning skills, and an added emphasis on academics.

> *But interestingly when I went to the community college at 17, (I started at 17 because I started early) that's when the [formal] learning really kicked in, is after high school, for me.*
>
> *So I went to the community college and I did very well. And that's where this student started emerging, and really getting into the studying. And better study habits, so I made the Dean's List for 3 out of the 4 semesters I was there. And I was like, "Whoa!! Me???" Very interesting.*
>
> *The community college, obviously, it's a whole different set up now. The teachers, the professors care about you, but they don't care enough to push you. They're not going to motivate you. You have to motivate yourself. They will motivate in their own way and they teach and he's a good professor, a good instructor who is good. But the onus is now on you as a student once you get to the college level. So I figured that out. "Hummm, OK. Nobody is really going to hold my hand." And where I needed the extra help, I said, "Well, I've got to just speak up. Or I've got to align myself with my friends that are good students, which I then. So we created little study groups and one-on-one or just reviewing stuff for finals and things like that. So I got myself into a different mode, where I didn't do that in high school.*

Current Incidental Learning Experiences

In her early career, Gina worked in fairly small departments. She started in customer service and moved on to staffing positions in temporary service agencies. She then moved into management, managing the office and being responsible for sales quotas and staff. From there, she moved to banking, working fairly independently as an account executive traveling to various branches. After some time managing and opening up new bank branches, she switched to the bank's corporate headquarters.

Working in corporate headquarters provided an opportunity to advance, do the work she loved, and have steady hours that would allow her to complete her college education. Corporate headquarters was also a fertile ground for incidental learning.

Gina's first lesson at headquarters was about politics. At first, she just heard colleagues talking about what was happening around headquarters, and she thought *"Hmmm, funny, I don't experience it that way."* Then she began to experience the politics.

> *I think the big learning…was about the political landscape of a corporation…how the political environment affects everyone, and how after a while, I don't know if it's part of the maturing aging process and you just learn life's lessons by experience. I really believe that. But I had such a learning about all that. To pinpoint the players. It was amazing to me and a bit frightening because I didn't like what I was seeing. I didn't like what I was experiencing. I didn't like the way I was being treated. I didn't like anything to do with the politics in that organization.*

The situation became worse when political considerations changed the structure of the organization and had her reporting to a new boss who she believed was threatened by her and trying to get her to leave the organization.

The second lesson was about "personal strength [and]…survival skills."

> *The long and short of this story and the big learning was I got over those hurdles and I thought, "Oh, you're a pretty strong character Gina. You just keep digging in now that you know the game.*

She learned how to survive in that environment "without compromising my integrity and my moral structure." She learned to "maneuver with her [boss]. I got my work done. I do good work. Always on the money…Excellent reputation."

She learned about people as she watched her original boss interact with others in the new political environment.

> *So you see, I'm learning about people that I… especially him. I'm very disappointed in him because I really had a lot of respect for him years ago. But I see how he operates and how he uses people and if you don't dance to his beat, if you're honest and you're not willing to play those little games or do whatever, I don't know. I'm not even going there. He chews you up and spits you out. And I'm not the first one this has happened to at all, AT ALL with him. I can name a bunch of people who fell into this trap.*

Some of these lessons did not appear to be completely new. Gina had talked about the politics of working for a family-owned temporary staffing company. She had talked about learning of her own strength and character when she went through her divorce. In fact, when she described the process of learning about how she wanted to act in these situations she brought up earlier lessons:

> *I realized that I had choices. That I didn't have to react. That all the things that I know how to behave, my mother and father taught me respect people. But yet not be a doormat either. And assertiveness training. It's like all of your professional training and formal training, everything you've ever learned, all of a sudden comes where you've got to use it.*

and

> *Once I got through that fear, it's like I drew from these old strengths… "[Gina], you went through a divorce where you were faced with a lot of fear about confronting him and whatever. Fear of being on your own, raising the boys. What in the world are you afraid of here?? It's only a job. Your reputation stands. You're a proven person."*

As we discussed how some of her lessons earlier in life contributed to her learning later in life, it appeared to follow a pattern. First, she experienced incidental learning – either a major lesson like the politics at corporate headquarters or smaller lessons about a networking skill that she possessed or needed. Second, she looked at how she was going to handle the situation. Third, she drew from her past formal and informal experiences to develop a plan for coping with the new situation. Finally, she learned about her survival skills and strength of character. While she drew from past experiences, knowledge, and skills, she experienced most of these situations as new learning, new building blocks of knowledge and experience.

S2 – Lani

Early Learning Experiences

"I remember the people things, not so much the doing things."

Lani had some episodic memories from her early days. She remembered learning Bar Mitzvah prayers from listening to her brother repeat it over and over. *"I don't remember actually like learning it. Just from being there hearing it over and over again."* That applied to several of the things she learned as a child: she learned from being there and seeing the experience over and over. She learned from observing or hearing.

Lani didn't remember much from school. She didn't remember the teachers' names or the experiences. She didn't remember "doing a whole lot" outside of school. For the activities she did join, like baton and flute, she had vague recollections of when and why she started or stopped, and limited recollection about specific learning activities.

Family life was a central focus of Lani's learning. Lani observed the dynamics among her own family members. She helped her mother out a great deal. She developed strong personal ethics for right and wrong behavior. When things were not going well at her house, she learned to seek out parents of her friends and members. She learned to observe other families and how they operated.

> *"That's probably the biggest thing I learned as a kid – just how to survive. Just those survival instincts."*

and

> *I think the biggest learning, more of life lessons than in like actually learning stuff in school. I think the biggest learning between 10 and 20 was probably figuring out that, "OK. My parents are who they are. They're not nurturing kind of people. They're not open. They're very dysfunctional and don't expect them to be like other people's parents because they're just not going to be." I was married [very young].. And I was with my ex from childhood through many years of marriage and until our divorce.]. So his parents and grandparents kind of raised me. That's where all the real relationships came from, a lot of it. Although when I was much younger and I actually had next door neighbors who were, I called them surrogate parents. And that was probably middle school. And high school actually too. I knew enough to know, probably because I had a relationship with my in-laws there was no bond [in my family]. It's not like we talked about stuff. We talked about the weather! When my mother [got sick], that actually got better. But we never had a real relationship. My house just wasn't like that. So for years it was when I learned what my in-laws were like.*

The rest of her stories seemed to relate to these ideas. Learning about her family; learning about people; learning from people; and learning about her own standards and ethics. She also noted "I learned more in the last 10 years than I probably did the [up until that point.]

Current Incidental Learning Experiences

Scheduling conflicts caused a long delay between my first and second interviews with Lani. Lani had forgotten most of what we'd talked about. Like I did with many of the participants, I re-introduced her to the concept of incidental learning. We also chatted briefly,

adjusting from the work day to our interview. When I finally asked my first question, Lani was ready; she answered immediately

> *The first thing I think of is not learning something, it's watching people's mannerisms. The thing I've noticed about watching people, for example at [the last company I worked at] everyone started there sentence with "SO,…" . (laughter) That's the way they communicate, and then here I notice it's physical gestures. People talk with lots of this. And they all, everyone, you can tell they work together because everyone that works together has the same….this is how they explain things (uses a hand gesture). So I notice things like that…[I have also learned leadership styles.]*
>
> *But it's more learning about the environment rather than learning a skill. I'm learning that just by watching the leader of the group that I support, and realizing that, O.K., he doesn't have good leadership skills. And figuring out, how am I going to impact this group of people knowing that he's not going to drive it and I'm going to partner. I'm going to have to figure out how I'm going to get to be the driver. So I think it's just realizing I need to deal with it. He doesn't realize he needs to be a leader. Doesn't realize that he needs to do different things. He's the kind of person, whoever was last in his office, they can get whatever they want.*

Lani went on to give many additional examples of incidental learning coming from watching other employees. In some cases, the situation (or person) that she observed was entirely unintentional, it was something that caught her attention at a meeting. In other situations, she would learn something from an individual, find it useful, and than observe their future behaviors or actions to learn more. Most of what she learned related to areas such as interpersonal activities, professional activities, cultural norms and networking aspects of her job. For example

> *That's, and that's kind of what I… I think there's a lot of… I forgot what it was, but there was something that, there was some kind of communication and I was talking to [the head of the group] that I supported just a month ago. And I don't know what it was, and Amy said, "Well, I wouldn't say that." And I said, "Why would NOT say that?" And it was something, it was a negative kind of thing. "I just wouldn't feel the need to say that, if there's no reason. And I'm thinking, but why not? You know, let's hide the fact…hard. And I don't remember what it was because the example, but I remember thinking, "OK, I wouldn't have thought not to say that. I wouldn't have taken that to be something secretive or something that we wouldn't want to say." So that was a…you know, it's learning about the*

> *culture. That's the hard part. So those are the subtle things I'm learning as I go along in the culture.*

She did mention that she had learned a little technical information for the agencies she supported – again by watching and listening – but this learning was more limited.

There also seemed to be several learning opportunities that seemed to be, in part, missed learning opportunities for Lani. It was difficult to tell whether they were indications that she had missed the learning opportunity, she was in the process of learning something, or that she understood intellectually, but could not act on. For example, while she emphasized her learning from watching and listening, she mentioned that she had spent months looking for training that an employee had requested. After she had a proposal in hand someone suggested that she should be talking to Ken, because he handled that.

> *[Ken is] the person in corporate training. And he has some other person who would do all the research and they'll go out and find you a vendor. So I find out that… So the learning for me was, O.K. if I look back on my notes, somebody mentioned his name. But nobody mentioned, and I never asked, "So do I need to call him or will it save me work?" I obviously didn't pursue that enough to realize that he would do it for me.*

Of course, in this case, it could simply be the volume of information. Lani is relatively new at the job and there is a lot to learn. However, another story she told related to her ongoing style of interaction at this job – and other jobs.

> *I'm very principled and I'm passionate about those things and to me it's part of my role [to raise HR issues that are problems.} Whereas [my boss] would do it much more subtly and she'd do it over time….[it's] just my blunt style…[At this company,] .I think they're very cautious, or I should say they're very conservative… I think it's the culture. I think some are a little more rebellious and they just say [what they think]… but I think [most employees] are really cautious about communication. Unfortunately. For me. It just means I'm going to get in trouble more…I need to learn how to chose better words and use different vocabulary. I need to learn how to tone my communications differently. And in writing, I'm fine. It's when I'm in a conversation and the words come out before I think about it.*

Moreover, while she said she was much more concise in e-mail, she went on to give examples of "long-winded e-mails" and inappropriate e-mails replies she had sent because she hadn't read the original e-mail carefully enough.

In two interviews – stretched out with a long break in between – Lani told stories of learning by observing and listening to others. She had many stories that clearly illustrated this learning. Her depth and passion highlighted the importance of this learning. During both of these interviews, however, Lani also mentioned *"I'm on this track and I can't think of other things that are different…"* While it is difficult to say for certain, this tendency to latch onto a particular lens or viewpoint may also illustrate an aspect of her learning.

S3 - Sally

Some participants agreed to participate because the study intrigued them. Some understood the rigor of a dissertation and wanted to help out. Others were approached by a colleague and agreed to participate. Sally was one of a few who was eager to participate and expressed a passion for adult learning at the start.

Early Learning Experiences

When asked for her first recollection of learning, Sally's answer – like most of her answers – came fairly quickly and clearly.

> *I think it was first grade, I had a very, very kind teacher, who was very young and very supportive, and she pulled three, there were three of us I think, aside to teach us to read because we had shown an aptitude for it and I remember sitting in that circle and we were picking out words from the book and reading to each other and she was there.… I remember looking around the room and how proud I was that I was one of these special people who was chosen and recognized for what I was doing and for the talent that I had. Interestingly enough, I loved to and still love to read and it has always been one of those thing and as you ask the*

> *question, I am wondering if that, how much that experience must have influenced me. But, yeah, I felt very special.*

Her awareness of learning as an experience and her own learning in particular went back to her middle school days. Sally recalls that in elementary school, it was her "education time," but in middle school they emphasized that they were going to "learn this today."

> *I remember, I didn't really understand what teaching was versus learning. It was, I don't know, it was just something, I had a teacher that I was close to in middle school and I remember saying to him, they don't use that word. How come they don't use the word learning? Why aren't people learning things? He said well…and the difference between learning and experiences and it kind of struck me…. his interpretation was that learning was interactive and teaching was more, um, was it dictatorial, but that's not the word I am looking for. Lecturing. And as, and if I think back through school, it got more and more lecture-like and less interactive and less hands on as school progressed.*

All of Sally's early learning experiences involved a teacher, coach, mentor, or authority figure. Her experiences were both good and bad. The lessons all appeared to be powerful. Most of her learning all appeared to have occurred at the time, although I suspect that in some instances she didn't have the language to fully describe it until later. Sally learned about how to get along in the world, her inner strength, values, or survival skills from both her positive and negative experiences. From her positive interactions, she was also able to advance her knowledge and skills. From her negative experiences, she also learned about the frailties of others. Interestingly, while Sally's stories typically described formal learning environments, the lessons she learned were rarely formal lessons. For example:

> *Between middle school, I had a coach who helped me learned to play volleyball, which I ultimately learned to love and went on to high school to have a phenomenal coach who, our team went on to be close to state champions and I was chosen for an All-State team, I was one of the top six players in the state and it was a tremendous experience for me. He was quiet and reserved and…kind, he was um, he was fair, he made me work hard and motivated me to want to be, to be the best I could be. He never, and we had an awesome team. He brought the whole team up.*

Yeah, um, because our team was so strong and each one of us had a role on the team, it was, um, there was a point where he had to make some decisions in my, it was particularly in my senior year, and, as to who was who and who got to be captain and…it was an interesting toss up as to who was going to be voted captain. And I was not chosen as captain, he chose my best friend and I was disappointed. I was very disappointed. And he, I remember he took me aside afterward…And he followed me out and he said I know you're upset. You expected to be chosen and no, no coach, be humble for him, and he said no, no, I know you expected it and because of the role that I played -- we played in a set up where I set all the time – what he said to me was the role you play on the team, the role of captain is what you do because of the position you have and you influence every single pay. You dictate, you control where that ball goes, who's going to hit next and you know where your players are and he said I don't need to make you captain to have you show that leadership. And it was, I didn't really understand it, until we were, I remember being in matches, and he very rarely from the side line told me what to do. He let me make the decisions, I was the quarterback of the team and it was very interesting role for me to have because I was never in the spot light, it was not part of me. I blended well. I was there, I was pulling on the rope just as hard as everybody else, but I was not the one who was in the spotlight.

An example of learning from a negative experience:

On the flip side, I also played tennis. I had a teacher, a tennis coach who was not a very good player in himself and would set rules and expectations. We were playing in a ladder system and if you play somebody and you won, you beat them two times in row, then you took their place on the ladder and I started playing tennis when I was nine years old and by the time I was 15, I was a pretty decent player and I kept beating the number two player on the ladder and he would not swap us because she was a senior and I was a sophomore and encouraged his players to cheat during matches: look close, must have been out, kind of stuff. Ultimately couldn't play for him and left the team and [I learned] I couldn't change. I couldn't compromise the ethics that I have been brought up with, very clear in my family. You don't cheat. Everybody lies, hopefully they're only, gee that looks nice on you, when it doesn't, you know, kind of thing, or nice hair cut. But it was not; you don't cheat, especially if it influences somebody else. It's just not the way you do things. And to me that was unacceptable.

Sally went on to say how the decision to quit probably cost her a college scholarship and impacted her for years to come, but she did not express any regret. In fact, the lesson she learned has also shaped her.

Many of Sally's learning experiences evidence powers of observation. Being the youngest child, Sally learned how to push the limits but not get in trouble at home by watching her brothers and parents interact. She learned how to "lay low" and cope with an elementary school teacher identified as "the witch." by observing her brothers experiences and guiding her own behavior. Her learning often came from observing how a teacher handled a particular situation.

Current Incidental Learning Experiences

Sally's observation of the people and events around her come through in many of the incidental learning experiences that she shared. One of Sally's responsibilities is recruiting new employees. The employees she had been screening for a particular position had not been appropriate fits, so she went to meet with the hiring agency to find out what she needed to do differently. Sally came away from the meeting with a much better understanding of how she needed to write up the recruitment information. She also identified two aspects of the incidental learning. First, she has identified a need to reorganize the department, and began to identify some thoughts on what should be done:

> *Just yesterday, we were in a meeting to discuss recruiting positions that we have open. And as a result of the recruiting positions, one thing led to another and in the meeting yesterday, [and I began] to learn about how the organizational functions…I wanted to understand how the recruits should be structured so that they could best utilize their resources and as a result the gaps became more available and more obvious…and I found myself distracted by it sometimes and when I was trying to pay attention to what I should have been paying attention to and I was, gee, I wonder how they do that and I [want] to explore that. I almost wanted to stop what I was supposed to be working on and say, "Let's talk about that for a couple of days you know.*

She also learned more about the company's product.

> *…one of the things that they were looking for was someone with a very specific skill set and as a way of explaining to me what he wanted a person to do, he actually took me for a walk and showed me physically what the product was the*

> *person was going to be working on. So I got to learn a lot about how the products integrated together and what this piece, this structural piece that they were looking for this special skill on. This is what the person is going to be working on. This is how it integrates with everything else and as a result of talking about that, he shared with me how pieces all come together….so it was neat, I got to learn more about the product.*

Sally's stories of incidental learning might also be described as taking advantages of opportunities for learning, which is not surprising as she noted: *"I'm one of those people who believe you learn something new every day."* When she was looking up a new software package on the Society of Human Resource (SHRM) website she discovered many resources, including a toolkit for recruiting -- among other useful resources.

> *I was actually on SHRM's website and I was looking for something very specific and I was looking for new software…I couldn't quite find what I was looking for and I knew I had to read, and I didn't want to read…I struggle with reading on the screen and…it's kind of an overwhelming site sometimes when you out looking for things and unless I have a reason to be surfing, I am usually doing something else and it was kind of neat.*

When she does company training,

> *I learn a lot about the people, and how they function and how they tick; especially when they get personal, which a lot of them do and then also about their jobs.*

Sally went on to describe one particular instance where she changed her perception of an individual during a training activity. This type of activity seems to be representative of Sally's style of learning and of validating her learning.

> *Feelings mean everything to me. Whenever I have gone with the feeling that I felt was right it has been rare that it is wrong…if I have a funny feeling I will - - I now go to [look for] facts to try and validate that feeling.*

S4 – Susan

Early Learning Experiences

Susan struggled through the three interviews to come up with the "right" answer.

> *when you say learning of course I immediately go back to thinking about situations in school but clearly I learned a lot of things before even getting into school and considering pretty much everything we in life is something we needed to learn in one way, shape or form*

Much of her time was spent discussing the nature of learning and comparing her own learning style to that of others. Sometimes she seemed to have trouble articulating her experiences. Other times, she expressed concern that she didn't have valid stories. In between some of the questioning and analyzing, however, she relayed some early stories of learning that appeared to have a powerful impact on her.

Interestingly, Susan was one of a few who interspersed stories of learning experiences that were frustrating with stories of learning that were pleasurable.

> *Well very clearly the first thing that comes to mind and it's sort of embarrassing is, when I was in nursery school learning to skip and the reason that I remember it is because I had trouble learning to skip and needing to actually be shown how to skip versus I kind of galloped more I guess it was so I guess the very first one that pops into mind is needing to actually be shown how to skip and every other kid it seemed to from what I remember come very naturally and yet for whatever reason it didn't to me.*

Learning to drive a standard car proved a similarly frustrating and embarrassing experience. On the other hand, Susan noted:

> *I tended to pick up things quickly if they were things that I was interested in or things that came easily to me. I realize a lot of people learn things or are challenged if things don't necessarily come easily. It represents a challenge for them and that's a motivation for some people because come hell or high water they're going to learn…but so then I know you want specifics so very broadly for me, if I have an interest in it or if when I did it I found that it came easy, that for me was what you know, is part of my motivator and that came kind of easy I'm*

> *sure….Other things to this day I've probably had no interest in and therefore never learned it or maybe never learned to do it well so.*

The stories Susan shared did reveal some clear passions and interests. In fact, if she had an interest in something, she was often willing to overcome some obstacles or participate in something outside of her comfort zone. Joining the baton squad in high school and learning drafting are two such examples. She described her experience with joining the baton squad where her motivation to learn overcame her strong dislike of competition.

> *I remember very clearly needing - - I tried out for baton squad in high school and having absolutely no background in it whereas a lot of the girls that tried out for the squad had grown up having lessons and whatever and I remember trying out for that and then there was a level of formal teaching because you had to learn certain routines but having absolutely no background at all you need to learn that. You needed to learn it in a relatively short period of…so I very much remember that experience and what that was like and then, and being successful at it…[I was motivated;]…I wanted to make the squad so badly that it was something that come hell or high water I wanted to learn how to do that …there was a lot of practicing involved and it was very nerve wracking because it was competitive. There were only so many slots that were open that they were going to be filling…There were two different cuts that they made before final pick of who was making the squad and I remember you know there were a lot of people that tried out at first…Well I'm not a competitive person at all and now that I think back on it it's like oh my gosh, would I ever put myself through a situation like that again? I hope I'm never in a position but it was something that I was motivated to do so I very clearly remember that in high school.*

Susan went on to describe how unpleasant the process was for her colleagues that weren't selected and her strong dislike for the whole process used to select the squad.

She also described her experience learning drafting:

> *In seventh and eighth grade all girls had to take home economics and it was a half year of cooking and a half year of sewing and all the boys had to take shop classes. It was half a year of woodwork and half a year of drafting. I wanted to take the drafting because that was something that I really had an interest in back then in the 1960's. Girls weren't allowed to take drafting. You had to take cooking or sewing…*
>
> *When I got into high school freshman year, the only way you could take drafting was if you signed up freshman year for shop which was four different classes from*

> *each marking period; a drafting, a wood working, an electrical and I think an automotive was the other one and I had absolutely no desire to do that. When sophomore year came, sophomore, junior and senior year there were full year drafting classes, drafting one, two and three. I got myself into drafting one. We you'd go in the class all of the boys and of course they all had the benefit in seventh and eighth grade if they were in the Milford School System of having drafting plus any that then took the shop courses freshman year…I went in never having been trained or taught other than what I picked up on my own and taught myself through reading books and through studying and ended up going through all three years of drafting. By the time we got to senior year and drafting three the class was very whittled…I think seven of us that made it to senior year drafting and I was told at the time - - I don't know if it's true but the drafting teacher had told me that I was the first girl ever in the history of [our] high school to actually go through and complete the senior year of drafting. So that was something that I had an interest in and learning and doing it. Just being motivated…*
>
> *It was kind of neat but unusual at the same time being the only girl in the class with all the boys in the class and actually, when you're dealing at that age, some were fine with it, others were you know relentless with it and um you know, made fun of it. You know, what would a girl be doing there? But I loved it and I had a great teacher and I'll never forget him also.*

While it was clear to Susan and me that some school subjects, some skills, and some activities were very interesting and motivating and others were not, it was less clear why they were motivating. Whether it was her successes or her failures, her chance to learn arithmetic by playing store (which she loved) or her attempts to drive a stick shift (which was painful), she often would go on to say:

> *so that motivated me for some strange reason, I have absolutely no idea [why]*
>
> *[driving a car] did not come naturally to me at all…and again I think back, why didn't it come naturally?*

Current Incidental Learning Experiences

Once again, Susan's penchant for analyzing came through when we talked. She spent a great deal of time talking about the concept of learning and various learning styles rather than describing specific learning experiences. Many of the stories that Susan shared described times when she would expand her knowledge or skills, particularly in areas related to data, reporting,

and numbers. As she mentioned, these were areas of strength and interest. While on the surface, it appeared that she had done a number of different types of human resource jobs, enough to classify her as a generalist, she clarified this for me:

> *Again, because most of what I've done through my career and I may have mentioned this, is I've pretty much remained specialized in certain disciplines. And I've tried at all expense to avoid certain areas, specifically, the benefits area.*

She went on to explain that when there were several employees in the same type of position, she would handle the data and reporting aspects and let others handle the "people" aspects of the job. She preferred the work behind the scenes. Moreover, she was selective when choosing which professional association meetings to go to, sticking with ones that were directly related to her specific interests within the field. Common themes related to numbers or balancing the bank accounts earlier in her career and tracking data or doing reports later in her career.

While Susan said she applied for most of her new jobs because they sounded appropriate and interesting at the time, she also frequently described her career as happening to her.

> *As my job changed through the years everything that I did I always thought was the best thing ever. And then my job would change on me and I'd get really upset because I'd made very few actual changes on my own. I've made a few but most have happened to me because of some changes and I'm really upset. And then once I got off to the new thing, it was like, oh my God, now this is the best thing and boy, I would never want to go back to that …*

> *Some people are motivated by new and by challenges and I tend to see myself more being somebody like stay within their comfort zone, what they know. You'll be really good at what you know versus, you know, going into something new and not knowing and knowing that you don't know and knowing that you have to learn, you know what I'm saying? Um, so I'm not necessarily so sure it was the newness that it was being put into a position and having to do something new or do it a different way. And then finally getting comfortable with it, going, wow, this is really good. And now we don't want to look back.*

Much of the learning that she described was depicted as self-directed and planned. She mentioned that she got her knowledge from attending seminars, doing research, or asking questions.

There were several incidental learning stories all surrounding her work with one particular manager. One of her managers was described as extremely bright on the technical and legal aspects of human resources, but her personality and working style were very different than anyone that Susan had worked with before. This created a very difficult work environment and a lot of reflection. Susan describes the situation:

> *[The boss] was relatively new and she was unlike any other manager that I ever worked for and it was a huge adjustment. I guess all along I had worked for managers, and they were all female, so I don't know if that has anything to do with it, although I think it probably does, because they all have a very soft approach and, you know, if you were talking and everything was touched in a certain way and then in came this new manager and oh my God, it was cut and dry to the point and don't ask questions… Her style was, and I saw her do this with a lot of either co-workers or employees, she liked to break people down and they she built you back up.. And um, so it was difficult. I guess to me the one thing that sort of stood out was…is you observe how people do things differently…And then [I started to look at] what made me like someone and working for them and really wanting to put forth, you know, a total effort for them versus others and what was their style…*

During this process, Susan emphasized that she learned that there were different management styles, and she became conscious of what styles she did or did not want to emulate. She became aware of her own management style. In addition, Susan learned how to express her needs, and – even more importantly – to adjust her style to work so that she could survive in this work environment. In fact, she mentioned that she was still friends with the woman and had worked with her again later on in her career, even though it was clear that she still was opposed to the woman's approach.

Susan also learned a lot of factual and legal information from this boss. While she didn't like the women's style, she was able to learn "*what it was she was trying to draw out of people, and how she was, you know, what types of information she was looking for and gathering.*"

S5 -- Mary

When I started reading the transcripts from all my interviews, I often found them devoid of the richness of the conversation. I missed the nuances of the face-to-face discussions. My first time through, I typically read them and listened to the tape recordings; this helped me to get the full rhythm and depth of the interview. For a few of the interviews, the personality of the participants came through in the transcript itself, and I could "hear" their words as they spoke. However, reading the transcripts from Mary's interviews seemed to go more smoothly than the interviews themselves went. I spent some time trying to think about what nonverbal cues may have caused me to experience the interview differently than the transcript. I had a few thoughts, but no clear answer.

Stepping back from the content of the transcript, I noticed a marked difference in the pattern of the interview with Mary. Unlike most interviews where the questions were short and the answers were long, it was difficult to distinguish the questions and answers at a glance on many pages of Mary's interview. The pattern of conversation looked more like the back-and-forth nature of a casual conversation. It was not that Mary didn't have stories to tell or didn't want to participate, but she often seemed rushed. Her answers were brief and direct. It rarely felt like she was reconnecting with an experience. I frequently found myself asking a lot of questions to try to get a full story, and then to understand the meaning of the story to her. Several times, I ended up explicitly asking about the connection between the stories she told.

Early Learning Experiences

When first asked for her earliest recollection of a learning experience, Mary noted:

> *I do remember kindergarten, some things you know, learning - - and I guess I remember because my daughter is in kindergarten - - my kid is in kindergarten and I just can't believe the things that they teach in kindergarten now compared to when I was in kindergarten. I definitely remember learning my ABC's, my colors, my shapes - - and I remember being in kindergarten, some of those days and um you know, compared to now they are learning how to read and ah you know, spell and sound things out.*

When asked if there was a particular story or learning experience she could recall, however, her memories turned to life experiences: the substitute teacher who "scared the heck out of me" or playing house with a boy in kindergarten. She had interesting and varied experiences (I led the class in a song and taught the class the hand signals, or I took cooking and was able to help out at home.). However, she didn't seem to recall how or why she got involved; neither the process of learning and nor the lessons learned were the salient issues.

Learning became more central when Mary reached her college years. A field placement experience in college was clearly a major learning opportunity.

> *"you would really actually get to see what you learned about, you know and actually get to practice because we didn't get to do like psychology or any kind of counseling or anything. So we could actually see the behavior or the complexity of the mind in these people that you could only read about… So you got to see - - you know, and things that [patients] would say - - made sense to them obviously, but didn't make sense to us, but then the counselor would meet with us, the doctor or the psychiatrist or whatever, would meet with us and kind of do this history, a profile on the person and then you could see how some of the stuff they were saying and [the doctors] know it could come up as totally crazy, how little - - [the patients' stories] had some reality to it, but it was just either distorted or - - so it was just very, very interesting - - things that I was able to learn from that that you could never get from a textbook. So it was all hands on - - you know, ah first-hand experience you know that was very, very helpful.*

Another learning experience that appeared to be equally compelling to Mary was described as an "aha" moment, when she was able make sense of all her religious teachings, and figure out what religion meant to her.

After discussing these learning episodes, the conversation shifted to skills that she hadn't been able to master, and that she avoids to this day.

Current Incidental Learning Experiences

Mary readily provided a story of incidental learning in the second interview:

> *Certainly most of my learning is more about the bank as a whole, you know like maybe about a department or a business.*

As we explored this, Mary described two types of incidental learning. One aspect of her learning involved the realities of the business.

> *- - a line of business or - - and I will generally will pick things up and um, because I attend my customer staff meeting…But I also learn by - - you know what the businesses are doing, like what they are trying to achieve, what their goals are at the [company]…like one of the areas that I support is security and the amount of compliance, not only the compliance of banking, but the amount of compliance that they have to um meet up with in security business is unbelievable - - just learning about you know, what they have to deal with and you know - - it almost becomes a business of its own…there are so many things you have to look out for and be careful of and make sure you know things are you know, being looked at in a certain way from a compliance standpoint.*

The other aspect of the experience involved applying the theoretical rules of human resources to the ambiguities and realities of a business system. At the end of the day, the job needs to get done. Mary put it this way:

> *generally by going to those meetings I will learn more about their line of work, the challenges that they have to deal with. You know, because my role is Human Resources so… in my mind I am focused on a prescribed method sometimes (laughter), but I - - it is nice to hear what they have to deal with and the things that they are up against and the challenges and all of the business things that they have to deal with, because it gives me a better perspective on - - it is not just clear cut, you go and you do this or you do that because there are other things to*

> *consider…I was sitting with the Manager and I had my own mind on - - it was very clear cut in my mind that this person [should be fired] because of the past behaviors that were going on, and then when I heard the Manager talk about his need to um really have to - - not tolerate her, but work with her a little bit more because of the expertise that this person held that nobody in the business [had]…So it was a learning process of what it is like to be a Manager out there in a business instead of just this Human Resource person coming in and saying, "This is what you should be doing."*

Interestingly, Mary's stories of learning seemed to be episodic – once again the emphasis seemed to be on the *experience*, the understanding of the learning was fuzzier and needed to be drawn out. In some cases, it the extent of her learning was unclear. For example, Mary attended open management-level meetings intended for sharing ideas and became fascinated with hearing how the executives think, looking at issues from a broader perspective or from their customer's perspective. When discussing these meetings in both the second and third interviews, she described the learning as follows:

> *…they would always talk on a very broad perspective which I always liked to get out of my little world and hear things from a broader perspective. I just like the way their minds worked. Things that they would talk about. I liked the exposure to the kinds of things that they would talk about, the broader perspective, the bigger needs. I just like to be exposed to that so I can learn from it.*
>
> *INT: Can you think of anything that you did learn from those in particular?*
>
> *R: Just some of the things that they'd think, that they would talk about or think about, I would just – I never would have thought about. … But I – they just had a whole different frame of mind, a whole different way of thinking, and it just makes you look at things differently or opens up your way of thinking to a broader perspective too.*

and

> *…If they [have] an HR need, they'll call whoever that person specializes in, and but they'll also work very closely with the businesses. So it was nice to hear the perspective of what the HR needs were from that level, from then work so closely with the partners, with their customers.*

In a later interview, when asked if she looked at things differently from attending these meetings, she mentioned that the meetings became closed and she couldn't attend. The

experience, however, was what she kept emphasizing. Her learning seemed to be an awareness of a different level of thinking. Perhaps she learned and applied the information at a more tacit level, but I believe that it was too new or too different for her to integrate into thoughts or actions.

The last incidental learning experience that Mary mentioned related to developing computer skills:

> *Well I guess - - um I have become much more computer savvy because of being in the job, where I didn't need to learn about computers, but just because of uh - - oh yeah! Here is one thing. (Laughter) Um we developed a workshop from employee relations, actually two of them, but one in particular called nipping in the bud, progressive discipline and guidelines and you teach Managers how to um consistently um address performance issues early on so that it doesn't go on forever. And we just didn't have the manpower to get it on Power Point and every time I needed something changed I had to sit with the person and show them what I needed done. And through watching that person make the changes and sitting with them enough I was able to pick up how to do the thing, and now I do it myself now.*

Of all those interviewed, Mary had the longest tenure on the job (over 15 years) and at her company (over 30 years). Mary related her tenure to her learning:

> *The problem is, in my own um - - in my actual field of employee relations um - - I am at a point where - - well I am not an expert, but I have gotten to the point where I am pretty um - - I am pretty well versed in the different things and um - - so the only way to learn is to go to a course, but generally it is more a refresher for me than it is learning anything new, so kind of passed down in learning anything new in my actual field. So I would have to be learning in other areas of - - you know of Human Resources.*

In the last interview, when asked the role of learning in her life, Mary replied:

> *I guess it's more subtle now because my life is so full and so busy, for me to sit down and take the time to try to learn something, I don't have the patience or the time right now. I think that a full life with five kids and [a job that is] almost full time and just a lot going on.*

Nonetheless, her love for psychology – for learning how others think, feel, and react, was clearly a passion. When specifically asked about that, Mary replied:

R: Well learning how people feel, it fascinates me how people react. How people think of things. You know, how they can be so – you know from their – in their world. You know, everybody has a different perspective on things and you just – it's always fascinating how different people have different perspective and sort of learning a lot about the nature of people and kind of predict how they may act or think. You know, that kind of thing.

INT: Is that an ongoing learning or is that something for someone in your field who – not that you know everybody but that you get to know kind of what to expect?

R: I think that's ongoing because the more you deal with people the more you – you build on your experiences. That's something you can always use as a foundation of, you know, your experiences. Of course something new always comes along. Something you thought, just when you think you've seen or heard it all, something new will come along, right? But basically you can build on your experiences and continue to learn from your every day experiences in the field.

Earlier in that interview, we'd talked about all the learning involved in having a large family – an issue that a colleague had raised. Mary mentioned that she had never thought of it from that perspective, but that she had definitely learned by trial and error. She went on to say:

INT: Do you like learning that way?

R: By trial and error? Well it certainly stays in your mind a lot. It's really ingrained in your mind what can happen, you know, if you don't do the right thing. I'd prefer to know the right way to do it and then if you have little errors then that's okay. But that was kind of – I felt for me that was kind of – I would have liked to have known a little bit more. I would have liked to have been a little more prepared I guess. But you don't know what you don't know until you learn or until you experience it and then you know what you don't know and then you can look into it. So – yeah.

S6 - Rasa

Rasa moved to the U.S. when she was about 18 or 19. Since she has been in the U.S., she has learned to speak the language, earned two degrees, become a human resource professional, and started a family.

Early Learning Experiences

When asking participants for their earliest recollection of learning as a child, I was often greeted with a pause. For some participants, this took them back almost 30 years; for many participants, it was much longer. For Rasa, this was not an issue. She was full of recollections, and her stories flowed easily. Her early learning came from interacting with the world around her. Visits to relatives opened up a new world of sights, textures, and experiences, along with an introduction to different lifestyles. Her early years at school offered a mixture of positive and negative learning experiences, depending on her success or failure in a subject – and depending on how the teacher handled it.

As a young teenager, Rasa's world expanded further. Travel to a foreign country opened up her horizons, sharing how and what people in another country ate, and seeing new sights and sounds. Travel was costly, but her family emphasized the importance of being aware of the world beyond her country.

Rasa's later learning experiences included the transition to a foreign country. Watching children's television helped Rasa learn and practice the new language. Extra support and attention from college professors helped her overcome her frustration of feeling isolated by not knowing the language, having a job, or having friends. "*I loved that college*," Rasa said, "*and that's why I love going back and being a part of it*."

Rasa interwove her learning experiences in and out of school. Each type of learning was equally valid. She was clear as she relayed her experience and clear as she highlighted the learning gained from the experience.

Current Incidental Learning Experiences

Once again, Rasa's awareness of her learning is immediately evident. Perhaps this is because she spent time between our first interview and our second interview thinking about my definitions of incidental learning. Perhaps it is because she is a new employee and very attuned to all the learning involved in a new job.

> "*I'm pretty new here, so every meeting, every movement, every discussion, every e-mail is a learning opportunity because [I'm] trying to learn about the day-to-day tactical aspects of work, but at the same time learning about the culture, the political aspects of things, and the role that people play*."

While focusing on incidental learning, Rasa's first story, once again, highlighted her attention to the world around her. Discussing a meeting that she attended, Rasa briefly described the topic of the meeting. Her learning experience was broader and richer than the topic on the meeting's agenda, however. She began to learn about the relationships between two departments. She watched – and later validated – other participants' response to the speaker. Moreover, she related these experiences directly to her own behavior,

> *I guess the next time I am in a situation like that, I just want to be very cautious about my own behavior [to make sure that I am behaving collaboratively]*.

As with her early learning experiences, Rasa's examples of incidental learning were varied. In her first weeks on the job, much of her learning was incidental.

> *What I was thinking about was the first few weeks I had a lot of informal one-on-one meetings with my boss. And I would ask her one question and she would talk about 5 other topics too because one topic related to the next. So at the end of the meeting, I would know a lot more than what I anticipated.*

Moreover, as Rasa works on HR (Human Resource) projects, she describes how she is learning the technical aspects of the insurance business:

> *Just assimilating myself into the organization, talking about for example… I [am] in HR so we talked about people's performance, their competency, compensation, development, everything that deals with individuals. But as a result of having*

> *those conversations, I'm feeling like I'm learning a lot more about the auto and homeowners insurance because once we talk about somebody's business goals, how did they handle it over the last year?*

and the business needs of her company:

> *As of right now we have a lot of priorities in hiring and staffing. So as we hire people, where do we place them? What are the priorities of the business? Which team is in need of having like the first 5, the most experienced hire under him? Then there are talks about people's movements and, "This part of the organization needs a lot more help as a result of this business challenge, or that business growth." So it is working with those individuals, that population, but the topic could be different depending on what it is we're trying to solve for. Sometimes it's a matter of, "Oh look at the market. You've got to be concerned about the tension issue. So why is it a challenge as a result of talking about why we need to keep somebody. But then you are still learning about this is what's happening in the market. And here's what is happening with your competitors. And here's the business." And all those side learnings as a result of talking about a human resource. You start learning more about the financials of the organization, the picture of the market out there, competition.*

While Rasa doesn't attempt to specifically look for this type of information, once she has this information, she finds ways to use it.

> *Oh yeah, always. That information is used on a daily basis. In an organization like this or an industry like this, competition is pretty strong. Everybody is doing a great job so in order to be able to compete or maybe advance in comparison with your competition, you maybe want to have certain advantages that they can copy. So on a daily basis everything that you do or touch, utilizes some of that education and learning.*

Rasa also finds that she is learning a lot about the culture in her new organization:

> *I came from a culture of voicemail and interest in meetings. And all of a sudden I was reflecting back…. "OK, I'm not getting a lot of calls from voicemail. So this place, the culture is a little different. They're much more e-mail oriented…..And I wasn't used to that because I was coming from a culture that voicemail was the way you lived and you got a call back within an hour or two... OK this is different. In order to be productive, you kind of need to find out what works for them. And then meet them in the middle somewhere. So it's another learning.*

More evidence of Rasa's learning orientation came at the beginning of the second interview. As always, I started by giving the participant an opportunity to share any additional

thoughts they'd had since the last time we met. Often, the participants said they'd been too busy to really have a chance to think about the interviews. On occasion, a participant mentioned that he or she had an "aha" experience where they were able to understand incidental learning more completely after they recognized a (potential) incidental learning experience. Rasa offered a different perspective; for her, the learning was more central:

> *Every time I feel like I'm learning something new and learn about some formal or informal training that gets me to be more knowledgeable about this place, I think about your project.*

A common thread in Rasa's learning is her application of her knowledge. For example, when Rasa was asked when she was aware that she was learning about the company and the industry, she replied *"when I was able to be more effective in my role."* Similarly, she used her new knowledge about the culture of the organization to change her way of interacting with other employees. She used her learning experience in the HR meeting to identify how she would want to conduct an internal meeting. Moreover, Rasa's new knowledge was typically validated by multiple sources, or over time. Rasa often made an assessment based on her professional experience, but would check it through a variety of other sources.

For Rasa, learning equals experience. When asked about the role of learning in her life, Rasa offered the following:

> *In one word, now that I'm a little older, exciting. Sometimes I actually think about that. I've had obviously many changes in my life, going from one culture to the next and different stages of my life. What I think about is how boring life would be without all these experiences. So I guess I would probably say learning equals kind of experience. Maybe not the right kind of terminology, but learning something new is just so exciting and energizing. I periodically think about how much of life I miss not being very close to my family members. But then the only way I calm myself down is to say, "Whoa! Think about what I've been able to explore and learn and experience. What a more exciting life it is, versus what it would have been if I had not included all this."*

S7 - Mark

Mark had an incredible memory for names. Through his professional and civic activities, he has met many business and civic executives. He is just as likely to remember the names of his childhood friends and teachers or co-workers from a job he held 30 years ago.

Mark loves people and networking. It appears to come naturally to him, and he avidly pursues and improves on his networking skills. Mark sees himself as more of a sales, marketing, and business development professional than he does a human resource professional; he entered human resources "through the back door," using his sales skills to identify and bring in new business.

> *[I really like what] I'm doing here where you're providing more of a softer product if you will, management developer or individual development counseling the type of products that make people better, that make organizations better or make them more successful and more profitable, those kind of things. That to me really works because you know, you're really helping the organization and probably people, people to become better, be more satisfied with what they do so it has a kind of nice feel for it rather than selling somebody a hundred and forty work stations or something.*

Early Learning Experiences

One of Mark's statements in the first interview summed up many of his learning stories:

> *you're always learning because you have to be where you have to keep your ears open, see what's going on and observe. And or reject, if you think something is good you deal with it, [if] it's not quite where you're going, discard it and go on to something else.*

Mark's recollection of learning came from the day-to-day observations that he made about the people and events going on around him. He learned that water expands when he left a glass of water outdoors in the winter. In grammar school, he learned how about friendship and

> *"you learn the people you're going to be friends with because they respect where you're coming from and you know, nobody's going to rat on each other, you know, you're going to be there. I've got your back – that's the expression today…"*

He learned to use a camera by joining his buddy at a class. He learned to play golf from a pal he met on vacation. He learned about German food and his heritage on family trips to New York City at Christmas time. When he was a bit older, he learned from a "city cousin" how to navigate the subways of New York City. In fact, many of Mark's stories of learning in his childhood revolved around broadening his experiences and insights. Whether he was describing his first plane ride on a jet, fishing and living on a farm, learning about alligators and the intercoastal waterways, or helping his younger siblings understand the impact of the death of a relative, life was an education for Mark. In his words:

> *Fortunately,[I] have [had a] really interesting and a full life, up through now so with my family then and now, with my wife and kids, grandkids, we've been able to do all this stuff and experience a lot of things.*

While I don't disagree with Mark's assessment, he does seem to be blessed with a good and full life, I also noticed that he was a close observer of all of his life's experiences. He relished each story he told -- from the frozen water breaking the glass to renting a car and seeing the Norwegian countryside when he was stationed there in the military. While he didn't consciously describe it as "learning," he was constantly trying to observe, understand, and grow from his experiences.

> *I think it's a, I'm what's called a semi-conscious project and I'm not really focusing on [learning]. Maybe after the experience is done, I'll reflect on it but I don't really consciously go in to try to do that…It's just like, I guess, an example is when you go to a like a performance, be it a piece of music but more particularly a play, or a musical or whatever it might be, and you know and it could be a wonderful production and you enjoy it and it's great. And you leave. Or it can be so magical that at some point in time of the production you really develop a feeling for the characters and, as I say, you know, you get pulled in, pulled across the footlights into the show and you really care about the characters in the play. And we've experienced that in a number of shows that we've seen over time and then we see some other shows where they were terrific and got great reviews and very nice. So I think that kind of example really is how you look at some experiences you go through. Some of them are whatever,*

> *superficial and there's others really impact who you are, what you become or how they influence you because you really get pulled into the action or you are pulled into the experience so really it creates a substantial impact on your life that you remember very distinctly and again, keep [the lesson] for whatever it's worth going forward.*

Mark came from a very musical family; music has always been an important part of his life.

> *Well, I mean, I was always pretty inquisitive because I was an only child for 7 years. And so I was very musical, still am. And I really enjoyed learning about music…about all these instruments and the different sounds that they made and how they all came together at the end to play a piece of music. So that was kind of fun…But so in learning about music and just learning from adults, my aunts and uncles who were around me and my cousins. That really always was part of my existence.*

Mark plays four or five instruments. He played in a college band and folk group (with many of the famous names we know today). He has been active in singing groups throughout his life and currently sings with a major symphony. Nonetheless, his learning experiences were not expressed as hours of lessons and practice. Learning music also seemed to come as an experience of observing and participating in life.

> *Yeah, I only took six months of clarinet lessons when I was in the third grade or something like that. You know, everything else was really self-taught. Not that I'm any good but I'm good enough to get by. And I mean, so I can contribute. I can play; I can somewhat read music…But as far as instrumentation is concerned, my friends at [college] basically taught me that once you have the rhythm down you go from there. And bass fiddle was essentially kind of learn it on your own. There's only four strings and so you can't go too wrong, you know? And the drums are just keeping a beat and piano. You know, I don't play the piano correctly but I play it so I can back up people you know. It's fun. I enjoy it.*

Current Incidental Learning Experiences

Mark's incidental learning experiences at work can be summed up as follows:

> *there really is learning on the job and when you've been in the business as long as I have you really …[get a] little gem from every particular call that you make that can work the next time around.*

Almost all of Mark's incidental learning experiences came from his interaction with clients. For example:

> *Yeah, I met several years ago with a woman who was vice president of human resources for [a company] out of [a town in eastern] Connecticut. This woman had just taken over the position. She had come up from [a major city] to Eastern Connecticut…and this was a culture shock I think to her. Anyway I went into her meeting with a colleague and we had a half hour to meet with her. During that half hour she answered her cell phone three times, answered her office phone once and then got on the computer twice to check the stock prices of her company. I'm looking at my colleague, saying wow, why are we here? I mean it was just a bizarre situation. In the probably five to ten minutes of total time that we had with her in a half an hour, we had a chance to talk about what we're doing but it was just so bizarre and the incidental learning from that was I guess to clarify what's going on. I mean to the point that we had made the appointment to go out the day to meet with her, several times we got cancelled and finally the date that we had when we got out there, we were waiting in the lobby and her administrative assistant comes out and says oh, she thought this was going to be a phone call…We kind of rescued it but it was just you know, the lesson to be learned was I guess trying to qualify better you know*

During the period of time that I was interviewing Mark he candidly shared an incident that represented incidental learning – and a missed opportunity to learn. During the week between the first and second interview, Mark had a heart attack, operation, and an education about heart disease. He talked about it very openly:

> *Sometimes your incidental learning comes from making silly mistakes too and you say whoa you know, I'm never going to do that again. You know for me it was this last episode, at [the hospital] last weekend. I mean when I sat there and looked at all the books and listened to the nurses and the doctors I had many indicators you know for the last three or four months that were there but I didn't pay attention to them, i.e., some shortness of breath, being more tired than I felt, acid indigestion and finally last the last week sort of tingling sensation up until Friday when I felt discomfort in my chest, so that was all stuff that I should have paid - - I finally paid attention to it near the end and that's when I woke up on Saturday morning and said to my wife, you know, it's time to get some help here and so 911 and out they came…But now I know what it is, so clearly, I think anybody who, most folks who have had what I have had, you kind of revisit the being tired, the acid indigestion, the shortness of breath, a little tingling up the arm, finding that to say would be a pain in the chest or the back, you say, okay, that's how it all goes. So in the future, you're well prepared to listen for the*

> *cognizance of those signs going forward. So I would say maybe, that's certainly incidental learning.*

While Mark missed the signs originally, he has been actively sharing his knowledge and experiences with all of his contacts.

> *I let everybody know what happened to me because I would hope all of my friends and business colleagues and associates could learn from this themselves and say hey; if this happened to [Mark] it could certainly happen to me. You know so many e-mails I got back were - - you know [the CEO of an arts organization] said to me, he says [Mark], you've convinced me to start jogging again you know and let's eat healthy… So many people said let's go out to lunch and we'll have a salad so you know, I mean it's a lifestyle change and sort of you learn those things sometimes by getting whacked on the head too.*

> *You know, everybody processes things differently but I think we all need to be aware and hopefully, whatever happened to me, is a great wake-up call to all of my business associates whom I've let know what happened and my friends who I let know, too, and say, hey, listen, you know, just because you think you've got the world okay doesn't mean something finally can happen so you just have to be aware and listen to your—I always tell everybody—listen to your body. But I did, finally, but I didn't listen as strongly as I should have all along.*

Learning by *"being open to the world around you…the surroundings, the person that I'm talking to and what's going on…in the environment"* can be like learning from the internet – you can find almost any lesson you want to find; some will be vetted, others not. So I was curious to see how Mark selected and evaluated his observations. He told of two primary methods. First, he relied on his professional knowledge from previous experience. Second, if an observation or lesson was newer to him, he would check his perceptions with several professional friends and mentors – those who he respected from previous professional associations.

In addition, Mark's observations were never simply snapshot occurrences; it's an ongoing process of checking his assumptions. In fact, in one of his stories he talks about the learning that comes from

> *really try[ing] to understand the person for whom they are and you know what wonderful attributes they can bring to the table…they come in with a reputation*

> *but after you get to know them perhaps they're a little bit different than what their reputation is so you learn about them by spending a lit bit more time to get involved and really understand where they're coming from so I don't know if you would classify that as incidental learning, but certainly it's a learning process that's above and beyond what maybe other folks do.*

Engineers

EI -- Yang

Yang and I met at an IEEE meeting. A relatively recent graduate, Yang came to America to get his Masters and PhD A long time student, Yang moved to Connecticut about a year ago, and he had been working at his current job for about a year. He seems to enjoy his job. While he works in the most theoretical area of an R&D department, he finds the work to be a lot more meaningful than school, describing it as a lot more goal-oriented.

Early Learning Experiences

Yang's first recollection of learning came fairly quickly – a love of art. He took up art when he was very young.

> *"I don't know about engineering. I actually think I am more of an artist, an art person."*

> *"I love painting. You sit here and you draw or paint. You draw for three or four hours and you don't move and you don't feel anything. You just carefully focus on it and it is just like you forget everything in the world. You are so focused on painting and drawing. After you finish you just can't straighten up. You get stuck. I think it is a very good experience but I try to find that feeling in the learning of the other areas but it is kind of hard. It is like you are falling in love with that kind of work. It is very hard to have that feeling later."*

Yang's early learning included other hobbies, like singing (the family hobby) and kung fu that he was good at and that pleased him, but when Yang talked about art, he seemed to speak

with passion. Undertaken around age five to "fight back" against the ugly pictures his brother had drawn of him, he learned and practiced drawing on his own until the age of 14. At 14 he went to summer school for painting and found it a tremendous learning experience, learning from the other students and teachers.

'It's not like math or language you can learn by yourself."

As the demands of high school increased, the opportunities to paint decreased and finally stopped because he no longer has the time.

In his early years of school, Yang tried to learn how to be a good student by observing and imitating the good students. As he got older, he developed his own study habits and became a very effective student. Chemistry, physics, and math became his focus; with each subject being the focus of his interest for one year. The quality of the teaching seemed to be a trigger for his interest, but his learning continued outside the classroom. He checked out more advanced books from the library, worked with other students in the class to build small things (like radios) or talk about building larger things (like airplanes), and to help the other students in class.

Current Learning Experiences

Talking about his learning experiences as a child was easy for Yang. Identifying learning experiences in recent years was much more of a challenge, and the notion of incidental learning was baffling. Expressing doubt that he had any such experience during the first interview, Yang suggested we skip my incidental learning question in the second interview. I decided to shift the conversation to talk about his current learning experiences, hoping that talking about and thinking about learning would get a conversation going and the ideas flowing. His first response to the question of an example of a current learning experience came fairly easily:

> *Now, actually as I told you I'm in a research group so I try to learn a lot of things all the time because if you are working on some sort of projects and you don't*

> *know this topic, you still need to work on it so you have to learn. Specific things, like when I came here in August, I was assigned a project like a path planning to prepare a machine so you can have a better cutting quality but I don't have any previous experience on this topic so I read some papers and textbooks and I learned something and I worked on that. It is pretty good because you have a specific purpose. You have a goal so you can find relative materials so you can get familiar with these topics so you can start your work very quickly.*

Then, I moved on to the question about a current project or task that is most representative of the type of work that Yang does. Yang described a project that he is currently working on, an attempt to optimize the cutting process on the machines. In the process of exploring his work, he mentioned the brainstorming sessions that the research groups hold. While these sessions may, in part, attempt to develop solutions to the current problems, they are focused on looking at the larger needs and moving the company forward. Brainstorming sessions come in many forms. Sometimes they are limited to the immediate R&D group, and other times they include: the larger product development group, marketing, or members of students participating in university-corporate research efforts.

After exploring his work more fully, I returned to the question of incidental learning. Yang had no new ideas. I decided to gently explore whether there was an opportunity for incidental learning during the brainstorming meetings – just to see if I could trigger his recollections of incidental learning. In fact, Yang did have an example:

> *Of course because…[others may be] doing something you are not doing. So when we are together doing brainstorming or talking about projects, of course you learn something from other people. You just learn something, but you don't really use it. From talking, the talks that we had, actually you do learn something from other people….[For example, I learned about] cutter defect identification technologies because I have never been working on those kinds of topics. By talking I learned the technologies that they use on that project. Like they use optical method like an x-ray and laser things.*

Yang went on to say that each person typically works in areas that are their specialties,

> *"we stay focused on what we are doing because that is where we are very good at...other people are good at [their] areas that we are not, so mainly we focus on our own area."*

When Yang talks about projects they have discussed during brainstorming sessions, the focus of his talk is on identifying and solving the problem; he never identifies any learning that has taken place. In fact, Yang, who received his PhD within the last year, identifies the brainstorming sessions as an opportunity to use the information learned in school:

> *You learn based on your need or like in school you learn based on the requirements for the grade. You learn those things and then as I said you don't know what the purpose of this knowledge. Sometimes you know and sometimes you don't know. In the brainstorming session you use the knowledge and you come up with good ideas. I can actually use what I have learned.*

When discussing learning in more recent times, Yang identifies learning as going to school, doing research on Google or other on-line resources. In school, Yang says, you learn particular things because they are required. At work, he finds learning more enjoyable, because there is a need: learning is "purpose driven." You learn enough for the project you need.

Typically, my third interview ended with questions regarding the participants experience in their professional organization, particularly in regard to incidental learning. In Yang's case, I started asking about his experiences in general, avoiding mention of incidental learning. Interestingly, his initial answer included reference to incidental learning:

> *You learn from those people because they are older and have more experience and they have seen many things and they have like a good insight into the issues you have. Even maybe it is not directly related to what you are doing but it changes your point of view of these things like your view of work. I think it does affect me.*

Yang went on to describe some of the things that he had learned about the future of engineering, issues of immigration and engineering, innovation, and outsourcing from the speaker at a recent meeting. However, as we talked, he noted that this learning had not impacted him at work.

While Yang was able to describe some experiences that appeared to fit into the category of incidental learning, learning for Yang seemed to be best described as school work and research. Work, on the other hand was described as problem-solving that was based on the learning.

> *Actually we did a lot of tests before we came to a conclusion. Then we needed to think about it theoretically and experimentally try to verify that problem, and then try to find a way [to solve it]. I did experiments and I did a lot of simulations using the infinite elements analysis software. Then I verified it in both ways that there was a defect.…*It was an easy solution; I think it was a good one.
>
> *INT: So what would you say was what you learned from that experience?*
>
> *R: It is kind of hard because that was a project assigned to me so that is my job.*

EII – Zoe

Zoe is an upbeat person, she is an avid learner enjoying diverse interests. I met Zoe early in the process, and she was fascinated to learn more about my study and more than willing to participate. Zoe leads a very busy life, however. As she puts it

> *And for me, no matter what I do, it doesn't have to be my job, anything I do, I just give everything I've got.…and I do it because I get excited, it's excitement, it's passion.*

So she really worked to fit the interviews between her travel and other commitments. There was about a month between interviews, rather than the more typical one-week gap. While we took a few minutes to regroup at the beginning of the interview, we were still able to build upon the stories shared in earlier interviews.

I believe it was Zoe's love of learning -- and her strong desire to support others engaged in learning – that encouraged her to participate.

Early Learning Experiences

Zoe's parents encouraged learning from an early age

> *My parents were not educated with a mainstream education. It was like an elementary school type education. So they were very determined that my sister and I would get the education and change the path.*

> *So very early, very early, I remember she would get, my Mom would get, she'd go to neighborhood kids and find out what they did the first year in elementary school and then she would say, can we borrow the books for the summer? And we would have, my sister and I would have structured time to go over material. Then she would choose, my Dad would be very specific on that, articles, newspaper articles. Books that would be on the recommended list. It would be very informal and very ad hoc type, because they were not, as I said, educated.*

This encouragement of learning was a strong thread throughout childhood. Zoe grew up in a European country shortly after the war. Her parents were poor, and supplies were not abundant. Nonetheless, they found many ways to support the learning. For example, her mother would save the second layer of paper from the butcher shop and cut it up to create notebooks. They took the children to see Shakespeare in stage productions, and they had her apply her math skills to help in her father's business.

Reading was encouraged and Zoe loved reading. She would read newspapers and cut out stories on all types of topics, from theatre reviews to politics to socioeconomic issues. Zoe's godparents also supported her learning from a very young age:

> *I also was very fortunate, I had my Godmother who was educated and her husband was a lawyer, and they had a tremendous library at home. It was beautiful. They would allow me to go afternoons and sit in their library and choose and read any book I wanted.*

Zoe was introduced to algebra in her last year of elementary school and, in addition to reading, she started to love math. Once again, she had support from others.

> *So that summer before I started I went to High School, I had a cousin who told me, because all the kids were afraid of algebra, especially the girls, and so my cousin came by and she said "Congratulations, now you're getting ready for the*

> *new place, and she said I want to give you an advice. Don't listen to what people say, algebra is easy," because I was asking her: "Is algebra hard?" And she said: "No. Algebra is easy." So, I went and I got – because I was frequent in bookstores in the town. (slight chuckle) And I found a book that had like algebra problems, very elementary things. So that summer I remember I would just do different problems and learning, you know plus, minus, brackets, and very elementary algebra. So we went to go to, the school started, at least I was not fearful. Because someone told me, don't be afraid; it's easy. And so, I believed it. And also with the preparation, what I did. And so, oh my gosh, I was doing extremely well. So, um, the grades came and (pause) and uh, I was 13.*

Zoe went on to participate in advanced after-school programs in engineering and math in high school, interning in an architectural firm, and continuing to review construction proposals for her Dad.

> *So, and so I remember my Dad sat down and [told] me – what can you do with math and science is powerful, because anything in the world, this is where the world is moving. Technology and science and math , and he said: I want to tell you about this girl who is an architect in this town. She started in Germany, and she was the first women architect in my home town. My Dad knew her parents, and….um, everybody, the whole town was so proud when she came back from Germany, and she was the first woman architect in the town. So my dad would always give me that example. And he said uh, it would be nice, wouldn't it be?, if you wanted to be an architect or a civil engineer, and we can work together.*

Ultimately, Zoe's love of math lead her into electrical engineering instead of architecture, but she noted: "*So, I believe having role models and um it's important*." In fact, Zoe mentioned other women engineers and influential school teachers with whom she has maintained contact. However, it was clear that her love of learning was also a driving force. Whether talking about her early Shakespeare experiences, her first algebra lessons, her success with college-level math problems in high school, her work as an architect, or the summer math problems she did after a swim, she frequently and passionately said "I loved it!"

Current Incidental Learning Experiences

Zoe's interests remain rather diverse:

> *So engineering for me was almost like the practical aspect of the thing, to become an engineer. I find it very cut and dried, so up until today, I still go back to the things I did since I was young.*

Zoe was referring to maintaining her interest in theatre, reading, and tracking sociopolitical events. Nonetheless, it appears that engineering is still her main focus. She is active in national professional organizations, she is continuing her studies in engineering, and she is dedicated to her job. She also spoke a lot about how she related systems engineering – one of her specialties – to the legal system, educational systems, art and other aspects of life typically considered outside the scope of engineering.

Learning continues to be one of the things that Zoe is passionate about; she is constantly asking questions, exploring new ideas, and engaging in new experiences. She is constantly looking for connections:

> *I have been trying to tell [a relative]… can you imagine a legal system and you can apply systems engineering theory to legal systems. And I was showing to her some [diagrams]…and I said: (sounding energized) "oh my god, it's exciting…there are parallel situations there. I mean even, even the educational system, it's a system. There is an input, there is an output, right? There is some process. There is some tradeoffs that you have to do. The same thing in the technical thing. Right? The parameters may be different, right? But it's the same thing. Now in terms of literature that you are mentioning, not literature but art, um. I have a chart, and I'll send it to you that chart, what's the difference between an artist and a systems engineer, right? And I was telling an engineer that an artist knows already how to draw, right? The engineer knows already how to think technically. The difference here between an artist and a systems engineer is how the artist sees things – sees shapes, colors. While an engineer, it's how they are thinking; they are thinking trade-offs. They're thinking mathematical models. So then at the end, I said. So let's say the artist wanted to draw like a helicopter, would make this caricature, because we'd see this. While the engineer sees a helicopter as a hardware. So, if you think about it, there are a lot of parallels, and there are more connections and there are more similarities than differences. I just happen to believe that the associations may be different. Like the mathematician and the engineer makes models and uses math, while literature - you can structure a story and then the content of the story are the pieces. You put pieces in the system. (Slight pause and tone change) I know that's [crazy] maybe, but…(slight chuckle).*

Zoe interspersed technical/engineering learning in with her stories. She told of times when she was given lousy assignments and was able to turn them around, make huge contributions, and get glowing reviews. However, the learning she identified as incidental learning – and that, in fact, seemed to be incidental learning – all related to learning about herself or learning about others, even though some of her jobs had *"nothing to do with my degree."*

For example, her first work experience was in an area that was not directly related to her degree, and she learned a lot, noting *"once you have an engineering background, you can think things through."* The incidental learning that she shared dealt with learning how to supervise employees. For example, she learned that she couldn't give them all good ratings; she had to differentiate performance.

She also spent a significant amount of time talking about learning how to manage other people and learning about herself – and the interrelationship between the two. For example, she's learned that she'd rather work on the technical aspects of a project than on the human resource or administrative aspects. She is learning this knowledge to help plan the next steps of her career. Zoe has learned about "her limits" and doesn't like "babysitting."

> *The time you move from the arena from putting together some policy or some procedure, and then you start applying, um, and I learned that, um, I had my tolerance, threshold of tolerance who are not as driven or passionate about things, you know… I just found out that um, people have different levels of involvement… And I do it[get involved in my job] because I get excited, it's excitement, it's passion.*

In the process of learning her limits, she has not only learned more about herself, but she also learned more ways of working with others.

> *The more you push, the more resistance you feel. While if I pull back – and it's not the first time people tell me that – you know, the more I push back, it doesn't matter, I can turn blue in the face, it takes time. You can not…it takes it's own circle, cycle, um, so that, that, that's um the definite learning. (slight pause…And so, I don't know, I just like to pull back and say O.K. Let it be. You know, today*

> *we can achieve this. And so, that's the implementation is hard, to bring change in an organization…*

Many of these experiences come from the nature of her position – developing and implementing new procedures and processes. In the process, she has learned the differences between managing technical aspects of projects and managing people and their learning and the difference between working within a formal power structure and working to influence employees outside the formal power structure.

> *Once you move from managing projects, where the tasks are assigned and make the assignments, to managing people and their learning, it's almost like teaching, but in a different way. Because when I taught 4 ½ years in college, there was certain structure. You're the professor and you are supposed to be keeping some order and some structure, and I would be very firm, but then after people get to know me and they knew my limits I would then loosen up and I would be very friendly with students, you know college students and so on. In a work environment, I think, it's a little bit different. You have to be a lot more nurturing than in school, because these are professionals that are set in their ways. And they don't want to be treated as students, you know, so there is a delicate balance there…*

> *I've done project work; they come in with specific objectives. I've done well with this [but] I'd don't like the administrative aspects [of working with people].*

Perhaps one of the most interesting aspects of Zoe's stories was watching the progression of her insights. In the second interview, she identified her colleagues' resistance to change as fear, particularly for the longer-term employees who feared outsourcing, loss of jobs and so forth. As we started to explore this in the third interview, she had new and additional insights on the issue:

> *I also had someone who I had been mentoring and, um, and I'd been mentoring her and, um, I had been giving her advice, how to [accomplish?] things and so on. And she came back and she gave me feedback about how the perception, you know because she was in some discussion with some people, and it just hit me, you know like, I went "Oh my God" really this is the perception I give – like very hard treatment, very hard, and that gives me an idea that I –felt- but I did not want to admit or I did not want to…you have to pull back sometimes with adult learning. You have to pull back and let people make the mistakes, let people, um,*

> *come to the conclusions on their own, you know. So, there is some differences between adult learn and typical college-aged learning, and I think for me it's another opportunity learning about myself, and that's exciting.*

Zoe was a thinker. I believe she viewed her life through the lens of learning.

> *I can not imagine myself stop learning. I don't know what I would do with myself if I stop learning…I cannot imagine anything else, and it doesn't have to be technical learning, it doesn't have to be…learning about each other, learning about new things, learning about old things.*

EIII – Joe

Joe and I met originally at an engineering society conference. He was an interesting man and I enjoyed talking to him, but I wasn't sure how much he really understood about my topic. I thought the chances of having him participate in the study were fairly low. Nonetheless, I got his card and followed up with him. He had a busy schedule and wanted to make sure all he had to do were the interviews, but he participated in them fully. I'm still not sure if he understands my research.

Joe is an incredibly bright man. He works with computers, handling some of the lowest levels of programming. He is widely read in the sciences. Coming to the U.S. when he was a teenager, Joe is fluent in two languages and has a strong accent. He is fairly good at discussing his topic at a level that his audience can understand, but the combination of the complexity of his work, his accent, and his quiet voice proved challenging at times.

Learning seemed to be a subject that Joe was very comfortable with. He came up with stories readily. He was confident in the stories he shared and he seemed to enjoy sharing his experiences. While I had to ask him for clarification occasionally, he was always clear about the experience in his own mind.

Early Learning Experiences

Joe found kindergarten to be a very difficult adjustment, but after first grade, school *"became like almost a second home, basically."* Two aspects of Joe's early learning emerged. One, the teachers made a difference. However, most of Joe's motivation and learning seemed to come from an internal challenge. Subjects that were too easy or that didn't have a strong analytical aspect were boring or difficult for Joe. Subjects that engaged him quickly captured his interest and he avidly pursued these topics. For example,

> *In high school, for example, I was thinking of taking an AP class in calculus. At the time the teacher said, "OK, but we're not so sure you'll get [much] out of it." And it turned to be that the harder the subject it got, the more interested I got in it. In other words, the deeper it was, the more involved, the more I enjoyed it… it challenged me intellectually and [it challenged] my logical capabilities. And that always took me through whatever subject I learned. I don't know. It's been funny. It's been my pattern for some reason. I always like a good challenge. If I stay in a class, and the teacher is teaching me something when I could be reading a book or get someplace else, it just doesn't draw my attention, I turn right off. So that's me*

and

> *I started reading a lot of books in junior [year].. Which wasn't during the class. Like I all of a sudden I got an interest in aerospace engineering…I'd take a book out on the principles of flight. And what's the mathematics that say that wing can get lift and all that stuff? That's what I was into. Not into the "gee-whiz" part of it. I like to do something in depth. "How does it operate" kind of thing.*
>
> *One fellow who was an upperclassman, who was in my study hall class, saw me reading this book and he says, "Why are you reading this book? Do you understand what's going on with it? Why don't you read something a little simpler?" I said, "No, I like this book. I understand it." I enjoy doing that. I don't know why. But yeah, I do explore. And that was before the time they had the Internet. But I like to go out and look at books on different subjects that are outside of what I was learning in class. That kind of opened up a lot of vistas for me.*

Joe continued to go to school and also to independently pursue subjects that interested him. For example, in high school -

> *I was in biology class in school and it got me interested in the structure of DNA and things about how to approach things in biology. And I came across works in the area of biophysics, physics applied biology. And I found that kind of interesting. Using mathematical equations to describe what goes on in biology. Wow! And that got me interested.*

In college, he switched to a major in mathematics. Computer science wasn't really a field yet, and he hadn't decided what type of engineering he wanted to specialize in; but mathematics was the foundation for many fields. He took some engineering courses and one or two computer courses, but he obtained most of his computer knowledge on his own. The farther along he got in his education, the clearer he was about what he wanted to pursue and the more he focused on an aspect of that, leaving other subjects like biology – and after college math – behind. However, he also had less time to pursue his outside intellectual interests, finding he had to stay more focused on topics related to his core computer interests.

> *I was always obsessed with computers, computers controlling the real world. In other words, a computer controlling a machine, a computer controlling a motor. To me, the world of computer controlling bits and doing accounting and finance, it was like taking bits and turning them into other bits. It's like, your not interacting with the real world. I was interested in how to put it together. And I became gradually interested in robotics. And robotics transitioned into things that deal with the subject of artificial intelligence, which is like "How do you make computers smarter?" I almost took a leap in my thinking. Before it was concentrating in the mechanics of a computer. All of a sudden I thought, "What more can a computer do? Are there qualities of a computer that can be made to do more human-like'*

While Joe likes to take on jobs that allow him to expand his knowledge, for some time now, Joe has stuck with projects that fit into his niche.

> *I would describe [my niche] basically as anything that deals with interfacing a computer to equipment. Whether it be a simple application or sophisticated application. And that's my thing. Ever since I got into this field, what fascinates me is not so much a computer generating bits that you store as bits and used as bits and stay as bits. So the logical world looks – to me the power of computers is when you can link computers to something that lives out in the world.*

Current Incidental Learning Experiences

Incidental learning seemed to come from 1) his interests, and 2) the way he identified the projects. Joe's learning sounds remarkably similar throughout the years. His learning experiences all related to his technical, analytical work. His stories all related to some topic that he had stumbled upon, and then pursued independently. Some topics he pursued largely because he had a need on the job.

> *It depends on the situation. I go as deep as I have to go…but if I find the subject fascinating by itself, I dig deeper. Just because, "Oh that's interesting!" Let me find out more about it. What I'm thinking of for example, air conditioning is more mechanical in my mind, more mechanical engineering. And I can understand in general terms how it's operated. I don't get into the nitty-gritty of the design equations for air flow engineering. No I didn't go for that, because I don't need it for what I do. That's fine. If I need to learn more, I can get to it later.*

He described one time when he learned explored a new topic a little to meet his interests:

> *One of the things I do right now is I'm working on systems that monitor [the environment].. What do I mean by that? Things like electrical systems or power systems. ...So anyway…when I came in with it, it was like I wasn't expecting to learn as much about how power electronics. (Laughing) I wasn't planning to learn that at all, but I had to do the technology about it to understand how things worked and how things were set up in order to understand what I had to do with it. That's an example.*

One topic was so captivating that he switched his career focus. However, in all cases, he seemed to have some interest in the new learning that he identified. He was curious, and wanted to know a bit more about it.

> *My field was essentially software. More specifically, the way these systems traditionally work was an engineer learns the different programming language. Basically you learn a language, so I was working with the development compiler for this machine code.*
>
> *In the process, he stumbled across artificial intelligence, intelligent systems, and robotics.*

> *I stuck with that field. I don't do much with it right now, but I hope I'll have the opportunity to provide this technology; it's very powerful. Software technology is. So that's why it came about. So that was really purely by accident.*

EIV – Tony

Inquisitive. Hands-on. Satisficing. Looking at situations from multiple angles. Learning comes from succeeding, and from making mistakes. These were themes that Tony believed in, lived by, and that were interspersed throughout his stories.

Tony had no difficulty in talking and sharing stories. He was an active, hands-on learner, but he didn't approach his tasks lightly. He believed that many engineers spent too much time planning and too little time doing, but as he experimented he was always observing, questioning, reflecting, recalculating, and evaluating.

Tony was a good story teller. In both the second and third interview, he launched in with stories, once before I even had a chance to ask if he'd thought of anything since the last session. His stories were useful, and our interviews were interactive. While I always tried to be cognizant of my participants' time, all of Tony's interviews were long; he had a lot to say. His stories of learning seemed to bring back fond memories, and he seemed to enjoy reliving and sharing his experiences. He seemed to actively enjoy the process of learning as well as the results of his learning.

Early Learning Experiences

Tony was one of the participants who had vivid memories of learning as a child. When asked for his earliest recollection of learning something, he replied:

> *You know that is a good question for me because I remember a lot from being a little kid. …And, so, from a really early age I was always building things and trying to make things better. Basically my father was the type that if you didn't*

> *know how to do something, well he did it anyway. He was proud and - - if it worked that is all. You know he didn't know how to do this and he did it and it worked, and if it didn't work, you know you learned just as much or more…And even as a little kid I would give him ideas and he got a kick out of it. So that kind of like pushed me to give him more ideas, and I think that is something that you could learn a zillion different ways, whether you make mistakes or you do it right or you just don't say anything and you watch, you know, that kind of a thing. And I did a lot of watching and I was really lucky to have my father around, and that kind of a thing. And I remember - - I think it was like my sixth birthday or something, instead of buying me a toy he went to the lumber yard and got me a box of scrap wood and bought me a box of - - a ten pound box of nails - - and that was my birthday present, this big box of wood and nails. And I decided to build a raft - - that would never float in a million years, but - - and there was no water anywhere near me. But I had seen it on TV, so I just pounded all of the nails into the wood and called it a raft and - - and I was pretty young. But that is the way my father was. It wasn't like he was trying to teach me anything. He thought it would be a cool present for a kid. You know, kids enjoy piles of dirt and things like that.*

It's better to try was a theme through Tony's interviews. If it works, you'll have learned something. If it doesn't work, you'll learn something.

All of Tony's early learning was hands-on learning. As a child, he and his friends scoured the dump and found old electrical devices that they took apart and used for experiments – like trying to get a chair off the ground. A little older, Tony transformed an automatic car into a standard. He didn't know how to do it when he started, but he wasn't afraid to try. He still has the car today. When he was older and his father was sick and couldn't open the garage door, he was told that the garage design wouldn't allow for the installation of an automatic garage door opener, but he found a way.

True to his main message – that you learn from successes and failures – Tony told me stories of his less-than-successful experiments. *"I remember building a few things that I fell on my ass and hurt myself because I didn't build them good enough, and I guess that is a good learning experience too."* For example, there was the attempt to build a fire engine using a forty pound ladder on top of a ten pound wagon.

Building, electricity, and cars were woven throughout his stories. In fact, he told me, "*anywhere I've gotten in engineering I have gotten from cars.*"

> *I got my first car when I was eight years old, and the way that happened was my brother had a junk car and my father told him to get rid of that junk car. And the next weekend my father said, "I told you to get rid of it! It is still here." "No. I gave it to Nicky." He gave it to me when I was eight. I had a car (for a clubhouse) and um we used to just take parts off of that. I didn't know what they were, but I learned how to use tools. And then I got a job in a body shop when I was 16 and I got my first car - - drivable car (laughter) when I was 15. And I have always been into - - you know I am a little bit of a gear head. I have always been into cars. And then when I went and got my first job at - - out of engineering school it was for biomedical engineering and I went in for the interview. I thought I knew a lot because I just got out of school - - and they started hitting me with some questions here and there and biomedical was kind of new to me. The reason I got into that was my father was sick at the time. You know he died from a disease where he was sick for a long time where we had him home. So I learned a lot about real life biomedical engineering. And I went for a job at this hospital and the interview just wasn't working and then we started talking about cars, and they were really impressed that I knew my way around cars. And then somebody came in, "Oh, since you know cars let me ask you this question." And I told them, "No. Don't go to the mechanic. This is what you do." And, so, they hired me on the spot. tell them - - you know you will ask them a certain size bolt and they might know it from a drawing number, but when they pick it up they don't know. They couldn't tell you what size bolt it is that they pick up. Two totally different fields, but anything to do with hands-on materials really helps engineering. It just gives you that real deal feel.*

Tony got great pride from his successes. His failures appeared to pique his curiosity.

Current Incidental Learning Experiences.

Tony shared stories of technical and managerial experiences with incidental learning. There seemed to be a formula to Tony's incidental learning experiences.

Past experience + (experimentation and reflection) = outcome + learning

> *[We had a lot of problems here with the TASK module] when I first started and I kind of got - - you know this was my - - you know getting tossed into the fire and it was months late [being released.]… everybody was running around scattered saying, "You know what? We have to solve this before the end of the week. It is a major thing." And I didn't know enough. I was you know - - kind of - - I didn't know enough to realize how big a deal it was so I kind of ah took it low-key. Well*

> *this is a problem. You keep working at it until you get it fixed. And, so, in my ignorance I didn't throw all of the resources we had at it at first. All I kept saying was, "You know what? Um from what I understand this is the first unit like this that we got. If we fix - - like this one problem that we are seeing and send it out that would be a terrible thing if we find out there is another problem right behind it or related to it. So we should do a full test of it." And everybody kept saying, "No. No. No. There is no time for that."... So I was ignorant enough to not agree with everybody else and said, "Okay, well it has to go out. Let's just fix this problem and send it."*

Tony went on to reflect on how he would handle the same situation now that he has been at the company longer.

> *So you know what? If I had been here longer and went by the same[troubleshooting] procedures [the firm always did I think we would have had this problem on every unit. We would be tweaking, fighting, and then we would probably have to go out to [Country X] and change the software on the original [TASK] unit. So - - sometimes like taking a step back or being you know peacefully ignorant about something like that - - you know you have got to go with your gut feeling… I know for a fact that [were this situation to recur]- - the same people would be telling me to hurry it and rush it out the door…but my gut feeling would be to push back and get as much - - you know I might accelerate the testing a little bit or ask the guy from the vendor to come in a few days earlier than I did because I was waiting for us to solve the problems before we called him. So I mean there were lessons learned that I could probably shrink the process down, but would I ignore - - you know would I not just do that process where you are learning and fixing at the same time? Hell no! If the long run is going to - - you know you have got to weigh it, but if the long run was going to help you know more than hurt I would.*

The way Tony framed the technical problem resulted in incidental learning; he learned a lot about the equipment, how it worked, and what didn't work. The way he reflected on the experience also resulted in incidental learning about the best way to succeed within this company. He learned a lot about the styles, personalities, and processes of the leaders, and he learned how he could proceed in a way that balanced the short and long term goals.

While many of Tony's stories were of the technical nature, he also told other stories that had strong managerial or process lessons.

It is kind of like general learning, but the way this company works, like you get hit from all angles like at - - you know any job. You have got to take care of - - you have got to wear a lot of hats sometimes, but you have also got to deal with a lot of different people's requests. So I started getting into this thing of you know making a list - - and you know sometimes it is - - you know I go back to the list and then I started putting the post-it's up on the wall and everything to try to organize and prioritize. And I did that five months and I have gone through every way possible of trying to organize my to do list and I came to the realization last week, and this was just some - - maybe it is management learning. But I came to realize that if I just do the things on my list the problems really don't get solved. You are always just kind of like putting out fires, things like that. You are going back and either putting a band-aid on something or fixing it after there is a problem. And I realized if I just stick to my to do list it is not good for me; it is not good for the company. I never get to the end of the list and I never solve the root causes of the problems because I am just working off this. So I didn't toss away the list, but I ignored it for a while.

And I started realizing that I was thinking out of the box better. You know it was - - starting to play around with you know creative solutions for things. And sometimes you know you put blinders on when you look at a problem on a piece of paper and try to come up with a solution. And then if I have a list that somebody came up to me, "Did you look at that problem again?" You know what? Because I ignored it or blew it off for an extra day or something I found out another problem that related to that - - and you know maybe I could come up with a solution that solves all three problems at once. And I wouldn't have done that by working one problem at a time or even formally working off the to do list. So I kind of broke out my way of thinking a little bit from what I used to do. And I don't know. I learned something about - - you can't always do something just that concrete, like put it on a list and cross it off the list when you are done with it. Sometimes you have got to relate the whole job as a conglomerate of all of these problems coming together. And since you work for one company where a lot of the problems are related I guess certain - - at least in my job, it really makes sense that a lot of these problems can have multiple solutions that might solve multiple problems at once. That is something that came up.

Tony's practical experience has always proven to be ultimately successful for him. Inquisitiveness and perseverance appear to be two ingredients to that success. His ability to accurately reflect on his experience, to ask the right technical and practical questions, appear to be equally important ingredients.

EV – Peter

Peter always thought for long periods of time before he spoke and while he answered. His answers evidenced reflection on the question or experience at hand. It took some time before I could get the rhythm of his thoughts. I spent some time between the first and second interviews reviewing the tape to understand that rhythm. At the beginning of the interview, I was "breaking into" his thoughts too soon and cutting him off. By the end of the interview, I was doing better at providing sufficient time and was better able to gauge when his answers were completed. It was always worth the wait, as he had always put a great deal of thought into his answers, it was almost as if he was reliving the experiences, putting himself back into the time or place that he described.

Early Learning Experiences

Many of Peter's early stories of learning were rather vague.

Bicycle, I suppose that was significant but then when I was about six - -

INT: How did you learn to ride a bike?

R: I was at a cousin's house in the country and I sat up on a bike and of course we hardly remember the details of these things

and

I suppose using a saw and cutting wood, I must have learned that somewhere too.

and

In the fifth grade I started playing the trumpet. (pause) I can hardly remember any particular learning experience in relating to that; probably because I had a better idea of what it was supposed to sound like than most other kids. So it was quite easy for me.

And the list continues. Peter recalled skills, knowledge or abilities that he had that must have involved learning, like building fires in Boy Scouts. He also recalled things that helped him learn, like hands-on learning opportunities. But he didn't have any recollection of the process or experience of learning. Later on, when asked when he realized that he was learning about a particular problem, Peter replied:

> *I can't really think about (long pause) learning (long pause). Learning is almost in the instant you get into something, it's the process of sorting out what's going on. The first thing you do is gather information about it and start to try to assimilate it and organize it in a way that it begins to make sense, and that points to what is actually happening. So it's basically the moment you start actually (pause) investigating.*

Many of Peter's stories of learning revolved around hands-on skills and activities: building ships from scraps of wood, building campfires or chopping wood in Boy Scouts, and learning to use tools with his left hand when his he broke fingers on his right hand. In fact, he described it as his "fingers would learn."

> *I have a little trouble learning. Some people seem to be able to learn just to pick up a book and read it and they've got it...I need often times to do some practice and something like that. In the Navy I was in an all Naval Security Group and so we had all these cipher locks on all the doors and my fingers would actually learn the combinations. I completely forgot what the combinations were, and when I got to a given door, my hand would do the thing and I would go in and if somebody asked me what the number was, I would have to go in the door and I have to watch my fingers cause I really [think like that]- - and those things change every two months?, something like that. So it wasn't like I did it once and then remember it forever. You know I think I would have a couple of tries and then my fingers would have it.*

This hands-on learning proved very useful for Peter's days in the military. The equipment that he was trained on was not typically the broken equipment that he encountered in the field.

> *I went in the field and then just me and an Army guy and we were responsible for the teletype basically on-the-job training, basically observing the function, and trying to discern what wasn't working, how it should work, what wasn't working,*

> *what was necessary to fix it…I'm fairly visual in mind so for most things I kind of construct a model of it. That's pretty much where I started that; probably where I started more doing that….Although, I did a lot before then and now - - [I] may be more visual than some people.*

Another area of learning for Peter related to making sense of his family and learning to navigate family dynamics. These issues were interwoven with any of his other experiences, but they were also raised as independent learning experiences.

> *My father was infamous for showing me how to do things but never letting me do it…Yeah, I probably learned that if I wanted to learn something that I wouldn't tell him and just try and do it (chuckle).*

and

> *Of course during that period I had spent a lot of time trying to figure out my father's situation. At this point I look back on it he was basically subject to mood swings and depression…I think initially [my] focus was probably to try and find a way to rationally work out the issue, but in the end it wasn't really resolvable in that way. And for me the break through was simply being able to just externalize it as not my problem. (long pause) And ultimately getting out from under it some… I think the learning occurred when I'd find connections with other things that would validate some idea [of what was going on in my family].*

Perhaps one of the most interesting stories came when I asked him to elaborate on his "normal learning experiences."

> *Probably the first complication was poverty when I was, I think the car had broken down or something and I went to [a classmate's] house. It was this little one room house and a fellow in my class lived there with like five or six other people. (Pause) You're just not conscious at school. Everybody dresses the same. Behavior... necessarily people are different backgrounds so you don't really you know consciously - that might drive differences…I think it made me more aware of differences. I wasn't much aware of the differences at that time. My father was a teacher, and he had trouble getting tenure so we weren't prosperous, but we weren't poor. We just seemed to be about where everybody was…At some point I think I was sort of conscious of maybe why my tennis shoes got stolen.*

This experience stayed with Peter, impacting his awareness of class relations in society and impacting his actions when he was relating to the local populations of foreign countries who were working for the military.

Current Incidental Learning Experiences

Most of Peter's incidental learning experiences relate to solving problems. *"Any problem results in some learning I guess."* Many of his work problems did result in incidental learning. For example:

> *Gosh I'm always learning all the time and it's somewhat incidental (long pause). I had a problem last week with a um circuit that wasn't uh performing correctly so I (pause) I was suspicious of where the problem was but I learned that the uh manufacturer changed their die. It's no longer (long pause) - - they as recently as a month ago confessed that this part of it no longer work with all the old parts. That's about the easiest, nearest answer to that…The processes that they used to make them I.C.'s keeps getting smaller and this thing had been around for ten or twenty years and they could no longer find anybody to make it in the old process, so they redesigned it. They clearly intended it to be a hundred percent the same as the old one, but something didn't work the same.*

The core incidental learning incident that Peter brought up was that there was a new circuit that worked differently and impacted the project. However, Peter went on to explain how they did experimentation to find "work-arounds" to address this problem. In the process, they found several possible solutions and developed a better understanding of the nature of the problem.

This learning was very similar to some of his early learning. He was learning by approaching the problem from multiple directions: getting information from the manufacturer, working with hands-on trial and error processes, and creating a visual model of the problem in his mind.

In addition to describing engineering problems of this nature, Peter provided incidental learning experiences outside of work that impacted his workplace learning.

> *Mostly the (pause) train hobby in terms of things but (pause) working at Gerber has been my first exposure to machines that control motion and momentum and all that is involved in that, and certainly the minimum is involved in driving a vehicle or skiing. So I have a more, I'm more conscious of the fine points of acceleration from skiing and also I can see how it relates to moving something some distance and moving something where it's solidly connected is pretty obvious. But if you have a rubber band it can move through things which you always have to some extent or another then how do both ends behave as they move together more or less, but one moves and the other one starts to move.*
>
> *[The impact of rubber band relates to cross country skiing] in terms of the direction between you and the skis and the rest of your body and all that. (Long pause) That is certainly something I would learn by -- taught in school to an extent, but not the practical aspects of you've got a motor, you've got a belt and it drives something else and (pause) you know where the motor is, you don't know where the something else is but that something else is what we trying to control; stretch in between those two. And the relative size of those two objects can effect your ability to do it without vibration.*

Peter goes on to describe a machine that had stability problems in the motor when it moved. He described the inertia and the relationship between the two parts of the machine that were, in essence, on two ends of a rubber band. In a later interview, Peter put it in simpler terms:

> *Yeah when you start thinking about these things and then realizing that you did the things in physics in school but it somehow seems much more remote then driving. But dealing with the[m on a] more day-to-day basis with the machines here. (long pause) Perhaps that was a gradual thing, but probably over months in terms of [recognizing] that [the momentum, acceleration, and inertia of driving or skiing are] the same thing [as the machine movements] with a different perspective.*

Peter was able to do some hands-on work at the office, but he did even more hands-on learning in his daily life through his work with model trains, cars, and cross-country skiing. He noted that it was his day-to-day experiences that provided the lessons and insights for the workplace.

While he described each of these opportunities as learning, and was able to share some of his insights on the theory of momentum, Peter also noted:

> *The real learning is when it's - - we start to make some changes based on the idea of what's happening and seeing the results of the changes that - - without the results you don't really learn anything. You have ideas but they're not something you can test. (long pause) Call it validation.*

EVI – Jessica

Interviews can be easy and enjoyable for individuals who are good story tellers. For individuals that prefer the give and take of conversations, interviews can be awkward. Although my interviews were semi-structured and my goal was to be somewhat conversational, I was attempting to let each interviewee guide the discussion by identifying the learning experiences that were meaningful to him or her. My questions were often fairly general, such as: What is your earliest recollection of learning something in or out of school?

Jessica was one individual who, I believe, would have been more comfortable if the questions were more concrete and if the conversation had more give and take. Jessica was young, bright, and very personable. She gave careful thought to the questions and provided interesting answers. Often during the interviews I felt myself needing to resist the pull to provide more conversational responses, to share more. While I believe that would have made it an even more comfortable interview, it would have been inappropriate for the research. Despite these circumstances, Jessica revealed an interesting learning profile.

Early Learning Experiences

> *"I'm just thinking about you know, how much of an influence my friends were, and my sisters…"*

Peer influence was a source of positive learning for Jessica in her early years. She learned from siblings, friends, and classmates in and out of school. On occasion, she also learned by teaching her peers.

Jessica's earliest memory of learning was learning from her older sister. Her sister explained the alphabet, taught her math, introduced her to the concept of school, and taught her how to learn. She also learned *"not to do exactly as she told me because she was strong-willed, you know?"*

Jessica continued to learn formal and informal lessons from her friends and from interactions with her peers throughout her early years. For example, she gave a couple of examples of learning from her peers – or from teaching her peers – in class:

> *And just generally I'm thinking a lot about how, especially in high school, there was always the class time and then at the end of the class the teacher would say okay, do your homework, and then so many classes where it's work together where you know, two people can team up and do their math homework together. That was always I think a big learning experience and I think I learned more from having to explain it to whoever was sitting next to me than the times that they'd have to explain it to me.*

She also learned a lot from the group she hung out with. For example, they introduced her to an extracurricular academic program where the students worked as a team to build a prototype that would solve a particular problem. She described this as trial and error learning. She also provided examples of more subtle learning experiences that she had from this group:

> *… the people I spent time with focused a lot on their future and you know, what was – the plans that they had. So I think I was just influenced and learned from them to focus on that. But it was those people that made me realize where to go to be, you know, try new activities and find new things. They were the ones who convinced me to try new activities and get involved in things like that.*

and

> *I do remember one of my friends taught me how to get around the system in school….She was on the school newspaper, and sometimes she'd get so involved in something that she would forget to leave the lab and go to class because she didn't have a class every period at that point but she still had classes. And so she did that a couple of times and was able to just tell the attendance person that well, she was in the lab. And so that became her excuse and sometimes she was skipping because she wanted to be doing something else and she was still doing fine. So I learned that if I needed to get out of something I could also say I was in*

the lab. I guess that's not something that you're supposed to learn but it definitely was a good thing to learn.

These experiences continued into college.

The other thing that is popping into my head…[is] going away to college and those first few people you meet. I had no idea – it's like they show you where you can go, what you can do, what opportunities are available. And I can remember the first few days being there and having a friend of mine show me where the local Target was and how neat that was, just to know where that was. And that's not really a typical learning thing but because it was a new city, having someone show you where things were and teach you how to use the bus system or how to do that.

Current Incidental Learning Experiences

Some of Jessica's stories of incidental learning related to learning technical or engineering details, others related to process or interpersonal aspects of the job. All of her stories revolved around peer interaction.

At the beginning of the third interview, Jessica was excited. The interview started:

INT: Any additional thoughts after our last meeting?

R: Actually you know I uh, it didn't happen to me but I recognize what you've been talking about in someone else's experience…I was just excited to have an example you know… I think it's easier to see it from someone else's perspective than when you're looking at what you're picking up.

At Jessica's current job, employees appear to be very collaborative. Working in close quarters, they often hear each others phone calls and discussions. "*just overhearing [other engineers] discuss a problem you pick things up*." Jessica has learned things from listening to questions at staff meetings, listening to engineers talk with her office mate, and joining group problem solving sessions. She has also learned by asking for help.

[one time I had a question that] had to do with going and asking someone a question about sizing a cable and they would ask me more questions just to get the whole picture of the entire system that you're trying to look at, and then from that – they'll help you with the original question but [you'll also get input] on other things that who would have thought to look at…it's better to have someone understand the entire system so that they don't miss something and you don't miss

> *something. And it's unfair to ask someone to answer a question without giving them all the detail. And it's unfair to assume that they don't need to know the other details. I know there's a senior level engineer here who's very, very smart and every time I go to him with a question I will go in with the idea that I'm just going to ask him about this cable, and every time he has me sit down with everything he draws it out and writes it out and goes through the whole system, and I cannot – and there's always something that he asks or tells me that adds to my understanding.*

Jessica's been on both the asking and explaining end of these discussions, and she has learned in both situations. Sometimes she will raise questions about a particular problem, like she explained in the previous story. Other times, she will ask questions because she hears something that piques her interest.

She also gets involved when she thinks she might have an insight or perspective that may be helpful. While she may enter the discussion to provide assistance, she is also likely to come away with new information.

In addition to picking up technical information, Jessica also learns about business processes and interpersonal relationships on the job.

> *They were building a plant, and I was a new engineer so I couldn't really act as a field engineer, but being down there and watching the other engineers and hearing them and how they talked with the client or the constructors, it was a good learning experience on how to – how to interact. It wasn't necessarily a technical learning experience but learning how to go into a meeting and when you're asked a question that you can't answer – you don't have the answer, and learning what to say and how to say that you'll get the answer, or how to handle those situations.*

She went on to give an example of how she had recently used some of the techniques she had seen when working with clients.

Another example she shared:

> *We had several different modifications we were doing [on a job] and each week we had one meeting and they'd go through the status of each one of those modifications and it was a large meeting, twenty people. So they wanted more of a brief overview, and I did see someone once give a – not only the status but*

> *different options that the client could use, and I saw that and the reaction of the project manager, that that engineer hadn't discussed with the project manager these options and after that meeting, I overheard the project manager concerned that some of the options that were given were way out of scope of the project, and they couldn't pull them back now. It was an indirect way to know that make sure that everything went through the project manager – as aware, which is a big thing to know. Make sure not to get out of scope and make sure that your manager knows what's going on. A lot of what it seems like we're learning indirectly, it's less the technical and more the stuff they don't teach you in school. The working with the client and running a meeting type of thing.*

Jessica told interesting stories of learning to learn. The first incidental learning experience she related occurred at a staff meeting.

> *Normally they don't go into detail but this week he did stop and ask one of the engineers whether the question had been answered about safe path for a certain piece of equipment, and they started to discuss about how certain light fixtures would need to be moved and certain bracing would need to be removed from pieces of equipment to get this new piece of equipment through. Then they discussed how they would have to make sure that the installation of the new equipment would happen in a certain – certain operation of the plant to make sure it didn't violate any of the procedures or safety requirement, and it's something that I never would have thought of and coming up with a pathway of equipment to be installed, or thinking of, well you need to do it during a certain outage time of the plant.*

This theme of identifying more items to consider on a project resurfaced in several of her incidental learning experiences.

> *…I know when I started that a lot of the questions I ask now about things, I never would have asked in the beginning, and one of the things [I'm] learning to do here is ask every possible what if question you have [and] trying to anticipate what they would ask.*

and

> *So with these questions or hearing other people talk about their projects, it kind of creates a running list in your head of all the questions you need to ask that you wouldn't have thought before.*

Given the many opportunities for learning for peers, I asked Jessica how she decides when to get engaged with others. She had a strong propensity to get involved when she was

interested in a topic. She also mentioned that she likes her work to be thorough, so she will try to think it through thoroughly before turning it in, so she always aimed to have thought of all of the "what if" scenarios in advance. In addition, some of her learning opportunities came from the times when she started out helping her peers, but gained knowledge in the process. In addition, there were the lessons learned from being on a job site or attending a meeting. In fact, Jessica described how she will now take advantage of more of these incidental learning opportunities:

> *I think it's intentional that if you hear something you try and pick it up and keep it for next time which that wasn't the way it was in the beginning but now um (pause) even today we had a [meeting about] an instrument that was selected and it was calibrated incorrectly because the right data was sent to us but the wrong data was sent to a different company and no one verified that it was the same data. Normally I would care about an instrument and immediately kind of shut down because it's not what I do and you know kind of listen but not really listen. Now because these things seem to come up more um - - in other words it's easier to see how they cross discipline, that you kind of learn to pay attention and ask questions to try and really understand what happened and what the responsibility was and what should have happened differently but I know that in the past there would have been guilt and who cares, it's done, but now I see how wow, I feel this time it may prevent you from having the same problem on your project. The same thing could easily happen but you'll be looking for it and maybe when you get the second set of data you'll think, what if that's not the same and check it against the first set instead of just assuming that it's the same.*

Interestingly, Jessica's evaluation of her learning often provided another opportunity for her to interact with peers and another opportunity for additional learning. For example, when she was learning how to interact with clients, she evaluated her learning by either going and talking with her peers and project leaders or by watching others and

> *gauging the response of how maybe the second time around where uh, if I saw an interaction and I picked up what I thought was you know, that was the proper way to present the information [to the client]… and then if I was placed in that situation and presented the information the same way, if the resulting response was positive then I [would] think I learned it the right way. If it's negative then it would - - kind of triggered that way then maybe that's not the blanket answer to how to answer the question.*

EVII – Stan

Early Learning Experiences

Stan's curiosity and passion for learning and life came through immediately in the interviews. His earliest learning experience was "absorbing" electronics in his Dad's T.V. repair shop when he was around six years old. This formed the basis for much of his learning throughout his life. When asked if he enjoyed the early learning experiences with his Dad, Stan noted:

> *Yeah, it all kind of led – here I am in television so many years later…of course it's all connected.*

Stan's learning was all active learning – working with his Dad, being involved with the sound effects and lighting in the school play, fixing the electronics on the school buses. His recollections and stories are rich with detail, and described fond memories. One experience would often relate to another and he would often say "I'll get back to that" – and he always did. His stories are not all technical: he talked about gardening – another hobby he maintains now that he learned in childhood, and he talked about people, but it was clear that his core, memorable learning experiences involved working on electronic-related projects with a few other students or his father. These projects were never done in a lab or done for theoretical purposes. One story that Stan told is particularly representative:

> *There was one case where we came back after the summer and the PA System…just wasn't working; it was broken and nobody could figure it out. So again the principal came and got me and one of the other guys, Tony, and said uh it worked last spring and it doesn't work now. Can you have a look at it so we went to the office where they had this thing where they sit down with the microphone and uh Angelo and I were looking around and we noticed the office was a different color and nice and fresh looking. We asked them if they had painted the office over the summer and freshened it up. In order to paint the office they have to take these panels off where this thing was to get it out of the way. When they put it back together they didn't put it back together right. It was all falling apart inside and shorting out so all we did was neaten it back up and*

> *we fixed it so I have lots of good memories. I have a lot of good memories with stuff like that and they're all - - those are all learning experiences. When you fix something you learn something and I guess even to this day I guess what I've taken from that, from the bus and from the PA System problem was to - - before you just dive into something and try to fix it stand back, look at it and think about well what would cause this or what's different now that you know, something happened over the summer. Could that be related to why this thing doesn't work today? So even today when I'm presented with a problem I don't go right into you know making a lot of presumptions without even thinking about it and then just get into the detail work trying to figure it out. I stand back first and I say well what's different. What's happened between when it used to work and now that might be the reason it doesn't work rather than going in and just you know, trying to haphazardly trouble shoot it and fix it.*

Current Incidental Learning Experiences

Stan pondered the classification of incidental learning experiences throughout this interview. It wasn't that he had a lack of learning experiences, and certainly most of them were informal if not incidental. Several times, however, Stan said:

> *Well I'm trying to find things - - I'm trying to get away from the technical world because uh, um I'm trying to find something unusual and different.*

I was somewhat perplexed with this comment during the interview; after all, I was looking for his experiences at work, and if his most prominent incidental learning was technical, than that was important for me to understand. However, as I reviewed the transcript, I determined that it was more a matter of capturing incidental examples of technical learning and less a matter of avoiding certain types of learning.

> *You know it's hard to weed out something in particular only because in the technical field, in engineering we're constant - - engineering is applying science. That's what it is. I mean we take um, concepts that are discovered, invented or figured out in some way and we apply them to the real world. We built something for people so we're constantly doing things with our hands a lot and uh, so what - - I'm constantly - - if you look at what I put down for interests you know with gardening and woodworking and antique cars, they're all kind of technical and scientific at least in some way, even gardening. Um and (pause) it's hard not to learn through experience, you know, trial and error, doing things. Um, sometimes when I want to uh, fix or build something um and I do characterize my interests as life in a nutshell as fixing and building. It makes me very happy to fix or to build something. Uh, sometimes I'll (pause) pick up a book about it; you know a*

carpentry book or something and see what the techniques are. Sometimes - - often I learn by observing others who are good at it, um and paying attention to the detail. Again, engineering people do pay attention to detail so it's hard for me uh (pause) not to notice how things are done.

…So I'm constantly learning how to do things by um (pause) venturing into new areas, pursuing informal, away from work kind of things, more leisure oriented things that I'm doing. I'm trying to figure out more and more stuff because it's fun to do and so the ways in which I do it are sometimes I go get books and read little bits about you know, a particular thing. I observe experts or people who are good at it and then also sometimes I just trying doing it. I think I know how to do it and I'll try to do it and I'll make some mistakes and I'll realize oh, if I had just done it this way instead.

In fact, I believe Stan was more focused on the technical/non-technical dichotomy than he was on the work/non-work classification. After re-focusing our discussion on incidental learning at work, Stan identified the following:

I would say that I've never been a sports fan really… I've not had any interest yet. I work here at ESPN so that's rather odd; it would seem on the surface but it turns out that a lot of people in the department are the same way. I think I've actually learned some things about uh sports just from being here, being immersed in it, being around it [but] I didn't expect to learn anything. I didn't even desire to learn anything frankly but uh sometimes um, I think just by being in an environment you pick up things that you weren't even going to pursue to learn but you've learned something about it so um, don't ask me (laughter) for any details cause I'll embarrass myself

When asked if he was able to use this information in any way, he began to say no and then realized that he did use what he was learning.

This may be a little interesting. You know in meetings here, even technical meetings, it helps to get your point across if you can mix some of this sports metaphor stuff into what you're talking about. In the case of a technical issue, the world that I live in, if I'm trying to explain - - I love using analogies when I'm trying to explain things to people so um, if I can use an analogy that uses sports okay, then it might facilitate getting people to understand what it is I'm trying to say because they do understand it more… you have to know enough wealth of information about sports to be able to create a metaphor that actually helps to explain the other thing you're talking about. Sometimes it's just as simple as um, rather than saying we have to go out and do a remote event uh to instead say we have to go cover the Red Sox in Boston, uh it's a home game, you know to be able just to say that you have to have a certain amount of information uh, so.

Another aspect of Stan's challenge in identifying incidental learning came from his breadth and depth of interests. In addition to gardening and electronics, Stan was an avid car enthusiast and had a relatively new interest in studying world history. At work, he was responsible for being fairly knowledgeable about light, optics, mechanics, and pneumatics – in addition to his electronic and electrical background. In addition, Stan's current job had him exploring the history of technology and using it to help people understand the technology in use today. Stan is also responsible for working with their suppliers to brainstorm technical needs of the future and with standards committees to develop standards to help them for the future. Stan doesn't engage in any of these pursuits half-heartedly. His interest is contagious and his ability to share his knowledge with a lay person is impressive. As Stan mentioned, his use of metaphors helps him to explain complex technical ideas to lay people.

The interviews with Stan were rich with information and fascinating stories. Like Stan, in many cases, I had some trouble discerning which learning was intentional and which was incidental. Opportunities for learning were built into Stan's job. For example, one of his jobs is to create a virtual technical library that is geared toward the particular needs of his company. When asked how he picked items for the library, Stan said:

> *That's a good question and I know the answer. I hope it's a good reason;… cause I think if I'm interested in it they will be too. Um, so far it's worked so maybe I'm right...I think that I have and I think that people do see value in the things I see value in. Um I also - - and I say that because they've said that to me. Um (long pause) there are several times where there was an example like I just gave you about the 1940s research being applicable today in helping people to understand today why this very sophisticated system uses that.*

Stan also picks up many life experiences as learning opportunities. For example, one aspect of his job is to plan for the future customer needs. When asked how he does this, his answer indicated a general awareness of trends in the marketplace. He described extrapolating

advances happening in one aspect of society to his industry. When asked if he did a lot of that, Stan replied:

> *I think that's human nature, isn't it? We always learn things by relating to what we already know. That's why I want analogies when I'm explaining things to people. Um, if you have a complex concept to get across to a room full of people, I find it's a lot easier to say it's just like and then have a good analogy where most of them will, they have a lot of familiarity in that other area and you can relate it in that way.*

and sent on to explain that analogies came to him naturally.

When describing a typical task or project that Stan worked on, he identified another example of incidental learning. Stan was the Project Director for the construction of a new technical center.

> *I learned several things. I think we all did too, but uh one thing that I knew was crucial was to get everyone's input; not only for technical reasons so you built the best thing but for psychological reasons so people have ownership in it. Um you can build the best of something but if you shunned - - I use a strong word like shunned…I'm going to come out with the best thing and ….they're probably going to hate it just cause you shunned them even if it is the best thing. So getting ownership (laughter) is very, very valuable but also you get good input and we had a lot of great people here who had a lot of pent up ideas after you know, at that time twenty-three, twenty-four years of working here. We had a lot of people had been here a long time and uh they had a lot of great ideas but we never had an opportunity to put them into practice because we didn't have the time and space or whatever and now we finally did.*

At the end of the last interview, I asked Stan for any incidental learning experiences in professional associations. Stan shared that he learned how to comfortably give presentations and he learned more about interpersonal relationships. Once again, we returned to the conceptualization of incidental learning. Stan began:

> *Well okay, I'm trying to think of something non-technical because these are technical things…*

I mentioned that technical incidents were fine, and he replied:

> *Well [the professional organizations] exist for that reason so it's non-incidental then, right? I mean wouldn't it - - I mean I'm there to learn about mechanics*

from either of those associations and I don't - - so I can't come up with anything technical that I would learn from them that was incidental.

Chapter 5 Thematic Results

Phenomenology is the study of phenomena or the appearance of things (Cohen, 1987). The discovery of their essence is the ultimate purpose of phenomenological philosophy. Empirical phenomenological research describes the world-as-experienced by the participants of the inquiry in order to discover the common meanings underlying empirical variations of a given phenomenon. (Baker et al., 1992, p. 1356).

The purpose of this study is to explore the nature of incidental learning in the workplace. In addition, the study looked at:

- the impact of professional context on incidental learning, and
- ways of knowing for incidental learners.

This chapter will share the findings, responding to the questions in order.

Nature of Incidental Learning

By definition, phenomenological inquiry looks at the nature or essence of the phenomenon. The goal is to identify the "intuitively understood structure of experience." (Baldursson, n.d.). There is an inherent paradox in identifying the phenomenology of incidental learning. Most of us don't have an intuitive grasp of this phenomenon to the same extent we have a notion of many topics studied by phenomenologists – topics such as "going home" or "loneliness." In fact, part of the study of the nature of incidental learning is uncovering others' awareness and conceptualization of the experience.

This research took a hermeneutical phenomenological approach. The hermeneutical approach "is interpretive and concentrate[s] on historical meanings of experience and their

developmental and cumulative effects on individual and social levels" (Laverty, 2003, p. 15). Like other forms of phenomenology, hermeneutical phenomenology starts with gathering a description of the experience. The process of gathering and analyzing knowledge is really an interactive process between the researcher and the participant in the form of the hermeneutic circle.

The three-part interview format used with the Seidman protocol allowed the participants and me to start with a description of past learning experiences and current incidental learning experiences, and then to interactively interpret the meaning of these experiences. The nature of incidental learning in the workplace, therefore, comes from a rich understanding of the phenomena. The incidental learning experience is interpreted within the context of the individual's life-long learning and within the context of his or her professional experience. When looking to identify the nature of incidental learning, I was looking at the common structures of the experiences as they related to the participants' lives and professions.

Understanding of Incidental Learning

Conceptualization of Learning

Just as many different types of learning have been identified in traditional learning studies (e.g. Bateson, 1972/2000; Saljö, 1979a; Saljö, 1979b), the nature of incidental learning is inextricable from the individual's conception of learning. One major difference in the conception of learning involved the issue of learning's relationship to problem solving – a central issue for engineers. Some participants distinguish learning from the application of learning or from problem solving:

Then you try to use whatever knowledge you have learned from school or from anywhere else and try to find a solution for that problem. (Yang)

We start to make some changes based on the idea of what's happening and seeing the results of the changes that - - without the results you don't really learn anything. (Peter)

One of the things I do right now is I'm working on systems that monitor …things like electrical systems or power systems…And when I came in with it, it was like I wasn't expecting to learn as much about how power electronics [work]. (Laughing) I wasn't planning to learn that at all, but I had to [learn] the technology [because]…sometimes customers would call me up and ask me, "There's a problem I have here and I don't understand [the science behind it]." And…besides the computer person, I had to also be the equipment person for that person. So I had to explain to them, "Ok this is what happens and what happens with that." That led me to the fact that I had to learn <u>something</u> about power electronics to answer that person intelligently. (Joe)

Others consider learning and problem solving to be part of the same process.

Learning has been there and in large degree, through situations, through choices that I've made, whether they're positive choices or not so positive after you learn…we learn from life situations. (Gina)

You learn something regardless of whether something is successful or you don't finish it, you learn something. (Tony)

Learning equals experience (Rasa)

I think just by being in an environment you pick up things that you weren't even going to pursue to learn (Stan)

You learn "just by overhearing" (Jessica)

This distinction not only seemed to impact the types of experiences that the participants would consider learning, but also the experiences that would be salient to the individuals.

Participants' different conceptions of learning also became evident by the different approaches they took to learning. Some stories provided examples of surface learning approaches while others provided examples better characterized as a deep approach. In the surface learning approach, students passively reproduce material (e.g. Entwistle, 2001); it is more of a rote learning method. In the deep learning approach, students actively engage with the

material, critically reflecting on the ideas, looking for patterns, and relating it to previous learning (e.g. Entwistle, 2001). The differentiation between deep and surface learning approaches came about from qualitative studies of the conception and the process of learning in formal environments. (Marton & Saljö, 1976; Saljö, 1979b). There has been no formal study on deep and surface learning as it relates to incidental or even informal learning. However, these distinctions are evident between the participants, showing up not in the type of learning that was done, but in the individual's approach to learning.

Compare Mary and Yang's stories to Tony and Rasa's stories. Most of Mary's stories simply related to her attending and enjoying the strategy meetings. She explained that she liked to hear how the executives discussed information, and she emphasized *"I had really nothing to contribute and it was more for my own, you know, personal – for my own, you know, selfish [goals]."*

> *I had the opportunity to go to um some meetings that I really - - they were called the [strategy] meetings and what it was like higher level management that gets together and just discusses issues and gives updates and stuff like that. And I always liked attending those because um - - even though I have nothing to contribute there is a certain - - for a while there was an open format. Anybody could attend it that wanted to share and listen in, and I always liked to go into those because um I went more for listening and trying to learn the way people think…and one thing I did learn about how there was this one manager always um thought like their customers rather than an [HR] person, which I always found rather fascinating - - that was they always had their customers needs in mind when they approach situations, which I always thought was very um interesting. They knew their customer that well that they were able to - - um you know, know what they wanted and needed from an [HR] perspective. (Mary)*

Mary's descriptions of this showed her fascination with these meetings, but – like her other learning stories -- implied a passive form of acceptance of the learning. She tended to "simply reproduce parts of the content" (Entwistle & Entwistle, 1991, p. 206). Moreover, even in the third interview when we explored the meaning of her learning, Mary didn't relate this to

her own interactions with her customers. She did not relate the company's higher level priorities with her work.

Similarly, many of Yang's stories implied learning that concentrated only on the minimum requirements and did not reflect on the greater purpose of the learning.

> *When you learn, you are not learning for brainstorming. You learn based on your need or like in school you learn based on the requirements for the grade. You learn those things and then as I said you don't know what the purpose of this knowledge. Sometimes you know and sometimes you don't know. (Yang)*

It is interesting to note that surface learning is not equated with inconsequential learning or lack of intelligence. These are learning approaches that are taken by all types of individuals in all types of professions. In fact, studies of medical school students have shown that medical school tends to encourage and increase surface learning strategies. (e.g. Wilkinson et al., 2004). However, it does reflect a different orientation to learning.

Tony and Rasa's learning stories are quite different. Tony's story, an example of all of his learning stories, emphasizes several deep learning approaches, including relating ideas to previous knowledge of problem solving and looking for patterns and underlying principles. (Entwistle, 2001).

> *[The release of the product] was a couple of months late and everybody was running around scattered saying, "You know what? We have to solve this before the end of the week. It is a major thing."…All I kept saying was, "You know what? Um from what I understand this is the first unit like this that we got. If we fix - - like this one problem that we are seeing and send it out that would be a terrible thing if we find out there is another problem right behind it or related to it. So we should do a full test of it." And everybody kept saying, "No. No. No. There is no time for that." I was like, "It would be good because we have like five other units coming down the line just like this and it would be nice to know the problems up front since we have got the unit here right now, show them the problem." So I was ignorant enough to not agree with everybody else and said, "Okay, well it has to go out. Let's just fix this problem and send it." And we did keep trying things and then a guy from - - the vendor came and he was in the same mindset as me. He was like, "Well I am here for the week. You are paying me to come out here for the week. We may as well do as much as we can…." So*

> *we sat out there in the snow for two days and we turned it on and off 37 times I think - - and - - I think people were getting a kick out of it... And all of a sudden we had all this data and everybody was getting interested. And usually that kind of a test you do at once and you have to wait eight hours. And then you might get two tests like that in on a shift and then you wait until the next day…. So we [got] ten times as much data and [had] ten times as many eyes on it…we found all of the problems along the way that weren't big problems, but there had been enough to trip the unit maybe in the middle of commissioning or something like that, which could have been in itself a big thing if we had minor problems. So with messing around we found a lot of little problems, fixed a lot of big ones.…then as the other [products] got shipped in - - um the first thing people would ask is, "Did you get all those changes from [Product X] into the software for the next unit?" (Tony)*

Rasa's stories, including the one below, also show her tendency to treat each learning experience as an integrative part of her experiences, a type of deep learning.

> *The primary goal of that interview is to screen the candidate for the positions if you want to hire them. That incidental learning is, "Wow! This is how their organization handles a situation like this. Or this is what's happening in their organization…" So that was the secondary learning I would call it. But I wasn't really… It wasn't my goal or planning on learning, but just happened. It was a good opportunity to learn…That information is used on a daily basis.…So knowing how your competition does that, prepares you for making sure you copy their strength and make sure you stay away from the mistakes that they make. (Rasa)*

Those who tended toward a deep approach to learning had more incidental learning experiences to share and richer stories. As they told their stories, they often made connections between the incidents and sometimes between experiences on and off the job. They typically provided more implications of their learning.

While participants' stories seemed to fall on a continuum of deep to surface learning, there was often a consistent pattern to an individual's stories, whether the participant was talking about childhood learning or current incidental learning experiences. The third interview in the series, when we explored the meaning of the learning experiences to the participant, would often be the real indicator of their approach to learning. In some cases, as we explored the meaning of

the experience, a much richer story emerged. In other cases, the learner had little more to add, and might even seem confused about questions that asked for any additional depth of the learning experience.

Conceptualization of Incidental

Many participants recounted incidental learning experiences when asked to describe their early recollections of learning – before the concept was even discussed in any depth. I doubt they were aware that their examples fit the category. However, it was often more difficult for individuals to focus exclusively on incidental learning. In some cases, I had the individual start talking about current learning experiences in general, and then we would return to the specific focus on incidental learning.

The participants had different conceptualizations of what constituted the "incidental" nature of incidental learning. For example, Stan tended to look for non-technical examples of incidental learning, believing that any technical learning was – by definition – part of his job, and therefore not "incidental."

> *You know it's hard to weed out something in particular only because in the technical field, in engineering we're constant - - engineering is applying science…. engineering people do pay attention to detail so it's hard for me uh (pause) not to notice how things are done. (Stan)*

Jessica, on the other hand, drew many of her examples of incidental learning directly from the technical aspects of her job. For example,

> *The way we have it set up here is that there are two people in each office, and a lot of the time here the person I'm sitting with is talking about some aspect of a project and once they hang up the phone or stop the conversation, you'll ask them about it and it'll be a project you're not working on. (Jessica)*

Rasa also drew her learning from her day-to-day work; her stories encompassed both the technical and non-technical experiences:

> *Considering that I'm pretty new here, so every meeting, every movement, every discussion, every e-mail is a learning opportunity…what comes to mind is there are formal meetings that are set up and you go to and you talk about a business topic. But the informal or incidental learning that I obviously hadn't planned to focus on in that meeting, is observing people's interactions during that meeting and learning a little bit about their staff. So that wasn't the intention of the meeting when I went into it. But I do see how people respond to discussion or what their approach is to the topic in that meeting, what role they play on that team. (Rasa)*

and

> *…so we talked about people's performance, their competency, compensation, development, everything that deals with individuals. But as a result of having those conversations, I'm feeling like I'm learning a lot more about [our product] because once we talk about somebody's business goals, how did they handle it over the last year? What were their challenges and priorities? Why were they successful or not successful? On the side, I'm learning about, "Oh! The Progressive is our number one competitor." And "This team had this goal that they had to accomplish as a result of introducing this new product that's going to be sold in the market in this way. Oh, by the way, here are all these legal challenges that companies like ours are dealing with." So I guess the side learning is all learning about the business.(Rasa)*

In yet another situation, Yang – who said he couldn't come up with any examples of incidental learning – explained that each person had a separate expertise which precluded meaningful incidental learning. For example, when I probed about the activities and potential for learning in the departmental brainstorming meetings, he described the learning this way:

> *So when we are together doing brainstorming or talking about projects, of course you learn something from other people. You just learn something but you don't really use it. From talking, the talks that we had, actually you do learn something from other people. (Yang)*

He went on to explain:

> *We may do some work on the areas in which we are not familiar with, but most of the time we stay focused on what we are doing because that is where we are very good at. In other areas maybe some other people are good at those areas that we are not so mainly we focus on our own area. (Yang)*

Yang did mention that there were rare occasions where he might pick up something:

> *When we are together, if you learn something from them, maybe you can have some thought when you talk to the people in that area so maybe sometimes that helps too.*

However, these situations seemed so rare and inconsequential to Yang that even fairly directed probing did not result in more than one vague example of incidental learning.

Many earlier studies of incidental learning avoided the variation in the individual's perception of learning and more specifically of incidental learning by looking for pre-specified information (e.g. Dollinger, 2000; Stokes & Pankowski, 1988, and Woods & Daniel, 1998). Not all studies were quite that directed, but most emphasized a particular kind of learning. As incidental learning is a learner-initiated and learner-evaluated form of learning, understanding the individual's conception of learning and the individual's differentiation between incidental and non-incidental learning, is fundamental to the understanding of the nature of incidental learning.

One key difference in the conceptualization of "incidental" in an incidental learning episode focused on the difference between exploring a problem not knowing what one would identify as the cause or solution and picking up an entirely new piece of information. Zoe provides an example of the latter. In the second interview, Zoe shared what she thought caused the employee resistance to actively participating in a major change initiative at work. At the time, she had learned about some of the employees' fears that the change was the first step in downsizing. After that interview, however, a mentee came and provided unsolicited feedback that taught her more about herself:

> *But, I also had someone who I had been mentoring…I'd been mentoring her and, I had been giving her advice, how to [accomplish] things and so on. And [after a meeting] she came back and she gave me feedback about how the perception, you know because she was in some discussion with some people, and it just hit me, you know like, I went "Oh my God" really this is the perception I give – like very hard treatment, very hard, and that gives me an idea that I –felt- but I did not want to admit or I did not want to…you have to pull back sometimes with adult learning... and I think for me it's another opportunity learning about myself, and that's exciting. And it's, sometimes you may not like, uh, the feedback, but I'm the type of person that I sincerely like to <u>hear</u> that, so I can just….but the biggest challenge for me is learning about myself, but also adjusting, you know, and changing ways, (Zoe)*

Sally shares a similar example of picking up a totally new and unexpected piece of information:

> *I was actually on SHRM's [Society of Human Resource Management] website and I was looking for something very specific and I was looking for new software and as a result of looking for the new software, I was kind of poking around on the site trying to find it, with a search I couldn't quite what I was looking for and I knew I had to read, and I didn't want to read, it said I've got to read. And, I struggle with reading on the screen and get tired and I said ah, and all along the way, I found a whole bunch of things on SHRM's website that I didn't know were there. There's a tool kit [with sample job descriptions] that's out there that I didn't know was out there. (Sally)*

Stan, an engineer at a sports organization, shares an example of learning almost by osmosis:

> *I think I've actually learned some things about uh sports just from being here, being immersed in it, being around it so I didn't expect to learn anything. I didn't even desire to learn anything frankly but uh sometimes um, I think just by being in an environment you pick up things that you weren't even going to pursue to learn but you've learned something about it (Stan).*

In other cases, however, learning was described as incidental when it was clear that there was a problem to be solved or a need to be addressed, but that problem or need wasn't clearly understood – and the solution was unknown. For example, Sally shared an example of incidental learning that occurred when she was having troubles identifying appropriate candidates for a new

recruitment effort. She went to meet with the staff to find out why the candidates that she selected weren't appropriate, and the meeting resulted in several examples of incidental learning. This is one of them:

> *[Incidental learning has] happened quite a bit in the last couple of years, for me. As I have had more opportunity to work on the organizational development things…Probably a good example of it was, it was just yesterday, we were in a meeting to discuss recruiting positions that we have open. And as a result of the recruiting positions, one thing led to another and in the meeting yesterday, to learn about how the organizational functions and as a result… and as a result[I learned about] the gaps became more available and more obvious and I learned how I can best service them so, there has been a lot of that over the last couple of years and probably, as I have been given more responsibility and a broader range of freedom. I get to talk to more people and to learn and know that I almost always, when I meet with somebody through their organization and we're talking about people and personnel, I always learn something about our product and how our product develops. (Sally)*

Similarly, Mary identifies a need to understand her client's business better, thus she attends the staff meetings to learn more about the issues they were facing.

> *Certainly most of my learning is more about the bank as a whole, you know like maybe about a department or a business - - a line of business or - - and I will generally will pick things up and um, because I attend my customer staff meeting. The groups I am supporting, I will attend their Management meeting just to - - the reason I am attending them is more to hear about the challenge - - to learn more about their business, so - - but also to hear about what challenges and issues they are dealing with [so I can] better support them. And um, and, so, generally by going to those meetings I will learn more about their line of work, the challenges that they have to deal with. (Mary)*

This type of situation often occurred in technical situations as well. For example, Peter shares the following story:

> *Gosh I'm always learning all the time and it's somewhat incidental (long pause). I had a problem last week with a um circuit that wasn't uh performing correctly…[so I contacted the manufacturer of one of the parts and] they gave a strong hint and then that correlated with the way it was behaving. (pause) We based the access to this at two intervals and um, they had said that you can't do that anymore and it had to do with the blocking value. When you started reading it and maintaining it through the second speed process and –(Peter).*

Peter goes on to share how they tried experimented with different solutions and ultimately solved the problem.

In all of these situations, it is clear that the learner knew there was an issue that needed to be addressed or a situation that needed to be investigated. They took steps to explore the problem or situation, not knowing what they would find. In some respects, therefore, each of these situations may be described as intentional incidental learning. In each case, though, there was also some unintentional incidental learning – some learning that fell beyond the scope of the initial mission. For example, when Sally investigated why her recruitment efforts were not resulting in plausible candidates, she was able to learn how to design a job recruitment effort that was more appropriate to the department's needs. At the same time, she learned that there was a need for departmental reorganization, and she learned more about the company's product. The incidental learning about the latter two issues was far beyond the scope of her understanding of the problem, and far beyond her expectations for learning during this investigation.

There was a tendency for an individual's examples to fall mostly into the intentional or into the unintentional category. However, as we saw with Sally's example, it was not always participant-specific. Moreover, while some examples seemed to clearly fall into the intentional or unintentional category, other examples were unclear – and likely to be unclear to the participant, unless that individual is extremely self-aware and constantly attentive to his or her decisions.

Frame Analysis

While there were different conceptions of learning, there are also some common frameworks between members in each profession – and differences between engineers and human resource professionals. Most of the engineers typically spoke of learning in relation to

problem solving, logical thinking, and technical understanding, while most of the human resource professionals emphasized learning related to life experiences and interpersonal interactions.

All of the engineers discussed the learning that occurred when you solved problems: "*any problem results in some learning, I guess*" (Peter). In fact, most of their learning involved the identification and resolution of problems.

> *And then if I have a list that somebody came up to me, "Did you look at that problem again?" You know what? Because I ignored it or blew it off for an extra day or something I found out another problem that related to that - - and you know maybe I could come up with a solution that solves all three problems at once. And I wouldn't have done that by working one problem at a time or even formally working off the to do list. (Tony)*
>
> *Actually we did a lot of tests before we came to a conclusion. Then we needed to think about it theoretically and experimentally try to verify that problem and then try to find a way. I did experiments and I did a lot of simulations using the infinite elements analysis software. Then I verified it in both ways that there was a defect. There was a permanent information problem on that product. (Yang)*
>
> *And literally I spent so much time, like half my time, learning about what was goes on mechanically, in mechanical processing manufacturing of metals, what is required. What's involved in it, I never knew. It was new to me! To better understand how to apply growth technology, you have to be around where the problem starts. (Joe)*
>
> *But just overhearing them discuss a problem you pick up things. (Jessica)*
>
> *Even today we had a couple of meetings which were kind of like lessons learned like meetings where there was a project and something happened and as a result of it we just had a meeting just so everyone was aware of what happened, why it happened, what should have happened, what could have prevented any problem from happening and uh, there was one this afternoon on um an instrument that was selected and it was calibrated incorrectly because the right data was sent to us but the wrong data was sent to a different company and no one verified that it was the same data. Normally I would care[less] about an instrument and immediately kind of shut down because it's not what I do and you know kind of listen but not really listen. Now because these things seem to come up more um - - in other words it's easier to see how they cross discipline, that you kind of learn to pay attention and ask questions to try and really understand what happened*

> *and what the responsibility was and what should have happened differently (Jessica).*

Joe doesn't specifically use the word "problem" to explain his situation, but his learning came from first addressing a problem that he had, and then from responding to his client's problems:

> *How did I learn about that? Well, it was a kind of gradual thing. First I was[working on a] computer program that was getting some data from something and displaying some graphs and you ask yourself, "Well, what's that all about?" And [then] customers would call me up and ask me, "There's a problem I have here and I don't understand where you put things in this."…That led me to the fact that I had to learn <u>something</u> about power electronics to answer that person intelligently. (Joe)*

Engineers also emphasized logic and a prescribed way of thinking and analyzing problems in their learning; they emphasized the theoretical rules for learning.

> *We think very logically which some people who aren't like us say we're too black and white but to us, in our words it's that we're clear about what we're saying and I guess to turn it around we'll say to the people who like things in the gray area are hiding something or trying to you know, pull a fast one on somebody. I mean we like clarity and with science and engineering is about formulas and rules and things fit and knowledge builds logically, one thing follows from another. (Stan)*

Zoe's situation was a little different. Her incidental learning experiences varied a bit more than most of the engineers; they did not fit as neatly into the theoretical, logical framework. In fact, many of her incidental learning experiences related to expanding her skills or increasing her knowledge of herself and others. Nonetheless, most of her talk of learning incorporated a strong logical and theoretical approach. Zoe relates systems theory logic to law, arts, and sociocultural dynamics. She has created charts where she has laid out the relationship, and she has engaged others in these conversations.

Zoe's approach seems to illustrate the notion of frame alignment. Frame alignment describes "the linkage of individual and [group] interpretive orientations, such that some set of individual interests, values, and beliefs and [group] activities, goals, and ideology are congruent and complementary." (Snow et al., 1986, p. 464). Zoe is surrounded by engineers with advanced degrees – at work, at home, and in the high-level volunteer position that she holds in the association. In fact, Zoe's case may illustrate frame amplification (Snow et al., 1986), a type of frame alignment, that leads to "clarification and invigoration of an interpretive frame" (p. 469).

By contrast, the human resource professionals emphasized learning through being observant, including observing their own intuition. They often equated learning with absorbing or participating in day-to-day experiences. New employees emphasized the importance of observational skills as a means of surviving and adapting to their new environment. For example, five of Lani's six examples of incidental learning came from watching and listening to others. As a relatively new employee, she learned about the group culture, company communication norms, and leadership styles. She also learned about enhancing her professional demeanor, and she even learned some technical information. One example that she shared she defined as relearning:

> *He doesn't have a commanding presence at all. He's a very paternalistic person so he doesn't exude confidence in his decisions because he just sort of makes a decision. So what I've learned from watching what that's doing to his group. So it's just reinforcing a behavior that I already know is detrimental to being a leader. If you're going to make a decision, you've got to stick with it you've got to be confident in what you're doing. It doesn't mean you can't admit that you're wrong, but you've got to be confident. (Lani)*

Moreover, she also addressed the omnipresent learning opportunities:

> *there is something to learn from everything. I always look at every experience out there and say, "OK…" Specially things that are not good, things you screw up.*

And say, "What could I have done differently? Or how can I do this differently? What can I learn from walking around? (Lani)

One of Gina's most powerful incidental learning experiences centered on the political landmines of her organization.

I think the big learning in probably the last year and a half…was about the political landscape of a corporation, any corporation. Not necessarily exactly where I was, but in general how the political environment affects everyone, and how after a while, I don't know if it's part of the maturing aging process and you just learn life's lessons by experience. I really believe that. But I had such a learning about all that. It was amazing to me and a bit frightening because I didn't like what I was seeing. I didn't like what I was experiencing…So the big learning came about me, as a person, how to handle it all. Like avoiding these landmines… But I realized I knew lots of people I could trust. And the ones I knew I couldn't, I tried to avoid. Or be politically correct, whatever that meant, without compromising my integrity and my moral structure. I would refuse to buy into some of that junk. And it helped to talk with the people that I trusted about certain things I was going through. What happened? They said, "I'm having the same issues." Isn't that interesting? So it was a big learning. (Gina)

Mark's incidental learning experiences came from daily life events where he remained observant, particularly as it came to networking and developing interpersonal relationships – something that he considered to be a key component of his job. He described it in general:

But learning is, you're always learning because you have to be where you have to keep your ears open, see what's going on and observe. And or reject, if you think something is good you deal with it, it's not quite where you're going, discard it and go on to something else. (Mark)

And I think you, you know, if you're kind of tuned in you become you know, a light goes on kind of thing that happens, you know, somewhere during it that makes you aware that you are experiencing something new or you're learning something new. (Mark)

He also provided a recent example of getting to know a new co-worker:

Also there is the incidental learning, especially when you deal with building relationships with people. I think you really have to have an open mind and really try to understand the person for whom they are and you know what wonderful attributes they can bring to the table. There are several people - - I'm

> *sure you've experienced this where they you know, they come in with a, they come in with a reputation and but after you get to know them perhaps they're a little bit different than what their reputation is so you learn about them by spending a little bit more time to get involved and really understand where they're coming from so I don't know if you would certainly clarify that as incidental learning but certainly it's a learning process that's is above and beyond maybe what other folks do. It's spending a little bit more time to try to understand or really see where a person is coming from and say oh yeah, now I get it or I understand where you're coming from. I understand what you're all about and what you're trying to do. (Mark).*

Sally's observation of people and events came through in all of her incidental learning experiences. Whether she was participating in a recruiting meeting or conducting training, she was also observing the world around her.

> *[when] I'm training… I learn a lot about the people, and how they function and how they tick; especially when they get personal, which a lot of them do, and then [I] also [learn] about their jobs. So I think our training experiences have created a lot of opportunity to learn things that I'm not specifically asking, but they're sharing as a result of their experiences. (Sally)*

When engineers tend to approach learning from a logical, scientific process, often dealing with technical issues, and human resource professional tend to approach learning as part of all day-to-day experiences, it appears that participants are using frames.

> Frames are basic cognitive structures that guide the perception and representation of reality….frames structure what parts of reality become noticed. (Koenig, 2004, p. 2)

Entman (1993) elaborates on this aspect, explaining:

> "Framing essentially involves selection and salience. To frame is to select some aspects of a perceived reality and make them more salient…in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation." (p. 52)

Participants' examples of learning illustrated the framing concept. For example, in the following example, the concept of learning seems to be outside of Yang's frame of reference:

> *INT: So what would you say was what you learned from th[e problem you solved at your previous job?]*
>
> *R: It is kind of hard because that was a project assigned to me so that is my job. (Yang).*

Bateson (1972/2000) and Goffman (1974), the originators of the concept of frames, explain that frames help to answer the question "what is going on here?" They also help guide our focus:

> The frame around a picture, if we consider this frame as a message intended to order or organize the perception of the viewer, says, 'Attend to what is within and do not attend to what is outside.'….The picture frame tells the viewer that he is not to use the same sort of thinking in interpreting the picture that he might use in interpreting the wallpaper outside the frame. (Bateson, 1972/2000, p. 187-188).

For Goffman, "what matters most is how the audience interprets [an] interaction" (Lemert & Branaman, 1997, p. x). In my research, the participants are the "audience" choosing to use frames to analyze the world around them. Engineers typically honed in on problem-based and technical experiences as examples of incidental learning, while the human resource professionals often talked about office dynamics and interactions.

Learning Styles

The first interview with each individual was typically an easy one for both of us. The participants had a chance to reminisce as they recalled their learning experiences in childhood and early adulthood. The casual atmosphere allowed me to get to know the person. The second interview was sometimes a little more unsettling for the participant. Few – if any – of us are used to thinking about and recounting stories of incidental learning. The stories did not come as easily, and participants were often concerned with whether or not they were telling me the type of thing I wanted to hear. During the first set of interviews I noticed how different the participants' learning stories were. However, during the second set of interviews, a pattern began

to emerge: the individual's learning style remained fairly consistent. That is, the style represented in many of their childhood learning experiences related very closely to the learning style related in their stories of incidental learning experiences in adulthood. (While trying to keep each interview unique, there are times where one will notice that the same pattern has occurred in two or more interviews. When this occurred, I acknowledged my findings in my notes and then made an effort to suspend these beliefs and to put my focus back onto understanding each participant's unique experiences. During the analysis phase, I found that some of these patterns did not materialize. Moreover, when I did analyze the data I explicitly tried to disprove the identified themes.)

"[L]earning style may be simply defined as the way people come to understand and remember information" (Brown, 1998; see also Dunn, 1984). Learning styles have been defined in numerous ways. Brown divided the research into perceptional – using the physical and sensual elements, cognitive – emphasizing receiving, storing, classifying, and transmitting information in the brain, and affective – a holistic approach that encompasses all aspects of the personality. Others have differentiated learning in a more simplistic manner, dividing learning styles into auditory, visual, and kinesthetic (e.g. Felder, 2002).

Kolb (1984) identified two continua involved in learning: the perception continuum and the processing continuum. The perception continuum identifies how we think about things – do we tend to rely on thinking and abstract conceptualization or on feeling and focusing on concrete experiences. The processing continuum identifies how we tend to do things – do we tend to watch and reflectively observe or to take a more 'hands-on' approach and actively experiment. According to Kolb, most people tend to fall into one of four quadrants: feeling/watching; thinking/watching; thinking/doing; or feeling/doing.

Gardner is known for his research on multiple intelligences. He defines three different concepts that are related to this study: intelligence, domain, and style. "An intelligence is a computation capacity…A domain (shorthand for domain, discipline, or craft) is any kind of organized activity within a society, in which one can readily array individuals in terms of expertise." (Gardner, 2006, p. 31). Style "refers to the customary way in which an individual approaches a range of materials" (Gardner, 2006, p. 65). While Gardner makes a strong distinction between intelligence and domain, he is less rigid on the distinction between intelligence and style, saying that to "collapse the terms is no great sin" (Gardner, 2006, p. 65). In fact, he states that the relationship between intelligence and style still need to be worked out on a style-by-style basis. Clearly, my study provided no way to track the portion of the brain that the participant used for their learning. In fact, as Gardner notes, that we don't currently have a way to designate the specific neural circuitry that could absolutely verify the use of a particular intelligence in action. Gardner explains that students outside of a formal educational environment to engage in learning about the same topic through a variety of approaches or styles – from language to logic, to music, to kinesthetic imagery. Gardner (1993) also notes that individuals tend to gravitate toward their areas of natural intelligence, and he has found that most of us have several intelligences.

No single measure or test of learning style was done as part of this research, and most participants showed evidence of two-to-three learning styles or approaches. Nonetheless, it was apparent that different individuals had different learning preferences and striking to see how the learning preferences were evident in their incidental learning stories.

For example, many of Peter's stories from childhood related to using tools and building things by hand. He also shared this story of a learning experience in the military, right out of high school:

> *I have a little trouble learning. Some people seem to be able to learn just to pick up a book and read it and they've got it… I need often times to do some practice and something like that. In [the military]…we had all these cipher locks on all the doors and my fingers would actually learn the combinations. I completely forgot what the combinations were, and when I got to a given door, my hand would do the thing and I would go in and if somebody asked me what the number was, I would have to go in the door and I have to watch my fingers cause I really [think like that]- - and those things change every two months?, something like that. So it wasn't like I did it once and then remember it forever. You know I think I would have a couple of tries and then my fingers would have it. (Peter)*

At his current job, most of his work relates to machinery that controls motion and momentum. Once again, his stories of kinesthetic learning are prominent:

> *…things I do play around as a hobby often wind up being useful in the work in some way or another that's not really anticipatable… Mostly the (pause) train hobby in terms of things…[and] driving a vehicle or skiing. So I have a more, I'm more conscious of the fine points of acceleration from skiing and also I can see how it relates to moving something some distance and moving something where it's solidly connected is pretty obvious. (Peter)*

As we continued to talk, it became clear that he used his experiences on skis or when driving to inform his analysis at work. The opportunity to get out and use bodily-kinesthetic intelligence was the way he was able to solve the problem.

Tony, another engineer, was also a kinesthetic learner: "*from a really early age I was always building things and trying to make things better.*" Through his building, he learned various engineering principles. He learned how to change a car from an automatic to a standard, how many nails were required to create a ladder on the side of a tree, and how to connect wires so they stayed together. He was able to generalize from these principles:

> *So ever since I was a little kid I always liked to build things - - and the tree houses. You know you make a ladder going up the side of the tree. If you put one nail in every rung you find out that you fall on your ass pretty quick because the one nail pivots when you try to put - - you know, so you put two. And then you go up but the fat kid behind you goes up. And, so, then you put three and then you realize, well you are putting three nails in this little piece of wood. You can tell somebody, all right. When you are going to make a ladder you have to use wood that is a certain size and you have to put a certain amount of nails or you could fall three times and the kid behind you breaks the wood when he tries to go up, and you have to realize, okay you have to go find bigger wood and use more nails. And that - - you know, that is the way we learned how to build right. (Tony)*

He also learned that some of his hands-on learning conformed to formal principles:

> *John Doe [and I]…ran around and always got our hands into something mechanical or electronics to play with. And we had this fort that we put all car alarms on and everything so nobody could break into this fort you know? We had car batteries and car alarms and power supplies and everything…And we did all this wiring for the first time. We didn't know what we were doing, but we knew you know, plus went with plus and minus went with minus, and we started getting into things where the wires would pull apart because we didn't know what we were doing. So we started doing, okay make chicken feet. And we would take the wire and we would spread it into three groups and we would call them chicken feet because they looked like chicken feet. And then when he went to - - he went to engineering - - uh not engineering, but trade school. And he calls me up one day…and says, "Oh I went through this splicing class today and the first splice we learned was this thing called whatever, whatever, but it was chicken feet. Remember what we used to do when we were little kids?" We just did it because we found out the wires would pull apart, so we did it that way, because we knew it would hold them together better. It turned out he found out it is a formal splice that they had to learn in high school. (Tony)*

Tony's current learning also represented a kinesthetic style. The day I arrived for the second interview, Tony had just come from a meeting where the engineers on his staff were trying to solve a problem in the equipment. They were sitting around with the drawings, plans and problem reports, and cost estimates. Tony's response was: "*did you go out there and look and you know kick it around a little bit, kick the tires? Can you get that wire in there, any wire or maybe something - - is there room next to it?...*" It was a hands-on, physical approach that he used to understand how the TASK unit worked. Even when he was trying to grapple with his

management responsibilities, he took a very hands-on approach. He spoke of using – and reorganizing – Post-it notes around the office to get a handle on what needed to be done and how to approach it.

By contrast, some engineers took a much more logical-mathematical approach to their learning in their youth and this carried over into their incidental learning. For example, Joe talked about becoming much more engaged in school once he got into an AP class in calculus. As a high school student, he got interested in aerospace engineering, mathematical equations, and the structure of DNA, and he took out many books on the subject to pursue these subjects on his own. As a professional, he believed that the software programs that they were writing were not the best approach for solving the problems they had. He stumbled upon the field of artificial intelligence, which he then latched on to and continued to investigate. Joe's learning style – and his incidental learning – are consistent, but his learning style is different from Peter's or Tony's.

Many of the human resource professionals described themselves as observers: "I love to watch" (Gina), "it's watching people's mannerisms" (Lani), "I'm listening to everything all the time and I try to listen to what I see and hear" (Sally), "you have to be where you have to keep your ears open, see what's going on and observe" (Mark). Learning by observation is recognized as a common form of learning (e.g. Bandura, 1977; Kolb, 1984; Lave & Wenger, 1997). In this study, the observational learning of the human resource professionals generally seemed to be closely associated with interpersonal learning.

For example, Mark's childhood learning involved his interactions with others: the buddies in his classes, his city cousin. He emphasized the centrality of learning about how to fit in and create friendships:

> *"you learn the people you're going to be friends with because they respect where you're coming from and you know, nobody's going to rat on each other, you*

> *know, you're going to be there. I've got your back – that's the expression today. I think that's how you form some of those friendships when you're younger because you quickly, hopefully find out who the true friends are and who are not." (Mark).*

Similarly, most of Mark's incidental learning at work came from learning to network, learning to interact with clients by finding ways to relate to them, "being open to the world around you…the surroundings, the person that I'm talking to and what's going on…" In another instance, Mark talks about:

> *really try[ing] to understand the person for whom they are and you know what wonderful attributes they can bring to the table…(Mark).*

Mark's incidental learning typically related to his focus on interpersonal learning, often identifying new and better ways to interact with others on the job.

Sally's interpersonal learning style was also clear in both her early learning and her later incidental learning. While some of Sally's early learning involved watching from a distance, such as watching how her brothers interacted with their teachers or their parents, she emphasized learning that involved interacting with teachers, coaches, mentors, authority figures, and peers. Most of her incidental learning at work had an interpersonal component, observing and distinguishing "moods, temperaments, motivations, and intentions" (Gardner, 2006, p. 15). Sally noted that during training she "*learn[ed] a lot about the people, and how they function and how they tick,"* and she provided examples of what she learned, and how that impacted her job. She learned about the organization and its staffing and development needs by interacting with the members and leaders in other departments.

For Jessica, learning was interactive, learning came from interaction with others.

> *"I'm just thinking about, you know, how much of an influence my friends were, and my sisters…" (Jessica on her early learning)*

> *"Just overhearing [other engineers] discuss a problem you pick things up…so with these questions or hearing other people talk about their projects it kind of creates a running list in your head of all the questions you need to ask that you wouldn't have thought before." (Jessica on her current incidental learning)*

In her youth, Jessica learned what to expect in elementary school, learned to navigate high school, learned about extracurricular opportunities, and learned how to handle college from her siblings and friends. At work, Jessica expands her technical, political, and procedural knowledge through her interactions with her peers.

While it is impossible to know the extent to which these learning examples were physiological intelligences and which were styles. Nonetheless, most of Gardner's intelligences could be identified, although not all were evidenced in incidental learning. (For example, Mark and Peter showed strong evidence of musical intelligence throughout their lives, but there was no evidence of it impacting incidental learning.) However, the consistency of learning styles for each individual and the contrast of styles between individuals – and its impact on the participants' incidental learning was remarkable.

Common Sense

Incidental learning can be associated with the creation of Post-it® notes (Halford, 2004) or the discovery of the color mauve (Garfield, 2001). However, most incidental learning is not that glamorous. Like other forms of learning, most day-to-day learning is unspectacular. We may incidentally learn the culture of a new organization, we may incidentally learn how to frame an argument to persuade our boss, or we may incidentally learn a shortcut for a word processing function. It is the rare occasion when we experience transformational learning. Nonetheless, in retrospect, I realize that I undertook this investigation expecting to find major Post-it® note-type discoveries.

During the interviews, I enjoyed hearing the stories that my participants shared. When I first started reviewing the incidental learning incidents parsed from the stories, I realized that most accounts of incidental learning were not descriptions of transformational learning or major discoveries. In fact, I was discounting many of the stories as "common sense." As I began to reexamine my expectations, I started to reexamine the incidental learning experiences. To do this, I needed to consider what it meant for something to be labeled as "common sense."

On a pragmatic level, I looked at the examples of incidental learning to determine if learning in that context was inevitable, and if that particular learning outcome was inevitable. It wasn't. For example, Rasa, a fairly new employee, explained how she learned that her new firm commonly used e-mail to communicate rather than voicemail, as she was accustomed. As soon as she began to see which communication methods got her the desired results, she was able to change her behavior increase her productivity. Not all employees are attuned to this type of dynamic, however. In another example, Joe learned enough about power electronics when writing a computer program to answer the employee's questions both about the program and about the content. Not all programmers automatically learn about the subject matter which they are working with.

Similar conclusions can be reached for the other examples of incidental learning. Not all employees would identify the need for a reorganization – and sketch out a rough proposal – while working on position requisition forms the way that Sally did. Not all workers would take lessons learned building a solar-powered waterfall on the weekend to prescribe the next steps for solving an equipment problem on Monday, the way that Tony did. Other lessons – or no lessons – could be learned in all of these situations.

According to Berger and Luckman (1967) common sense knowledge "is the knowledge I share with others in the normal, self-evident routines of everyday life." (p. 23). Schuetz (1953) defines common sense as a system of constructs for organizing the world that are based on our individual circumstances and also based on an intersubjective and socialized accumulation of knowledge and assumptions.

> "In the natural attitude of common-sense thinking of daily life I take it for granted that intelligent fellowmen exist. This implies that the objects of the world are, as a matter of principle, accessible to their knowledge, namely, either known to them or knowable by them. This I know and take for granted beyond question. But I know also and take for granted that, strictly speaking, the "same" object must mean something different to me and to any of my fellowmen." (Schuetz, 1953, p. 8)

Similarly, Berger and Luckman differentiate between "the reality of everyday life that is taken for granted," which encompasses "the ongoing correspondence between *my* meanings and *their* meanings," (p. 23) and the aspects of the everyday life that are not identical. In the latter case, "others have a perspective on this common world that is different from mine. My 'here' is their 'there.' My 'now' does not fully overlap with theirs." (p. 23) According to Berger and Luckman, these differences occur, in part, because we each have different parts of our life which we apprehend routinely; that which we apprehend routinely makes up our taken-for-granted reality.

Second, not only is the learning not inevitable, but – as demonstrated earlier – the participants' conceptions of learning and their frames are different. Therefore, what is self-evident in the participants daily routines is likely to be different. For Stan, common sense is likely to be closely associated with logical, scientific thinking. For Sally, common sense is likely to be closely associated with intuition. On the whole, engineers identified more learning

incidents related to technical and operational matters, and human resource professionals identified more learning incidents related to business processes.

Finally, it is important to consider the hindsight bias that is inevitable in this type of exercise. Hindsight bias is the tendency for people to believe they could predict an outcome of an event after the outcome is known. The learning incident described by the participant is not only the most salient outcome, we also have the advantage of knowing its relative success and importance. Sally has had the opportunity to share, at least briefly, her reorganization recommendations. Joe has had the opportunity to respond to customers' questions about power electronics, and to see whether he learned the technology correctly and in sufficient depth to be useful. In hindsight, the learning may appear to be common sense, but it was not inevitable nor is the learning interchangeable (a condition required by Schuetz (1953) for common sense).

Success-oriented

Closely related to the hindsight bias, it was interesting to note that almost all of the incidental learning examples resulted in success. Several seminal studies have shown that incidental learning often occurs when mistakes are made (Marsick, Volpe, & Watkins, 1999; Wiswell, 1987; Marsick & Watkins, 1990). In fact, a few of the stories that were shared included mistakes that the participant made. For example, Mark shared an example of a time in which he was trying to engage a client to use his training services. He mistakenly assumed that the office that they were meeting in belonged to the person he was talking to, and tried to use the pictures and trinkets in the office as common ground to initiate the discussion. He has since learned to get additional information about the prospective client, to verify whose office they are meeting in, and to make few unsubstantiated assumptions. As part of each story, he shared how he was ultimately successful at that particular engagement or at future engagements.

Tony also spoke of the value of trial and error learning; he talked about learning from mistakes and he suggested: "*You learn something regardless of whether something is successful or you don't finish it, you learn something*." However, each of his incidental learning stories that had reached a logical conclusion had achieved ultimate success. (He did have one incident story that was in progress, but the indications were that his incidental learning was leading to a successful solution.) Therefore, the nature of incidental learning seemed to be equated in the participant's mind with ultimate success. That is, the user's perceptions of incidental learning was that learning occurred in instances where they believed they had successfully navigated a situation.

It was not as clear where the learning took place. It is somewhat natural in a workplace setting to place oneself in the best light. It is possible that this positioning impacted participants, leading them to include situations where they learned from mistakes, but ultimately benefited from the process. It is also possible that the learning was not complete or not full recognized until the participant had achieved a successful outcome. For example, in Mark's situation, he received immediate feedback that the office pictures he was using to guide discussion were a miscue. If I had interviewed him the day after this misperception had occurred, though, would he have identified it as a learning incident? Once again, common sense and hindsight bias lead us to believe he may have identified it as a learning incident. However, he could have also discounted this as an atypical event and continued his current habits. Moreover, he may have somewhat subconsciously experimented with other forms of verifying who his client was and engaging the client in discussion before he fully "learned" from that particular experience.

Although some questions remain, as the participants told their stories the proof of the learning seemed to come more from their successes than from their encounter with the problem.

In any case, it is notable that there were no stories of incidental learning where there was not an ultimate success.

Impact of Professional Context on Incidental Learning

A second research question asked: How does professional context impact incidental learning? Context has been shown to impact incidental learning, but there has been little research on the impact of professional culture. Professionals, according to Raelin (1991), can be described as "having superior intellectual training, maintaining their own standards of excellence and success, and being supported by associations that maintain the quality of the profession" (p. 8). Schön (1983) notes that we look to professionals for their expertise and ability to solve social problems in our social institutions and, in return, we grant them latitude in identifying the rights and responsibilities of their peers. Occupations, or occupational culture, is typically defined a little more loosely and apply to a broader group. Nonetheless, Van Maanen and Barley (1984) identify an occupational community as a group of people who are engaged in the same sort of work, who draw their identity from that work, and who share a set of norms, perspectives and values. What may differentiate "professional communities" from "occupational communities" is the degree of autonomy, self-control, and respect held by the group. The more autonomy and self-control, the more a group is defined as professional, and the more likely the members are to identify themselves with their profession, rather than their organization. The less autonomy, self-control, and respect offered to an occupational community, the more likely that the individuals will identify equally, or more, with their organization. But technology and organizational changes are changing these categories and blurring these lines.

In my research, I selected individuals who were members of professional organizations in their field in an effort to get some professional allegiance. Moreover, I started my participant

selection by attending the state-wide meetings of each association meeting. While neither state association leader formally endorsed my project, each state leader was supportive of my research, providing me with at least one of the following: access to the meeting, initial introductions to key members, an opportunity to present my research to the state board or to members, a complementary meal, guidance for working with their membership. I chose to work through the associations for two reasons. First, I wanted to include individuals who were – at least to some degree – associated with their professional organizations. Second, I was interested in the impact of these professional associations on the participants' learning.

The choice of associations immediately raised some differences. Members of Institute of Electrical and Electronics Engineers, Inc (IEEE), for example, were required to meet more rigorous qualifications:

> Member grade is limited to those who have satisfied IEEE-specified educational requirements and/or who have demonstrated professional competence in IEEE-designated fields of interest. For admission or transfer to the grade of Member, a candidate shall be either:
>
> > a) An individual who shall have received a three-to-five year university-level or higher degree (i) from an accredited institution or program and (ii) in an IEEE-designated field[16]
> >
> > (b) An individual who shall have received a three-to-five year university-level or higher degree from an accredited institution or program and who has at least three years of professional work experience engaged in teaching, creating, developing, practicing or managing in IEEE-designated fields; or
> >
> > (c) An individual who, through at least six years of professional work experience, has demonstrated competence in teaching, creating, developing, practicing or managing within IEEE-designated fields. (www.ieee.com)

[16] IEEE-designated fields include: Engineering, Computer Science and Information Technology, Physical Sciences, Biological and Medical Sciences, Mathematics, Technical Communications, and related Education, Management, Law, and Policy. (www.ieee.com)

Members of the national Society of Human Resource Management (SHRM) are only guided by the following requirements: "Individuals engaged in human resource management at the exempt level," (www.shrm.org) while members of local chapters aren't requested to prove any minimum qualifications for membership.

Engineers are one of the prototypical professional groups and are always referred to using the umbrella term of "engineer," similar to the way we identify doctors, lawyers, and accountants (e.g. National Academy of Engineers, 2004; Nguyen, 1998; Raelin, 1991; Schön, 1983; Trice, 1993). Given that, and the membership requirements for IEEE, I thought that the members of IEEE were likely to be a more homogenous group. The perception of the membership was quite different. At the initial state-wide meeting that I attended, almost every member I talked to emphasized the major differences between the various branches of engineers (e.g. mechanical engineers, civil engineers, electrical engineers), although they were all attending the IEEE meetings. Researchers (e.g. Nguyen, 1998), have referred to these branches as specialties. While the association members described the technical differences between the branches, the differences in professional culture were not apparent. Because the issue was raised, it is worth noting that I may have grouped individuals in ways that does not match their own identities. Therefore, I watched for this issue during the interview process. I noticed that while their area of specialty did come up on occasion during the interview, it was not central to the conversation. In fact, most participants worked in or were educated in more than one type of engineering.

Before conducting the interviews, I expected that I'd find a rich source of incidental learning at professional association meetings. Two common benefits of joining professional organizations are networking and learning (Merriam & Brockett, 1997; Raelin, 1991). Networking provides access to other members, jobs, updates on what other's are doing, and

opportunities to share successes and to share frustrations. Learning opportunities include monthly talks, courses provided for continuing education credits, conferences, and publications. Both seemed to provide fertile ground for incidental learning. In addition, the research of Mealman (1993) and Lawrence (2000) both showed the importance of incidental learning for adults in formal learning situations; it makes sense that the same would apply in non-formal learning situations. Finally, from my own experience, I know that professional associations are good sources of incidental learning. My research results, however, were not as clear.

Association Meetings

Information regarding the impact of professional culture or context on incidental learning was drawn from the entire set of interviews. However, one question from the third interview directly addressed this issue: *"Do you think that your professional education and experience impact your incidental learning at work? If so, in what way?"* In reviewing my data, I realized that this question was flawed. My original interest had been in finding out what impact professional associations had on the participants' incidental learning, but then I was also interested in knowing if they felt that their formal education had any impact in their ways of thinking. As a result, the question was too broad and confusing. Some focused more on their college education while others focused more on the professional association meetings. Often, participants answered "absolutely" or "definitely," but really couldn't come up with any specific examples. From the discussion, it was difficult to determine if there really was learning that they could not recall or if there was no learning, but they – like me – believed that this should be a context for learning. As a result of these issues and the vagueness of the answers, I got lax on this question. Rather than being clearer when I asked the question, I assumed that there was little

incidental learning, and I was less careful about how I asked the question and provided less follow-up to explore answers.

Nonetheless, there are a few tentative findings that can be related. First, participants had difficulty coming up with specific examples. As mentioned earlier, while eight participants answered affirmatively – often with words like absolutely or definitely – only four of the 14 participants provided specific examples of incidental learning, and one of these examples came from the workplace rather than from a professional association or educational setting.

Second, learning styles and frames seemed to play a role in the responses. For example, Yang struggled with the notion of incidental learning from the start. When he did identify examples of incidental learning, he typically discounted them as unimportant. In response to this question, he replied that he had the highest degree (PhD) already and had no need for learning. He also indicated that he did not learn from his participation in professional associations during college. As we talked, however, he shared some incidental learning from the meeting he and I attended (learning about outsourcing, engineering shortages, and the relationship of immigration to the field of engineering), and he shared some learning from his student membership (learning about robotics and about factories). However, he said that none of this had any impact.

Stan shared the importance of his participation in association and standards-setting bodies, as part of his job is to identify new technologies. However, he said that this wasn't incidental learning, as it was part of his job. His only incidental learning was learning how to give papers and presentations to large audiences.

Tony preferred hands-on learning to any type of formal or non-formal setting. Jessica's learning came from her interaction with others. In her efforts to set up programs, Jessica learned for herself that there is truth in the adage that "you can't please everyone." Peter said he learned

things that were secondary to the presentation, like learning about vision at a robotics presentation. He claimed that he was later able to apply these things, but he wasn't able to give a specific example.

While these stories provided little insight on the impact of professional associations, each of these stories fit the frames and learning styles that I had previously identified for these individuals.

Human resource professionals answered the question in a more positive way, but there were still few examples of actual experiences. Most examples centered around observations – observing how speakers presented, observing how meetings were conducted or how more seasoned professionals networked. Once again, there were numerous instances where the answers stayed at the general level:

> *"you also learn from casual conversation about what somebody's doing or what somebody else isn't doing or what worked or what didn't work, best practices, you know, those kind of things…" (Mark)*

Gina, who found learning in every experience, expressed learning in professional associations the same way. Using the metaphor of learning as a dimmer switch, she indicated that professional association meetings sometimes turned up the dimmer switch on something she already knew; at other times, the meetings turned on the light switch, and the dimmer switch would get brighter as she encountered the idea again. Susan, who often commented that she had kept her experiences in a fairly focused area of human resources, answered that she "absolutely" learned from these settings. However, she went on to note that by the time she started attending association meetings she already knew most of what she needed to know. She went on to say that she typically selected meetings for topics within her narrow area of interest. Again, this fit

the pattern of her interviews. While Susan emphasized that she knew we learned from all types of daily settings, she struggled to identify learning outside of formal educational settings.

While learning styles and frames remain important, the next step will be to understand how these styles and frames are impacted by one's profession. To fully understand the role that the professional association plays in incidental learning, it will be important to parse the impact of the formal educational training from the ongoing nonformal and informal professional learning.

Choice of Profession

In the first interview, I asked participants how they got into the profession. The answers were typically indirect. Often, the respondent went back to childhood, explaining the series of job that led to their current job, or the experiences in childhood that led them to go into a particular college program. Of course, this question was asked after they had shared numerous learning experiences in childhood, so that may have impacted the answer. Many – but not all – of the engineers entered the profession because they loved technology, electronics, computers, or math. A few indicated that they thought that engineering was the best way to have an impact on the world. There was at least one who mentioned the financial stability of the field. One person never really answered the question, as if the path he'd taken had happened to him.

None of the human resource professionals entered the field initially by plan, all fell into or came into human resources through another avenue – including accounting, psychology, paralegal work, banking, and sales. However, most of the individuals I talked to have actively chosen to remain in the field because they "love it" or feel it is a good fit.

> *Mine was totally by accident.…I was working on a business degree. Really saw that felt that accounting or marketing or some kind of field. By accident, a regional recruiter from a corporation was recruiting and we ended up chit chatting and she followed up with me…And she called me to say that she had a*

> *HR position and would I consider something like that? And I was like, "Sure." I was just out of school without any experience…And from the beginning I realized that I really enjoy it. It's the kind of work that I LOVE to do and it just worked well. And I just continued and haven't obviously considered anything else. Actually in fact two different times in my career, the last 12 years or so, I've had people who have asked me that kind of question. "Have you thought about maybe leaving HR and working in our business? Did you want to come and join us?" And there have been great opportunities. But that was really a time for me to seriously think, "What is it that I want to do? Is that beneficial?" Obviously it pays maybe more money. And I came to the conclusion that no, I really, really enjoy my role and wanted to stay in HR. (Rasa)*

> *but I really like [what] I'm doing here where you're providing more of a softer product if you will, management developer or individual development counseling the type of products that make people better, that make organizations better or make them more successful and more profitable, those kind of things. That to me really works because you know, you're really helping the organization and probably people, people to become better, be more satisfied with what they do so it has a kind of nice feel. (Mark)*

In a few cases, participants have come to recognize that there is a particular area in the human resource field that is best suited to their talent and skills.

Concluding Thoughts

There is insufficient data to make firm conclusions in this area. In general, human resource professionals talked about learning from observations or from interacting with people. In general, engineers stressed that they went to hear a talk or to network, but minimized the incidental learning in that setting. Moreover, these findings seem to confirm some of the findings found regarding the influence of framing and learning styles. More focused research might provide better insight into whether these professional associations provide learning that is not recognized or whether the participants' – particularly the human resource professionals – expectations of learning are really not being met.

Ways of Knowing for Incidental Learners

The third research question asked how incidental learners know they know in the workplace? Studies of epistemology have shown that individuals vary in the methods used for making meaning or "coming to know" information. For example, some individuals rely solely on external authorities while others rely solely on their personal experience. While formal learning is measured using formalized tests, papers, and grading systems to identify whether the individual has learned, and informal learning typically uses the learner's success in achieving their goal to determine if the individual has learned, what criteria is used to determine that incidental learning has occurred? How does the individual know that they have learned something? This topic was explored during the third interview with each participant. During the third interview, we explored the meaning of their earlier stories to their life and learning. After clarifying and exploring the meaning of the incidental learning experience, the participant and I explored how and when the individual knew they had learned something and how they assessed their learning or determined that it was right. In some cases, the participants had a quick, clear response. In other cases, they had to spend some time thinking about their responses.

Human resource professionals offered the broadest range of methods for describing their ways of knowing, with most participants using a different method for each example of incidental learning. Overall, participants most commonly used reflection-in-action or reflection-on-action (see Schön,1983), but they also relied on experts, or checked their tentative knowledge with multiple sources. In addition, there were one or two cases of subjective knowing (see Belenky et al., 1986). Engineers, on the other hand, almost exclusively used reflection-in-action or

reflection-on-action to validate their knowledge. However, there were also examples of relying on experts and examples of times when they used multiple sources to assess their learning.

Reflection-in-Action and Reflection-on-Action

Reflection-in and reflection-on-action comes from the research of Schön (1983); he describes these constructs as "an epistemology of practice." Reflection-in-action typically refers to the reflection that occurs in the midst of an activity, reflection done at a time when the participant "can still make a difference to the situation at hand--our thinking serves to reshape what we are doing while we are doing it" (Schön, 1987, p. 26), while reflection-on-action refers to reflection after the fact. There has been some debate on where the demarcation lies between the two (see Eraut, 1994; Smith, 1999; Usher & Johnson, 1997). Some researchers (e.g. Gilbert & Jackson, 2004; McAlpine & Jackson, 2000) have started using three concepts to help clarify this distinction: reflection-in-action, reflection-on-action, and retrospective reflection-on-action. According to this construct, reflection-in-action occurs while the particular event is in progress; for example, the participant reflects, learns, and adjusts his or her actions during a meeting. Reflection-on-action occurs "within a time-frame in which the issue can still be addressed, but not in the midst of activity" (Gilbert & Jackson, 2004, p. 2). Retrospective reflection-on-action occurs later when the learner can no longer apply lessons learned to the situation at hand, but may be able to apply the lessons to later experiences. For example, developing a set of best practices after completing a project is an example of a retrospective reflection-on-action.

The constructs of reflection-in- and on-action and have two key aspects that are relevant to the findings of my research. First, as Schön points out, the professional practitioner:

> has built up a *repertoire* of examples, images, understandings, and actions....When a practitioner makes sense of a situation he perceives to be unique, he *sees* is *as* something already present in his repertoire…[That is, the professional] sees the unfamiliar, unique situation as both similar to and different

> from the familiar one, without at first being able to say similar or different with respect to what. (Schön ,1983, p. 138).

Second, Schön describes these as a sensemaking process, a process of experimentation, and a "reflective conversation with the situation" (Schön,1983, p. 141) where the professional conceptualizes the situation, takes action, evaluates and modifies his or her response, takes action, and so forth. As professionals take these steps, they have an opportunity to use all their formal knowledge and practical experience to help them assess the situation and plan their action.

Many of the participants' explanations of their ways of knowing fit this category. In these instances there was an element of "gut feeling" expressed directly or indirectly along with some more concrete evidence of learning, such as seeing how a machine – or another employee -- performed or responded in a given situation. In the examples that can be identified as reflection-in or reflection-on-action, the "gut feeling" is always tangibly different from folk learning; the participant provided some evidence that he or she was using professional knowledge and experience, what Schön refers to as "seeing-as" – seeing a situation as it conforms to and varies from other professional experiences that the participant has encountered.

For example, Mark, a human resource professional, shared a learning experience he had in going to a customer meeting with a new boss. One of the things he learned was

> *to not get caught in that situation where I wasn't in control of the sales call, that I should have spent some time before we went out there to make sure that I had orchestrated the call appropriately , that she knew what she was supposed to do; I knew what I was supposed to do (Mark).*

Mark determined that this learning was valid by

> *Well, you know, I related it back to previous experiences that I knew that that was the right way to go and because I was relatively new in this company, you know, this was the general manager, you know, I made some assumptions that people*

> *knew what they were doing. Bad assumption, okay. You have to clarify those assumptions…and validate those assumptions to make sure they are correct. So you know, previous experience let me know that I was learning then and I just, you know, being in the moment you knew that it wasn't the right way to go….And on subsequent calls we did a heck of a lot better because we pre-planned. (Mark)*

Rasa, an experienced professional who was new to her current firm, shared a learning experience where she not only learned that she didn't like an individual's method of working with the group, but at a more general level she learned more about what was and was not the norm for group dynamics at the organization. When describing how she validated her learning, she explained

> *In this case I would say this was one of those situations that is not black or white, I'm right or I'm wrong. It's just my assessment of the situation. And that was based on my expectations of people, action/reaction in such a meeting. [I] haven't experienced that level of that kind of interaction in the past. [I h]aven't observed something like that in past. All of a sudden it was different. That's one. But it wasn't necessarily right or wrong. So if I were to come out of that meeting and have 3 people say, "Oh that's how we interact here. We want people to be very open and share their feelings." Then I would have probably changed my mind and said, "Oh that's acceptable. This is how they do it here." (Rasa)*

Rasa went on to say that the reactions that she saw from others implied that this was not the norm of the organization, and that the behavior she had seen was not acceptable.

Sally, another human resource professional, had been working professionally for many years when we talked. She shared this story about how she validated her incidental learning about people in the workplace:

> *I have been doing this for 15, 20 years that if I have a - - if I have a funny feeling I will - - I now go to facts to try and validate that feeling. Not that I think the gut instinct isn't correct, but I try to back it up because I have been encouraged to explain that to people. "What is it that you don't like? What did he say? What did he do?"…[The company] is more fact based. We have - - I think it has become more fact based. I never thought of - - I never really thought about it. Um - - you get so trained when you are interviewing and when you are in employee meetings and the phone surveillance and stuff like that, that you really watch for everything. You watch for language. You watch for body language. You watch for everything to try and pick up any - - any visual clues or auditory*

> *clues that you might get from the individual and it just becomes second nature to be observant to that. (Sally).*

All of these stories are examples of reflection-in-action. Reflection-in-action is a mode of being and doing where the professionals find ways of interspersing pauses or moments of reflections throughout their actions which allow them to reflect on the experience and to use this reflection to make their next move. Reflection-on-action follows a similar process, but allows the user an opportunity to reflect between meetings and between actions. As mentioned earlier, some participants' examples evidenced both types of reflection. Tony is a good example.

Tony provided both technical and managerial examples of reflection-in and reflection-on-action throughout his stories. His job at this firm was his first foray into executive management, and it was clear throughout the interviews that he was struggling to balance the need to act like a responsible manager, to follow engineering protocol and to respond to the directives of his boss with his success in "winging it." Some of his incidental learning came in finding ways to handle the challenges of management. Other examples of incidental learning occurred ruing technical endeavors.

One metaphor he used to describe the process he used, and the learning involved, in testing technology depicted the process of reflection-in-action:

> *A little to the left, a little to the right and you see if there's another path you could take and if you walk down the woods sometimes you come to a perfect fork in the road, you can go left or right. If you go down a path that has no forks you can go back and find a path that's hidden and it happens all the time when I go hiking too because I like to go trail blazing and there's not always a cut fork in the road where you can a or b. Sometimes there's a little hidden path and there's a little way that you didn't expect was going to be there so you know, as an engineer if you backtrack a little bit sometimes it's not a terrible thing. (Tony)*

Other examples that he used represented reflection-on-action. For example:

> *You just stick your neck out and say well let's do it this way or why are we going to do it that way? I can't tell you but let's do it that way…[then], you're lucky if you [are successful for] a month, [if] you [are successful for] two months well I'm batting two hundred; I'd better like back off a little bit and take the safe approach. I'm learning my lesson you know? If I can wing it and eight out of ten times, nine out of ten times come up with a good solution well I'm just going to stick to that and I've been pretty lucky in my career and I'm going back fifteen years but don't tell my boss this but I love to wing it because you never get anywhere just playing it safe all the time and you never get anywhere taking the guaranteed solution approach. You've got to go for the eighty-five percent solution and sometimes you have to stick your neck out and you've got to be daring enough to say well I made the wrong decision but last month I was nine for ten you know, so you've got to - - and you know what? People will accept that….*
>
> *if I had a bad day yesterday I'm going to take a little safer approach today but you know it's like that baseball team that tries to steal home too much. You know you're not going to always be able to do that and if you keep losing games you know, it's not just a game anymore. It's, now it's morale…it trickles down so you know you have to kind of tailor your decisions to your past days, weeks, months and learn from your mistakes and learn from just experience. Like I say I might weigh and I say instead of going with that vendor let's go with this other one and if you took the safe approach and went with that first vendor okay, you're not going to find out that A, this other vendor might do a better job, they come in quicker, but at the same time you might find out well this other vendor you screwed up and they're going to try just twice as much and take twice as long so then the next time you have that decision you're going to look back on the payroll. I made that decision the last time and it was either a plus or a minus and that's got to kind of tailoring and that's the meandering path.*

While Tony said that he "winged it" and said that he didn't liked to get bogged down in some of the layers of planning often associated with engineering work, it was clear throughout his stories that he relied on the knowledge that he had accumulated from the time he was a small boy. Much of this learning was expressed as technical design and troubleshooting skills, but he also used broader life lessons. For example, Tony shared that his organization was up against a deadline getting government approval. His bosses were pressuring him to call his contact three times a day. Tony, however, looked at how he had handled other situations where the "best" solution included elements out of his control. In those situations, he'd looked for actions that he could take that *were* within his control and proceeded in that fashion, preferring to get a

workable solution rather than chancing no results. He applied that lesson to his existing problem and came up with an alternative method for getting temporary approval if the formal approval didn't come through in time.

As I listened to Tony, I was impressed with his style and his grasp of situations, and I was also aware that his approach would not be successful for everyone. For his self-described "winging it" form of action to work in his current job, it had to be grounded in significant expertise, honed observational skills, and sharp critical reflection abilities.

Peter followed a much more formal repertoire when he was evaluating his incidental learning. His initial learning would occur on a gut-level understanding of a problem or situation. Sometimes he would use his understanding and experience from outside the workplace – for example, his understanding of the principles of motion learned from driving or skiing – to help him. However, for Peter, the learning was not complete until he had a chance of fully testing the knowledge:

> *it's a process of gathering information, developing an idea of what may be going on, testing that idea, and in the end [seeing] whether everything really makes sense…it's a basic scientific process that (pause) it's not like math; there's no real truth, it's just you've got something, you've got to a theory and with testing and time you can't find any reason why the theory isn't valid. (Peter)*

Nonetheless, while Peter wasn't comfortable claiming that the learning was complete before it was fully tested, he did often come up with tentative incidental learning that he was willing to experiment with. For example, in one case, he thought he'd unexpectedly learned that there was a stability problem in the equipment – and what change would fix it. He got some validation when he talked to another engineer who had simultaneously identified the same problem (but offered a different solution). He was comfortable enough with the idea to incorporate some

changes into future designs, but he was not willing to claim that the learning was completely validated, as they had not been able to prove it through a strictly controlled test.

Reflection-in and on-action can be seen in newer employees and in more experienced employees. Rasa's situation, described earlier, was an example of reflection-in-action. (Rasa is an experienced professional who was new to her company.) Jessica, another newer employee, had been out of college for a few years when we talked. She provided an example of reflection-on-action. Jessica had a good, professional job, working for the same firm in two locations. She was bright and interested. As we talked, I could see how she was learning both technical and professional aspects of the job. She described incidental learning experiences where she learned how to interact with clients at a job site; when asked how she evaluated her learning, she said:

> *gauging the response of how maybe the second time around where uh, if I saw an interaction and I picked up what I thought was you know, that was the proper way to present the information or answer the question and then if I was placed in that situation and presented the information the same way, if the resulting response was positive then I think I learned it the right way. If it's negative then it would -- kind of triggered that way then maybe that's not the blanket answer to how to answer the question. (Jessica)*

Jessica went on to provide an example of when she had followed this procedure to "fix" how she handled a problem with a client.

Sally and Zoe had each been working professionally for many years when we talked. Sally's experience, described earlier, represented reflection-in-action. Zoe's experience provides an example of reflection-on-action. Zoe, an engineer, shared this story about how she validated her incidental learning about how she projected herself in meetings she was leading:

> *I see myself, I see the human brain as almost like a computer, you know, you get data, you know, and then after awhile you form some patterns, and you know which patterns say you may be harsh or you may be – you have to change, it's just something that comes,…it's not something that, uh, you go and put some equation there…And if you hear this from some close friends, and you hear it from your*

> *family, right? And then you see that when I go and I say something positive, and I approach it differently, and I have some positive feedback. (Zoe)*

In each of these cases, and in the previous cases we mentioned, the individuals based their stories on "the repertoire of examples, images, understandings, and actions" (Schön, 1983, p. 138) that they have built up from their education and experience. They then took a particular situation, held it up to their experience, found what was unique or different and decided how to take action. They also followed the second principle that Schön suggests; they had "a reflective conversation with the situation" (p. 141). They took action. For example, in Jessica's situation, she saw what she (or someone else) did wrong, tried a new way of doing it based on her knowledge, and verified by watching colleagues, and seeing what result she got from the revised procedure. In Zoe's situation, she took in the feedback on her performance, did some preliminary analysis, checked with others who she trusted and who had a different perspective, tried out a new way of leading the meeting, and watched for the reaction. Rasa, Tony, Peter, and Sally also followed a similarly reflective conversation.

Some of this action-reflection-action cycle may come within minutes, as it often did for Tony as he was doing equipment tests. Other times, it took place over longer periods of time, as it did for Jessica, as she was trying different ways of preparing for and being in her meetings with clients at job sites. Nonetheless, reflection-in and reflection-on-action formed the main way that the professionals validated or assessed their incidental learning experiences.

Schön's general epistemology of practice appears to be the most important construct in this research and many participants used both forms of knowing. However, it is also worth noting that there was a tendency for human resource professionals to describe their learning in ways that depicted reflection-*in*-action and a tendency for engineers to describe their learning in ways that depicted reflection-*on*-action. Many of the ways of knowing described by engineers

appeared to follow a procedural way of knowing defined by Belenky et al. (1986) as separate knowing, using impersonal, logical ways of establishing truth claims. It is interesting to note that this approach fits with the frame previously identified for engineers -- evaluating knowledge objectively using logical and technical arguments. There was only one possible example of connected knowing, Belenky et al.'s (1986) other type of procedural knowing, among the engineers, but there were several examples of connected learning amongst the human resource professionals. Connected knowing is a procedure for analyzing the truth that is based on the individual coming to understand the other's perspective and reasons for that perspective. "Connected knowers act as…allies, even advocates, for the position they are examining" (Clinchy, 1996, p. 208) at first, although they may ultimately not agree with that position. For example, Mark often used a connected form of knowing, as shown in an earlier example:

> *I think you really have to have an open mind and really try to understand the person for whom they are and you know what wonderful attributes they can bring to the table. There are several people - - I'm sure you've experienced this where they you know, they come in with a, they come in with a reputation and but after you get to know them perhaps they're a little bit different than what their reputation is so you learn about them by spending a little bit more time to get involved and really understand where they're coming from so (Mark).*

As Belenky et al. (1986) note, all procedural knowers use a combination of separate and connected knowing. Nonetheless, connected knowing is more often identified as a feminist construct. In this study, most human resource professionals were females and most engineers were males. Further, separate knowing is also associated with more traditional forms of higher education. It is important to note, however, that the data collected in this study is not sufficient to definitively identify engineers as separate knowers and human resource professionals as connected knowers. It would be a useful avenue to pursue in future studies.

Other Forms of Knowing

Reflection-in and on-action was a nearly ubiquitous form of knowing, applying to most of the participants. Almost half of the participants also had at least one incident where they relied on expert knowledge to validate their incidental learning. Expert is defined "as a person who has special skill or knowledge in some particular field; specialist; authority" (Random House, 1999). In these cases, the participant identified the person as an expert either for their special skill in a particular area, their experience in a company, or knowledge of a field. Expertise, therefore, was a relative term. The experts were not necessarily identified as experts in their field by some objective standard. Nonetheless, all the stories shared seemed to support that the "experts" had additional and sufficient expertise to serve in this function for the participant's purposes.

For example, Stan worked in an organization that was heavily involved with sports. Stan had no sports expertise (or interest in sports), but shared incidental learning stories of learning more about sports from his participation in the company. When asked how he evaluated the incidental learning, he replied:

> *Well that's a good question. I assume everything that I'm hearing from those sports guys is accurate because look at where I work I mean, these guys should know what they're talking about. It's not - - it's their business; it's their job…(Tony)*

One of Mark's stories of incidental learning had two parts: one, the recognition of the power of networking and two, the need to do more networking. Asked how he evaluated this knowledge, he said:

> *Well, I had good mentors and friends who validated, you know, that's what to do. One in particular,…she has her own company… and essentially, she teaches mostly women how to network, how to be successful. (Mark)*

Mark went on to describe some of the things she taught him and the ways they practiced their networking skills.

Susan was working on staffing at one point. When employees had issues to deal with, they would come to her as she was the "face" in HR that they knew. As she sat in meetings with other human resource staff, she picked up her "functional ER [employee relations]" skills and knowledge. When asked how she assessed or qualified what she was learning, she shared:

> *…I would take her [an HR manager] word for it if it was something where it was truly a legal issue. I didn't necessarily go back and try to verify it or research it because I doubted her. I mean, she had years of you know, experience behind her. She was brought in, you know, very much as an expert and so I did take her word for it. (Susan)*

Reliance on experts differed from the related concept of received knowledge in Belenky et al.'s (1986) work. Belenky's construct of received knowledge assumes that the individual is unable or unwilling to develop knowledge of themselves or of situations on their own and are looking to others to provide definitive answers. In this study, participants were relying on experts input as one part of their procedural form of knowing.

There were also a number of situations where participants used multiple sources to validate their learning. Lani, an HR generalist, was finding that her current employee shared less information with employees than her current employees had shared. She gave some specific examples where she was learning, incidentally, that her style would need to change. When asked how she determined that her perceptions were accurate, she said she "*just kept asking the same thing…O.K. So, do we share this? Do we not share this?*" Lani would ask her boss and she'd ask her peers.

Rasa, also a fairly new employee, often verified what she learned from by looking for validation or congruence from several sources. In one simple instance, Rasa, a new employee at

her firm, discovered that her use of voicemail was not effective. She found that she had more success using e-mail or tracking down the managers she needs to talk to at the top of the hour and walking with them between meetings. In this case, she used just two methods of verifying her learning:

> *part of it was my own assessment because I didn't get the response back I was expecting, right? And the fact that I had many e-mails and fewer voicemails. So that's another fact that kind of confirmed. And then I spoke with my manager, also to confirm the fact that if I wanted a response, it was probably better to send an e-mail and wait for them to respond. So a couple different things. ... It is [working]! And they're really good with e-mails. They truly are. And now I know who to… but I know they're in meetings at top of the hour and bottom of the hours, I'll go look for them and quickly find them. Or I'll talk to them in between their meetings and follow them from one meeting to the next. It's working pretty well. You find the way that works for them. So what I'm learning is it doesn't bother them. In fact I was looking for one of the leaders the other day and he's like, "The cafeteria is closing right now. Do you want to walk with me?" So we walked down. He got his food, and walked back up and we resolved a couple of business topics that we needed to discuss. It was like a half hour meeting, but in a hallway. So you just learn, "OK, they're not bothered by that." It's just a different kind of atmosphere. Not negative or positive, just different. (Rasa)*

Zoe and Jessica also looked to multiple sources to validate their learning. For example, when Zoe's mentor provided her unsolicited feedback on how she came across to the group she was working with, she responded by looking to others and looking within to evaluate what she was hearing.

> *and it just hit me, you know like, I went "Oh my God" really this is the perception I give – like very hard treatment, very hard, and that gives me an idea that I –felt- but I did not want to admit… [and], I mean it's not only because I hear, um, a perception, you know , like the perception I form, as I said…I heard some feedback from people, but also I just bounce it back to my family. And, I go back for instance, I was telling my daughter, "do you think I do this? How do you perceive me?" I tell my son, I ask my husband. I just, I don't know, I (pause), I want to be sensitive to how people are perceiving, but you find out your family who knows you perceives you...(Zoe)*

Her daughter confirmed what she had heard at work, and Zoe went on to say:

> *And so, but, I don't know, you learn a lot also from your family, from your own people, and then you bounce it back with your close friends or your colleagues and associates, and you adjust accordingly…And ultimately you have to be open and honest with yourself to put (pause) to balance input. And there's some things that come, you come into terms with the way you were raised, the whole cultural thing and it's, I don't know, if it's something you can control to change, I think we can change our environment, the way we were brought up and all that, but there's some things that are so ingrained in our personality (laughing) (Zoe)*

Conclusion

In this study, I examined participants' phenomenological experiences of incidental learning at work in the context of their lives, with specific focus on the meaning of learning, the type of work they do, and their reason for entering the profession. Analysis of individual experiences was done via profiles, and analysis of thematic findings was done across all participants.

Findings showed that in the "lived world" experience of the participants, the nature of incidental learning is mediated by the individual's conception of learning and learning style. At a professional level, frames and reflection-in-action further guide the focus and validation of the incidental learning. For the researcher – and perhaps for the co-workers or participants themselves – incidental learning is easy to overlook; lessons learned often appear to be simply common sense after the fact. This may, in part, be due to the fact that learning seems to be closely associated with successful endeavors; stories of incidental learning ultimately had successful outcomes.

Existing research show that context plays an important part in shaping incidental learning. Context has been defined as a particular experience (Marsick & Watkins, 1990; Cseh, Watkins, & Marsick, 1999), as the larger socio-economic, political, and cultural context (Cseh, 1998), or as the structural context (Ellinger, 2004; Ashton, 2004). This study has expanded the

notion of context to show how the elements of an individual's personal and professional context also impact incidental learning.

Chapter 6 Analysis, Conclusions, and Recommendations

Introduction

The purpose of this study was to explore the nature of incidental learning in the workplace. This study was one of a few workplace studies that focused exclusively on incidental learning, and it is the only study done using a phenomenological approach. In addition, this research was the first to explore ways of knowing for incidental learners. The study also examined the impact of professional culture on incidental learning.

A hermeneutical phenomenological approach was taken to study incidental learning in the workplace. Using Seidman's protocol, in-depth interviews delved into the experience of the participants and the meaning that they make of those experiences. Interviews were conducted with members of two professional associations: the Institute of Electrical and Electronics Engineers (IEEE) and the Society of Human Resource Management (SHRM). Findings were shared in two ways: individual profiles and thematic connections (see Seidman, 1998). The individual profiles provide a way of understanding the individual's incidental learning within the context of his or her own experiences, providing a more holistic, in-depth understanding of the incidental learning. The thematic analysis explored the commonalities and differences between participants and across professional groups.

This study was based on findings in existing research (see Figure 1 in Chapter 1 for a visual depiction of existing research). Previous research highlighted the importance of context, specifically prior experience, working and living, and political and socioeconomic conditions (Callahan, 1999; Cseh, 1998; Marsick & Watkins, 1990).

Findings from this study (see Figure 5) showed that in the "lived world" experience of the participants, the nature of incidental learning is mediated by the individual's conception of

learning and learning style. At a professional level, frames and reflection-in-action further guide the focus and validation of the incidental learning. Findings also show that incidental learning is easy to overlook; lessons learned often appear to be simply common sense after the fact. Highlights of the findings are provided below:

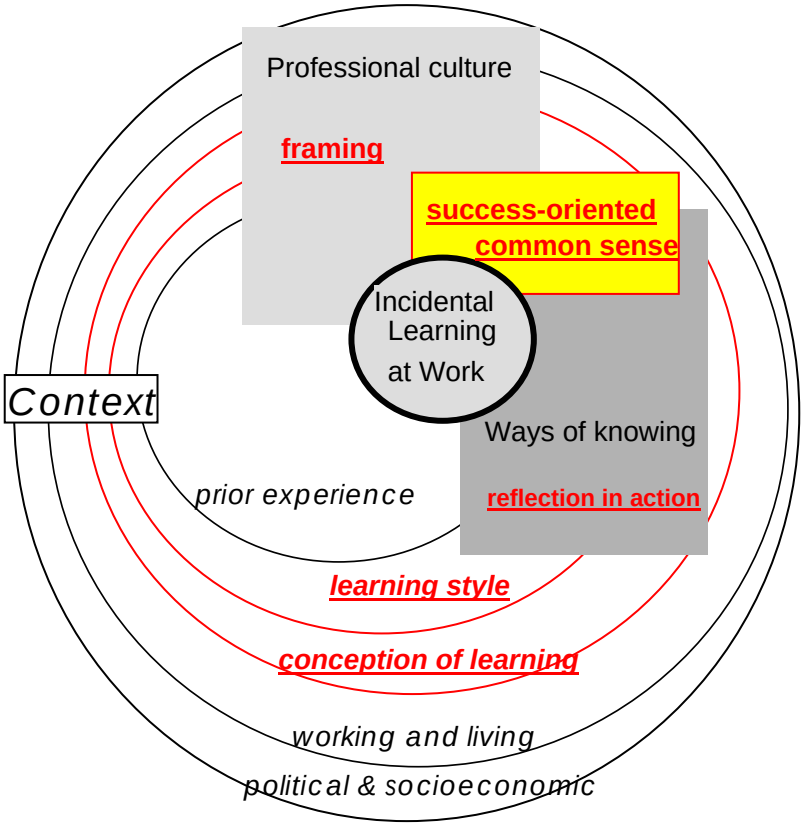

Figure 5 Research findings as they extend existing research on incidental learning.

Figure 5 provides a visual depiction of the research findings on incidental learning at work. Items in bold red are findings from this study.

Extending the Research

In this section, I will describe how this study extends the research and provide some implications for each finding, showing the significance of these findings.

Context

As shown in previous studies, context plays an important role in incidental learning. This study expanded our understanding of the individual aspects of context that are important to incidental learning. Past studies indicated that prior experience was important. This study looked at incidental learning in the workplace within the context of the participant's prior experiences. In the process, I identified the importance of an individual's learning style to his or her learning experiences. An individual's preferred learning style – whether kinesthetic, observational, theoretical/analytical, or interpersonal – was evident in their stories of incidental learning. It was also consistent with their stories of formal and informal early learning. Thus, we can extrapolate that the opportunity for an individual to engage in their preferred style of learning in their job will impact their opportunities for incidental learning. For example, if a kinesthetic engineer is working in an environment where he or she is required to rely on theoretical/analytical learning, opportunities for incidental learning will be reduced. For example, one engineer learned from interacting with peers. In her current job, employees shared knowledge and discussed jobs, problems and plans openly. She was able to provide a lot of examples of technical and procedural incidental learning. Prior to working at this site, she worked at an office that was not collaborative. She had fewer, more limited examples of incidental learning.

The second aspect of context that emerged was the impact of individual's conception of learning. In many cases, the variation of the participant's conception of learning appears to guide their openness to learning in certain situations. For example, those who conceptualized learning in a broad manner ("*learning equals experience*"), had more examples of learning and typically offered a broader range of learning experiences. Those who conceptualized learning in

a more narrow fashion typically had fewer learning experiences. This appears to be more than semantics. Some learners felt that they had learned all there was to know, either through advanced education or through years of experience. In these cases, examples of incidental learning – when finally identified – were often not clearly understood, were discounted, and received little reflection. It suggests that the conception of learning is closely related to our openness to new learning experiences. Further, participants differed in their approaches to learning. Those who tended toward a deep approach to learning had more incidental learning experiences to share and richer stories. As they told their stories, they often made connections between the incidents and sometimes between experiences on and off the job. They typically provided more implications of their learning. This has several repercussions for the workplace.

First, employees are told to manage complexity, handle ambiguity, think outside the box, and embrace change. The ability to learn from their experiences, to critically reflect on their learning, and to make connections between the various aspects of their job and sometimes between experiences on and off the job would appear to be valuable skills needed for today's workforce.

Second, results from existing studies have conflicted on the usefulness of incidental learning. This study has shown that different conceptions of learning and different approaches to learning have yielded widely different incidental learning outcomes. Therefore, the conception of learning of both the researchers and the participants is important to consider when designing and interpreting incidental learning studies.

Third, this study suggests ways that we might want to consider addressing conceptions of learning when we offer training, design jobs, or structure organizations to encourage broad and deep incidental learning.

Framing

Marsick and Watkins' (1990) model of informal and incidental learning starts with a diagnosis or a way of framing the problem. This model is a problem-solving model based on the problem-solving cycle of Argyris (Argyris as cited in Marsick & Watkins, 1990). Cseh's work on informal learning studied managers in Romania who were facing extraordinary marketplace changes. She based her study on Marsick and Watkin's model, but found that a new category emerged. Cseh found that "learning is embedded in the context of the learner and that triggers for learning are selected based on [the] framing of the business context." (Cseh, Marsick, and Watkins, 1999, p. 124). Callahan's (1999) research also confirmed that professional frames "support and constrain learning" in critical learning incidents (p. 206).

Frame analysis was identified and confirmed as central to incidental learning in the workplace in this study. The two professional cultures studied seemed to rely largely – although not exclusively – on different frameworks. In fact, problem-solving or a problem-focus was a frame for engineers, but not for human service professionals. The professional frames helped to identify what portions of a person's experiences were important, which experiences were salient, and when the learning had occurred.

Understanding the importance of frames on incidental learning offers us some options for surfacing these learning assumptions and helping workers to alter their perspectives. Frames are akin to figure-ground theory. When presented with a picture of the young lady/old lady, some of us will first see the young lady, others the old lady. When both are pointed out, most of us can see both after studying the picture. Professional frames may be a bit more entrenched. As one engineer said,

> *[My daughter and I] think very logically which some people who aren't like us say we're too black and white. But to us, in our words it's that we're clear about*

> *what we're saying and I guess to turn it around we'll say to the people who like things in the gray area are hiding something or trying to you know, pull a fast one on somebody. I mean we like clarity and with science and engineering is about formulas and rules and things fit and knowledge builds logically, one thing follows from another. (Stan)*

However, it is possible to broaden these perspectives. Callahan's (1999) research studied the bridging learning (defined as "the acquisition of knowledge, skills and attitudes during and/or resulting from…efforts to empathetically understand another's meaning," p. 116) of three professional groups – financers, technologists, and managers – working together in an incubator. She uncovered a number of examples of incidental learning where each group learned more about the other group's perspective, although in the end, each group retained its own frame and identity. Thus, simply providing more opportunities for more interactions between differing professions – that is setting up a context that encourages cross-functional engagement and learning– may aid the type of "bridging" incidental learning that goes beyond frames.

It would be useful to explore whether raising awareness of the frames that we each use, and that others use, to conceptualize learning may help us to expand our opportunities for incidental learning. This could be useful where cross-functional task teams are working on major projects or where companies or industries need to see situations from a fresh vantage point. Take advantage of all types of learning may offer the organization a broader array of options for moving forward.

In addition to the frames found in professional cultures, learning style can also be considered to be a frame used by participants. Therefore, to fully understand incidental learning in the workplace, it is important that we understand the complete context of the learner, including the employee's learning style and the employee's professional frames.

Ways of Knowing.

While some studies have lauded incidental learning as omnipresent and important (e.g. Ford & Herren, 1995; Rieber, 1991; Wilson as cited in Marsick & Watkins, 2001; Wiswell, 1987) and other studies have disparaged it as unimportant or prone to error (e.g. Dreyfus & Dreyfus, 2005). Yet, no study has examined on how individuals come to know what they have learned. This study found that most incidental learning in the workplace is validated in a manner akin to Schön's notion of reflection-on-action. In addition, in some instances participants checked with multiple sources or with on "experts" – those who should know about the topic at hand. By understanding the close connection between the incidental learning, the professional culture and framing, and the validation of the learning, we can begin to understand why context, professional training, and prior work experience are important delimiters of incidental learning. This provides us with an important new angle on the nature of incidental learning.

As the first study to focus on ways of knowing for incidental learning, more study is clearly needed. Understanding ways of knowing can offer us several benefits.

First, one of the reasons for exploring the learner's ways of knowing was to see if it provided any insights into why some individual's learn in a given situation while others do not. Preliminary results indicate that it does. Reflection-on-action – the most common way of knowing identified in this study – starts when a professional holds a given situation up against a repertoire of examples, and identifies what is familiar and what is unique. (Schön, 1983). Certainly, people in different professions are likely to have different repertoires against which they select (frame) and judge (evaluate) a situation.

Second, the evaluation of learning is an important component of any type of learning. Based on this preliminary research, it appears that critical reflection not only of one's learning,

but also of one's ways of validating the learning is essential to making the learning useful and for improving the process of incidental learning – particularly in organizations that want to support and enhance learning. Most participants said "that's a good question" and took a minute to reflect when I asked them how they came to know a particular fact, skill or attitude. Conscientious educators carefully select their evaluation techniques and scrutinize the results to ensure that the evaluation criteria actually measures the types of learning they hope to achieve. Helping employees to assess and hone their own evaluation techniques may be advantageous.

Common Sense and Success-oriented Learning

While some incidental learning incidents provided grounds for making major changes in the organization (i.e. the participant who learned that a department needed to be reorganized – and how to reorganize it), some incidental learning is more incremental in nature. The same can be said for other types of learning. Most studies of incidental learning in the workplace have focused on the critical incident technique, and looked for examples of critical incidental learning. For example, both Callahan's (1999) and Cseh's (1998) dissertations were designed to look at incidents that were perceived to have major impact. Cseh looked at significant learning events and Callahan looked at situations where the interviewee felt that he or she had contributed to a colleague's ability to work more effectively. To truly understand incidental learning, it is important to first grasp the full range of incidental learning experiences. This study has provided the opportunity to broaden our perspective on the types of and situations for incidental learning.

Discussion and Analysis

There are a number of issues worthy of note and discussion in the research results that have not been addressed. In this section, I would like to raise and examine these issues.

Background of the participants.

There is a fairly noticeable difference in the educational background of the participants (see Table 2).

Table 2. Educational Background of Participants

	Years in Prof. Assoc.	Highest Degree	Traditional/ Non-traditional?
Gina	6	Bachelors	Non-traditional
Lani	15	Bachelors	Non-traditional
Mark	4	Bachelors	Traditional
Mary	5	Bachelors	Traditional
Rasa	(10)	Graduate Degree	Non-traditional
Sally	10	Bachelors	Non-traditional
Susan	11	Undergrad Studies	Non-traditional
Jessica	5	Bachelors	Traditional
Joe	(25)	Graduate Degree	Traditional
Peter	15	Bachelors	Non-traditional
Stan	20	Graduate Degree	Traditional
Tony	3	Bachelors	Non-traditional
Yang	6	Graduate Degrees	Traditional
Zoe	25	Graduate Degrees	Traditional

(Items in parentheses were not provided; estimates are given.)

While all but one of the participants has at least a Bachelor's degree, the approach and timing of the education differed. All of the engineers have higher education degrees; four have one or more advanced degrees. Five of the seven engineers have attended traditional educational programs, meaning they went to school full-time immediately or shortly after high school and continued in school until they got their highest degree. All but one of the human resource professionals has a bachelors degree; one participant has a higher degree. Five of the seven human resource professionals attended non-traditional programs, meaning that they completed their degree later in life, typically working on the degree part time while working. Often, they explored several areas before they got their degree. The engineers typically selected the engineering/mathematics field before they went to college or in their first year. Human resource

professionals often entered the field indirectly; taking courses in the field after they started doing a human resource-related job.

Participants provided a variety of reasons for being in a given field. Many engineers had worked in electronics or mathematics from their youth, but the field was also selected as the field that "would make a difference" in the world. Human resource professionals typically said that they were in the field because they enjoyed it, but the field was also selected because it provided upward mobility that fit with their background and skills.

What is perhaps more important to this study is to look at how the differences in educational background may impact the participant's incidental learning. While there were exceptions, engineers seemed to rely on a more formal understanding of learning. As mentioned earlier, they often talked about testing hypotheses, solving particular problems, and testing their results. At times, they even referred back to the types of things they learned in school. On occasion, these formal ways of learning spilled over into their stories of learning from their personal life. However, the engineers typically expressed a love of technical, theoretical, or formal learning, or learning from reading books and newspapers, even in childhood.

Similarly, human resource professionals *generally* seemed to take advantage of learning gained from their life experiences, from observation and from interactions with others. The human resource professionals showed an equal level of interest in learning, but the sources were different. Once again, however, this difference can be traced back to childhood. For most of the human resource professionals, they learned from their engagement with others and with experiences. While some mentioned learning situations at school, they emphasized learning from mentors or experiences more than a particular lesson.

Therefore, while we don't have a complete understanding of the contextual and individual factors that brought an individual into a certain profession, the study has provided some interesting applications for the workplace. It is useful to recognize that the participants' educational backgrounds are likely to influence incidental learning. Awareness of this potential influence may allow managers and staff development professionals to take steps to bridge or expand contexts for incidental learning.

Intentional-Unintentional Continuum

It is impossible to study incidental learning without addressing the issue of intentionality. In fact, "unintentional learning" is an explicit or inferred aspect of many, if not most, definitions of incidental learning. For example, Kerka (2000) opens her Trends and Issues Alert (2000) on Incidental Learning with the following sentence: "Incidental learning is unintentional or unplanned learning that results from other activities." (p. 1).

Intentionality is not addressed in Marsick and Watkins seminal and often quoted definitions of incidental learning:

> Incidental learning, a subcategory of informal learning, is defined by Watkins as a byproduct of some other activity, such as task accomplishments, interpersonal interaction, sensing the organizational culture, trial-and-error experimentation, or even formal learning….Incidental learning….almost always takes place although people are not always conscious of it (Marsick & Watkins, 1990, p. 12).
>
> and
>
> Incidental learning is defined as a spontaneous action or transaction, the intention of which is task accomplishment, but which serendipitously increases particular knowledge, skills, or understanding (Marsick & Watkins, 1997, p. 187).

However, in their re-conceptualization of incidental learning, Cseh, Watkins, and Marsick (1999) do address this issue: "Incidental learning is unintentional/unexpected and almost always takes place although people are not always conscious of it." (p. 350).

Results from this study indicate that it is not always easy to gauge intentionality. At either end of the spectrum of planned learning, we can identify the learner's intention. Consider a hypothetical example. Perhaps I want to learn to program in html. I sign up for a course at my local college, attend classes, and study. At the end of the course, I can do rudimentary programming in html. This is intentional learning. Perhaps the teacher has a unique hobby. All her examples relate to this unique hobby. At the end of the class I've developed an interest in and learned about this unique hobby. This is likely to be unintentional learning.

However, of the other students who speak up, I find that one is grappling with similar marketing issues at work that I am dealing with. The two of us begin to chat and share our experiences. I may incidentally learn from our interactions. I hadn't *planned* to learn anything about marketing in this course, but I am more drawn to these conversations because they relate to a current need. This represents one of the scenarios where the degree of intentionality is blurry. To add to the confusion, my need to grapple with my marketing plan may be at the top of my "to do" list – or it may still be an idea in the back of my mind, something not fully articulated.

My findings indicate that participant's unexpected or incidental learning ranged from intentional to unintentional, often incorporating elements of both in the same experience. This supports Callahan's (1999) research. At the start of her research, Callahan (1999) assumed that incidental learning was unintentional. She found, however, that there was not a clear distinction. She noted: "As the possible byproduct of a great array of other activities, including other forms of learning, the results of incidental learning are not likely to be exhibited in any pure form. Put

another way, acquired knowledge, skills, and attitudes are likely to be a bundle of intentional and unintentional learning." (p. 199). She altered her model to incorporate this finding.

Moreover, Callahan noted that the participants who exhibited self-reflection and awareness in their lives, those who had begun to explore the meanings of the incidents, showed evidence of enhanced learning. The same applied to participants in this study. The deep learners were the ones who had reflected on their experiences, and they were typically the ones who spent more time thinking about the discussions that we'd had in our earlier interviews.

Clearly, this raises a new issue to be grappled with in future studies. Those designing the research must address the issue of intentionality either in the design, or if it is qualitative research, they may want to leave the issue of intentionality open-ended and address it in the analysis. While it is an important issue to recognize, it will be an extremely difficult issue to study, as it will be difficult to draw the line between a strong intention to focus on or learn about a subject and a weak intention to learn about a subject. Often, the individual will be hard pressed to distinguish between the instances of intentional incidental learning and unintentional incidental learning.

Practically speaking, this issue may be very closely related to the issue of frame analysis. While there are occasions that a topic may be presented in such a unique or engaging way that it catches our attention and causes us to learn – as may have happened in our hypothetical case of an html instructor who had a unique hobby. However, using the figure-ground theory, in many cases, we will encounter many opportunities for learning which will fade into the background; the learning opportunities that take the form of a figure are often likely to be something that relates to a need, interest, or prior experience.

While this creates a less precise definition of incidental learning, it also takes some of the mystery out of the concept of incidental learning. It allows us another avenue to explore – both as researchers and as incidental learners. As Marsick and Watkins (1990), Callahan (1999) and others have noted, reflection helps the learner gain value from incidental learning. At times, and with the guidance of mentors, it may be useful to extend this reflection to explore what types of incidental learning we, as employees, engage in – and what types of incidental learning are overlooked.

Nature of the Learner (learner v. professional)

Almost all of the incidental learning examples in this study resulted in success. In fact, the word success is sprinkled throughout the profiles. The few examples of learning that did not result in success -- or were not perceived as particularly successful -- occurred in childhood. Reflecting on this finding, I have to wonder – would the nature of the findings be different if we were exploring incidental learning in another setting – a setting outside of one's workplace and profession?

Stepping back for a moment, there may be a contradiction raised between the construct of "learner" and the construct of "professional." Professionals are traditionally identified as experts in their field. The higher the degree (e.g. a PhD in science) or the more specialized the field (e.g. a lawyer or an oncologist), the more faith we put in their judgment, and the higher our expectation is that they have the "answer." We don't go to these professionals anticipating that they will reply: let's learn about this together. The very concept of learning implies that we don't know something or that our current skills, beliefs, or attitudes are wrong.

> We suggest there is a politics around naming oneself as a learner. This is connected to maintaining a position vis-à-vis others, recognizing oneself as having a valued place in a work group and legitimation as a competent

> worker….Our research illustrates that every time [the terms "learning" and "learner"] are used in workplaces, they have meanings beyond what researchers may expect. They inevitably provide indicators of power elations at work…" (Boud & Solomon, 2003, p. 330-331).

Reflecting back on my participants, two who seemed to struggle most with the notion of incidental learning on the job could very well have been grappling with this identity issue. One individual, Yang, had recently completed a PhD, after completing two – and almost three – masters degrees in engineering. In fact, when discussing the potential for learning from professional organizations, he stated that he had completed his learning and was now applying his learning. Another individual, Mary, had worked in the same job and for the same company for over twenty years. She also explained that she had been doing the job so long that there was nothing left to learn.

While it is possible that neither of these individuals was engaging in learning, I believe that other explanations are also possible. In both of these instances, the individuals were bright and serious employees. Both were curious and expressed an interest in learning. When pressed, I was able to squeeze a few examples of learning. However, in both these instances, naming oneself as a learner would seem to conflict with their stated status and identity – either as a member of an academic or institutional community.

Stan may have also been grappling with a similar issue. Stan was also an employee with significant tenure in his organization; he held the role as a technical expert both within his organization and within international bodies representing his field. Stan was able to identify incidental learning experiences, but he kept looking for experiences that were non-technical and outside his area of expertise. As we explored this area, he explained that all technical issues were part of his job and therefore could not be seen as incidental. In retrospect, however, I have

to wonder if this line of questioning raised an immediate conflict: for most of us, it is difficult to maintain our power as an expert if we are also seen as a learner. After all, while we want our doctors to engage in continuous learning, most of us go to doctors – particularly when we have a serious illness – with the notion that they are an expert. Boud and Solomon (2003) address this conflict:

> "Learning and being a learner can be understood as a strength for the organization and for the individual, when this is seen as adding value to one's work. However, the process of learning and being identified as a "learner" creates professional and institutional tensions and associations of being a novice or a person who has yet to be accepted as a fully functioning worker." (Boud & Solomon, 2003, p. 330)

To fully understand the role that mistakes play in incidental learning, we must determine how we can alter the underlying perception that to be a learner implies that one is ignorant, uninformed, or in need of learning. How can we conceptualize learning in a way that an individual, team, or organization can be proficient and be learner(s) at the same time? Perhaps it is not possible. We may need to come up with a new language for discussing "incidental learning" that avoids reference to the term learning.

This issue has practical implications as well. As noted in the introduction to this study, continual learning is required to handle the whitewater environment. To assist employees and organizations in their attempts to engage in continual learning, we need to be find ways to position successful learners as more competent or more professional than non-learners.

Sub-goal of the job

As I was studying the issue of intentional versus incidental learning, a small study that used activity theory to study incidental learning came to mind. It occurred to me that whether

intentional or not, all of the examples of incidental learning in this study were connected with an ultimate goal of the participant. This study seems to support McCafferty et al.'s finding.

McCafferty, et al.'s (2001) research showed that incidental learning (defined as "involuntary memory") occurred when the "incidental" items learned were part of a goal-directed action. If the material was an important sub-goal to the task at hand, the material was learned incidentally.

In addition, I noticed that the examples McCafferty et al. provided showed a more active relationship with the material learned. The researchers studied incidental learning in a formal educational setting. When students had to create math problems or generate interview questions (of genuine interest to them) in foreign languages, they were more likely to remember the numbers or vocabulary involved than when they simply solved existing math problems or wrote an essay using vocabulary offered by the instructor. This seems to imply that the learning is more than a passing thought. In this study, when Sally was meeting with another department to determine how to improve her recruitment efforts, she determined that the department needed to be reorganized and came up with an initial approach to doing the reorganization. Sally was in a position to make this work happen, so she had the opportunity to actively react to these ideas. If it was outside her purview, it is possible that she would have initially "learned" about the need for reorganization, but not actively retained or assigned merit to this information. In another example, Stan was uninterested in sports, but retained enough sports information during his technical meetings with coworkers to enable him to use sports metaphors to explain his ideas. Stan used metaphors to explain technical concepts all the time; in fact, he used them throughout our interviews. He found them to be helpful in his own learning and helpful when he shared

information with others. Outside of learning sports to create metaphors, he did not seem to incidentally learn anything about sports.

In fact, this theory of incidental learning being related to a sub-goal of the job is confirmed in cases where incidental learning did *not* occur or was not given much merit. For example, Mary talked about attending strategic planning meetings. She enjoyed listening to the way executives framed and discussed problems; she found it to be very different. However, she couldn't provide any particular examples of what she learned. For her, it didn't seem to relate to the sub-goals of her job (as she perceived them), and the specifics of what she learned were not readily available. Similarly, when pressed, Yang talked about the learning he did in brainstorming sessions, but he didn't have a lot of examples or details to provide. He said that

> *"we stay focused on what we are doing because that is where we are very good at...other people are good at [their] areas that we are not, so mainly we focus on our own area." (Yang)*

I had four participants who were born and raised in other countries. I was fascinated that only one of these individuals raised issues of informal or incidental learning related to cultural or other events surrounding such a move. The participant who raised these issues was in the human resource field; she also raised similar issues about learning the culture, rules, and procedures. The participants who didn't raise these issues were all engineering professionals who were more focused on formal, technical learning. Once again, it appears that the incidental learning was in a perceived sub-goal of the participant's task.

If this is truly an element of incidental learning, it may offer us an additional theoretical understanding of incidental learning as well as a potential for a greater practical understanding. For example, I don't know the goal of Yang's R&D group or the goal of their brainstorming meetings. It is quite possible that the meetings are achieving their objectives by allowing each

engineer to get input on his or her project from other engineers at the meeting. However, if the agency wanted to use the brainstorming meetings to think of new products, solutions, or directions – to envision the work in new ways, they might want to consider how to construct these meetings so that the incidental learning becomes a sub-goal of the activity. To do this, they are likely to want to set up the sessions so that the participants are more engaged with the material.

Deep versus surface learning – importance of inspiring deep learning for informal/incidental

When I was exploring the findings that I later discovered could be termed deep learning versus surface learning I felt my practitioner hat re-emerging. For several years now, I have been an academic: working on my dissertation, teaching classes, attending conferences, and reviewing papers. Prior to that, however, I spent many years as a program manager and department head. I worked in the telecommunications field where technology – and therefore work practices of our group and our customers – were constantly changing. Expectations of response times, ways of conducting business, and types of job skills required were constantly being renegotiated. In retrospect, I realize that I encouraged my staff to engage in on-the-job learning on a daily basis.

As an academic, I can step back and explore the differences between deep and surface learning approaches. I can see that there are highly educated and dedicated employees who use both approaches. As a practitioner, I immediately coveted the workers with the deep learning approaches. I believe that it will be important for us to nurture deep learning skills in the workforce to keep pace with the changes that are coming and to be effective in the knowledge economy. This study showed that deep learning approaches to incidental learning resulted in broader and richer learning. It also showed that individuals who exhibited deep approaches to

incidental learning also appeared to use a deep approach to learning in childhood. Therefore, one of the best ways to encourage deep learning in the workplace may be to train young people to use a deep learning approach inside and outside of school.

Implications for Practice

Some of the findings in this study can provide guidance to managers and trainers who want to expand workplace learning. First, research has shown that significant incidental learning occurs in formal and nonformal educational settings. This study provides insights into how formal training may provide skills that can enhance the opportunities for incidental learning. Second, research has shown that context impacts incidental learning. Awareness of some the contextual influences on incidental learning may guide the design of a workplace conducive to incidental learning.

Developing incidental learning skills in workplace training

Workplace training can be used for presenting content, skills, or both. Designing training that also enhances skills associated with incidental learning could provide long-lasting benefits. For example, by incorporating skills on learning to learn in existing training, employees could start to redefine and expand their conception of learning. Encouraging learners to experiment with learning skills from Kolb's model (1984) that are outside their primary learning style could also help employees to broaden their conception of learning. By broadening employees' conception of learning, more situations will become salient and serve as potential opportunities for learning.

Participants in this study who had deep learning skills had more incidental learning experiences to share and richer stories to tell. As they told their stories, they often made

connections between the incidents and sometimes between experiences on and off the job. They typically provided more implications of their learning. While this study indicated that participants seemed to carry deep or surface approaches to learning from childhood, these are also skills that could be learned.

Teaching systems modeling or systems dynamics (e.g. Forrester, 1991, 1994) may be one way to guide employees in developing deep learning skills. Systems dynamics emphasizes the interrelatedness of seemingly unrelated incidents and highlights reinforcing and balancing feedback loops. System dynamics trains practitioners to understand the complex nature of events and to look beyond the traditional linear cause-and-effect models of learning. By practicing a systems dynamics perspective, employees may gain a better appreciation of the complexity of the issues in the workplace as well as the skills to be able to identify more links and to understand more implications of their learning.

The Lancaster Model of Learning (e.g. Burgoyne, 1999; Holdsworth, 2001) provides another avenue for teaching deep learning skills. Created prior to 1980 by a group of professors and students (see Holdsworth, 2001 for more detail), this model incorporates three modes of learning: receipt of input (being given information), reflection (making sense of information and generating theories), and discovery (learning by doing and resulting feedback). Designers of the Lancaster Model recognized that most formal learning incorporates two forms of learning, by training employees to use all three skills we can encourage them to make more connections between their knowledge and experience.

Developing courses that aim to increase an employee's cognitive complexity may also prove valuable. The ability to integrate constructs is a measure of the ability to identify commonality or relationships in the different theories; this is frequently defined as cognitive

complexity (Boal & Hooijberg, 2001). Some studies have shown that cognitive complexity can be learned (e.g. Little, 2005; Streufert & Nogami, 1989). One study showed that even well-known tools such as Bloom's taxonomy – if used purposefully – could enhance cognitive complexity (Granello, 2001).

Jonassen's (1999) model of designing constructivist learning environments (CLEs) may also be an appropriate tool. CLEs "engage the learner in meaning making (knowledge construction)" (p. 217) by basing the learning on an ill-structured problem. Employees might enter training with existing problems, or the organization may want to provide some current organizational issues. Employees are offered information resources, collaboration tools, knowledge-constructruction tools, communication skills, and a group setting to address the problem. As a result, they develop one or more solutions and have a change to practice strategic thinking. Moreover, the learners are introduced to multiple perspectives, and they have the opportunity to enhance their cognitive flexibility. Because the CLE starts with existing problems, these skills are more likely to transfer to other projects (Mayer, 1999).

Developing the workplace to enhance incidental learning

Research has shown that context impacts incidental learning. In this study, the employees' conception of learning and their perception of their respective roles sometimes limited incidental learning. Although all participants in my study said that they enjoyed learning or that learning was important to them, employees who identified themselves as experts either because of their longevity, position, or recent acquisition of a terminal degree indicated that they had nothing to learn. An organizational culture or environment that honors learning along with education and achievement can encourage employees to identify themselves as learners.

Broader job descriptions and knowledge of where the worker fits into the larger organizational goals may also enhance incidental learning opportunities. Findings from this study indicate that incidental learning often occurred when the issue was a subtask of the main goal. Moreover, this study supported previous studies that indicated that very specific goals tend to limit opportunities for incidental learning. By creating broader job descriptions and by providing knowledge of where employees' work fits into the broader organizational mission, there is an opportunity to increase the areas that are salient to employees, thereby increasing the opportunities for incidental learning.

Recommendations for Future Research

While anecdotal research on incidental learning dates back to 1942, studies of incidental learning in the workplace are in their infancy. More work is needed to support, clarify, and expand our existing understanding of this important construct.

First, it would be helpful to replicate the study to explore incidental learning in more professions; these studies could explore the frames of these professions and confirm or disconfirm the general findings from this study. Assuming the findings in this study are supported, the more we know about the different frames and profiles of incidental learning by profession, the more we can work to enhance, broaden, and bridge incidental learning opportunities in organizations. I would recommend that Seidman's protocol continue to be used to explore the full context of the incidental learning.

Second, it would be helpful to expand the study and explore other contextual factors that may impact incidental learning. As part of my study, I had two participants from the same company. I noticed that the participants had similar approaches toward learning, and it sounded

as if this was a tacit part of the hiring process. Although this is an anecdotal incident, it would be interesting to explore how an organization's culture impacts incidental learning.

Third, as the first study to explore ways of knowing for incidental learning, more research is needed in this area. For example, additional studies – perhaps in conjunction with replicating the study with other professions – could confirm or expand the ways of knowing used in incidental learning. It would also be interesting to find a way to study incidents where the identified ways of knowing altered or disconfirmed the incidental learning of the learner.

Fourth, a more difficult, but important, element in studying incidental learning is to study the missed opportunities for incidental learning. While these data allow us to speculate on why incidental learning opportunities may be missed – frames that don't allow some situations to be recognized, conceptions of learning that limit learning, learning styles that limit learning in some environments, for example – it would be useful to find a way to study this phenomenon more directly.

Fifth, it would be interesting to explore the context of formal educational programs on incidental learning. As this study shows, the engineers attended more traditional higher education programs and appeared to use more formal problem-solving and scientific approaches to address all learning, while the human resource professionals – who typically participated in non-traditional higher education programs – approached learning in a more experiential fashion. It would be interesting to study this in more depth to understand more about how the formal educational programs impacted the learning of the participants. In addition, it would be interesting to understand the participants' understanding of learning *before* they entered higher education programs, to understand the impact of early style preferences and family or educational contexts.

Sixth, this study had inconclusive, yet surprising, results regarding the role of professional associations in learning – particularly incidental learning. One of the primary functions of professional associations is education – through courses, conferences, speakers, and journals. In addition, professional associations have the potential for creating or strengthening the frames which their members use to view and assess the world. In fact, that is generally a role of professions (e.g. Raelin, 1991). To have the independence coveted by professional members, the associations generally look to have some control over their members. Requiring continuing training and certification, using self-policing, and administering peer-reviewed or editor-reviewed journals papers all contribute to "maintaining the quality of the profession" (Raelin, 1991, p. 9).

When professionals work in larger organizations (rather than "putting out a shingle" and working independently), however, this professional influence may hold less sway. Nonetheless, there is a concern about the silo effect in organizations, and each silo is typically a different department – and often a different profession.

To understand the context of incidental learning, it is important to understand the influence of professional associations on individuals learning frames on frame alignment, and on frame amplification. Moreover, additional study on the influence of professional associations on incidental learning – and other types of workplace learning – would have practical benefits. It would be useful for directors of professional associations, for human resource departments (who often fund the memberships and related travel in these organizations), and for adult educators who are looking to enhance adult and vocational educational opportunities.

Seventh, it would be interesting to tease out a better understanding of learning from mistakes to gain a better understanding of when the learning occurs. To what extent does the

learning occur when we realize that we've made a mistake and to what extent is the learning dependent on our ability to overcome or solve the problem? Can we learn from a mistake that we can't "solve"?

Finally, this brings us to the general question of how to study incidental learning. Existing studies of incidental learning show how difficult it is to study this construct. It is understandable that most researchers are able to separate the definition of incidental learning from informal learning, but then merge the study and blur the lines. Incidental learning has been found to be extremely contextual. Attempts to study incidental learning by predetermining the learning (e.g. Dollinger, 2000; Woods & Daniel, 1998), don't offer realistic findings. Attempts to study incidental learning by setting up scenarios or case studies automatically alter the context.

However, incidental learning would be an important adjunct to other organizational studies. Learning occurs in a broad range of activities within an organization. Studies of organizational learning, organizational culture, project management, decision making, and conflict negotiation are just a few of the areas that could lend themselves to further exploration of incidental learning.

Action research studies are another fertile ground for exploring incidental learning. For one, action research doesn't rely on retrospection. Incidental learning can be identified as it occurs. Second, transcripts, tapes, or journals allow the researcher to examine the learning as it unfolds. This may help to gain a greater understanding of the success-orientation of incidental learning. It may also help researchers to better identify why some incidental learning opportunities are missed or overlooked. Moreover, researchers can observe and explore the ways of knowing as they occur. Third, the researcher is privy to the context of the organization,

the profession, and the learning process, although the researcher may not be able to explore the participant's early learning experiences or entry into the profession.

Concluding Thoughts

Incidental learning is one of the least-understood types of learning. This study expands the research exclusively focused on incidental learning and, in the process, our general understanding of incidental learning. Building on the seminal work of Marsick and Watkins (1990, 2001), Cseh (1998), and Callahan (1999), this study has expanded the notion of context to show how the elements of an individual's personal and professional context also impact incidental learning. Findings showed that in the "lived world" experience of the participants, the nature of incidental learning is mediated by the individual's conception of learning and learning style. At a professional level, frames and reflection-in-action further guide the focus and validation of the incidental learning. In addition, findings from this research suggest that incidental learning is easy to overlook; lessons learned often appear to be simply common sense after the fact. This may, in part, be due to the fact that learning seems to be closely associated with successful endeavors; stories of incidental learning ultimately had successful outcomes.

In addition to extending the research on incidental learning, this study has helped refine key areas for future research. In the process of studying incidental learning, I have confirmed the value of using a hermeneutical phenomenological approach to explore this concept and suggested some other research methods that would be appropriate to studying this construct.

Continued research on this topic is important. Incidental learning is an aspect of organizational learning. Understanding this form of learning is useful for management, human resources, and organizational change consultants in their attempts to develop a more competitive workplace.

Appendix A

Informed Consent Form

Title of Project: Epistemology of Incidental Learning
Investigator: Polly Silva

I. Purpose of this Research

This research is investigating incidental learning in the workplace. As one of the few studies designed to look exclusively at incidental learning, this research is exploring the nature of incidental learning. This research will ask you to reconstruct your past and present experiences, focusing on the actual episodes in your life.

II. Procedures

Participants will be asked to complete three semi-structured interviews. Interviews will be scheduled at a time and place convenient to the participants and will last approximately 45 minutes. Interviews will be scheduled in advance.

Signing this form constitutes informed consent for completing these interviews as well as permission to tape record the interview.

III. Risks

There are no anticipated risks to participants.

IV. Benefits of this Project

This research will expand our understanding of learning in the workplace, providing useful insights to management, human resources, and organizational development specialists. You may find the interviews interesting and you may learn more about yourself. However, there are no guarantees that you will personally benefit from participating in this research.

V. Extent of Anonymity and Confidentiality

All data collected in this study will be confidential, and no person-identifiable data will be used. Your name will not be associated with the content of the interview. Publications about the findings of the study will mask the identity of the individual.

Interviews will be tape recorded. Transcripts will be prepared and made available to the participants for review. The only one with access to this information will be the primary investigator, the interviewee, and a professional transcriber (if used). If used, the transcriber will sign a confidentiality agreement. A copy of the transcripts -- with name and any personal

identifiers changed -- may be made available to the committee chair during the data analysis process. Tapes and transcripts will remain in the possession of the primary investigator.

VI. Compensation

Participants will not receive compensation for participating in this research.

VII. Freedom to Withdraw

Participants may refuse to participate and are free to withdraw from this study at any time without penalty. You are free not to answer any questions that you choose or to request that the tape recorder be turned off at any time during the interview.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University and by the Department of Human Development.

IX. Participant's Responsibilities

I voluntarily agree to participate in this study.

X. Participant's Permission

I have read the Informed Consent Form and I understand the conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

XI. Contacts

This study is being conducted by Polly Silva under the auspices of the Adult Learning and Human Resource Development Program at Virginia Polytechnic Institute and State University. If you have any questions or concerns, you can reach Ms. Silva at 860-647-9275 or at psilva@vt.edu.

Dr. Jamie Callahan and Dr. Bert Wiswell are serving as co-chairs for this study. You can reach Dr. Callahan at 979-458-3584 or at jcallahan@tamu.edu. You can reach Dr. Wiswell at 703-538-8468 or at wiswell@vt.edu. The procedures for this research have been reviewed and approved by the Virginia Tech Institutional Review Board (IRB). You may also contact the Institutional Review Board at 540-231-4358 if you have any questions or comments regarding your rights as a participant in this research.

I have read the Informed Consent Form. I understand and agree to the terms of this project.

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Signature Date

Appendix B

Interview Guidelines

Interview I -- Life History

Task: To put the participant's experience in context by asking him/her to talk about: 1. his/her learning experiences in the past, and 2. events that led up to him/her being in this profession.

Means: 1. Ask the participant to reconstruct early experiences with learning, and 2. ask the participant to reconstruct the activities and thoughts that led up to him/her being in this profession.

Outcome: An understanding of the participant's perceptions of learning, and an understanding of how the participant came to be a(n) [x].

Interview II – Current Experience

Task: To concentrate on specific details of the participant's experience related to learning and related to being a member of this profession.

Means: 1. Ask the participant to reconstruct one or more informal learning experiences at work where the learning was a byproduct of some other experience. 2. Ask the participant to reconstruct one piece of a project at work that is most representative of the type of work that they do.

Outcome: How the participant experiences incidental learning. What the experience is like and how he or she perceives the learning.

Interview III – Sensemaking

Task: To engage the participant in a process of self-reflection so that he/she can make meaning out of his or her experience.

Means: Ask participants to connect factors in their life that brought them to where they are now exploring the relationships between

- their perceptions of learning and the types of incidental learning they have experienced, and
- epistemologies of their profession and epistemologies of their incidental learning.

Moreover, I will be asking participants to look at the details of their incidental learning experiences as they relate to the larger context of their current life interests, problems, and ways of evaluating the world.

Outcome: An understanding of the experience of incidental learning for each participant and the role it plays in the participant's life.

Appendix C

Interview Forms

Biographical Information

Name_____ Profession_____

Current Employer_____

Current Title or Position_____

Number of other [position(s)] in the department_____

Comments (if needed) _____

_____

Number of years:
In the company_____ In your position:_____

Approximate Size:
Of the company_____ Off the department_____

Professional Association Memberships

Name	Number of years

Formal Education (schools, degrees)

School	Program	Degree

Outside interests_____

_____

_____

Please attach a resume or biography -- if available.

Interview Format

Project: Epistemology of Incidental Learning

Date: Time:

Place:

Interviewee:

First Interview

A. Introduce the Project

- Brief Description of Project; Timeframes
- Confidentiality
- Answer Questions

B. Interview Questions -- Focused Life History

Focusing on recreating the concrete experiences; telling stories.

1. What is your earliest recollection of learning something (in or out of school) when you were younger – say before age 10? Reconstruct the experience.

   probes – for understanding
   probes – for further examples

2. What is your recollection of learning something (in or out of school) between the ages of 10 and 20? Reconstruct the experience.

   probes – for understanding
   probes – for further examples

3. I am interested in learning how you came to be a[n] [profession].
   a. How did you originally hear about [profession]?
   b. What was the course of events that led you into the [profession]?

C. Conclude

- Any additional thoughts that you want to share.
- Preparation for next time – define incidental learning
  Incidental learning – where you learn something that you didn't plan to learn.
  - Formal learning – attend a class
  - Informal learning – you purposely engage in learning, e.g. find out how to refinish a bureau
  - Incidental learning – you are doing your daily work, and you find that you learn something that is unrelated to your primary goal.
    - Have them give an example -or- provide help desk example.
- Confirm time and place of next interview.
- Thank participant.

Project: Epistemology of Incidental Learning

Date: Time:

Place:

Interviewee:

Second Interview

A. Introduction

- Any additional thoughts you want to add from the last interview?
- Introduce today's topic

B. Interview II – Details of Current Experience

Focusing on recreating current experiences; telling stories.

1. Think of a recent experience at work where you learned something, but the learning was a byproduct of some other experience. Reconstruct the experience.

(Repeat the question to get additional experiences.)

2. Think of a task or project that you worked on recently that is most representative of the type of work that you do. Describe the task or project in general, and more specifically, what your role is in the project.

C. Conclude

- Any additional thoughts that you want to share.
- Confirm time and place of next interview.
- Briefly mention the topic of the next interview.
- Thank participant.

Project: Epistemology of Incidental Learning

Date: Time:

Place:

Interviewee:

Third Interview

A. Introduction

- Any additional thoughts you want to add from the last interview?
- Introduce today's topic, reviewing the notion of incidental learning to re-focus the participant on that particular aspect of learning.

B. Interview III – Reflection and Sensemaking

1. In our last interview, you told a story about learning [x]. When were you aware that you were learning [x]? How did you determine that this new knowledge was right/true?

(Repeat for major incidental learning examples)

probes – will vary by situation

2. Given what you have reconstructed about your early and current learning experiences, how would you describe the role of learning in your life?

probes – for incidental learning if that topic is not specifically addressed

3. Do you think that your professional education and experience impact your incidental learning at work? If so, in what way?

probes – using the participant's own words to review examples given earlier

C. Conclude

- Any additional thoughts that you want to share.
- Confirm contact information and estimated time for sending transcripts.
- Thank participant.

Appendix D

Hermeneutical Principles for Research

- seek understandings of the participants' world of significance through immersion in their world (Addison, 1992; Benner, 1994).
- make explicit the shared world of understanding between the researcher and the researched.
- immerse oneself in the hermeneutical circle throughout the research spiral.
- make explicit the immersion of the researcher in the hermeneutical spiral.
- draw out what is hidden within the narrative accounts and interpret them based on background understandings of the participants, the educators and the researcher.
- enter into an active dialogue with the participants, the educators, the trustworthiness checkers, the narrative itself as spoken and written (Addison, 1992).
- maintain a constantly questioning attitude in the search for misunderstandings, incomplete understandings, deeper understandings (Addison, 1992; Benner, 1994).
- move in a circular progression between parts and the whole, what is disclosed and hidden, the world of the participant and the worlds of educators and researcher (Leonard, 1994).
- engage the active participation of the participants in the research process: the implementation and the interpretation (Plager, 1994).
- encourage self-reflective practice by the participants through participation in the research and through offering a narrative account of the researchers' understandings and interpretations.
- view every account as an interpretation based on a person's background (Plager, 1994).
- view any topic narrated by the participant as significant at some level to the participant.
- deem every account as having its own internal logic; whatever is brought to an interview is significant to its bearer, consciously or not.
- access and make explicit participant understandings through their own modes of existence, mode of engagement while being sensitive to one's own modes of existence and of engagement and foregrounding.

- be aware of one's own use of coping tools in any of the modes of existing.
- engage in the spiral task of hermeneutical interpretation along with the participants.
- keep track of movements in understanding (Benner, 1994).
- work with participants to see which points are salient.
- view IP as an interpretation of participants' interpretation.
- look beyond the participant's actions, events and behaviour to a larger background context and its relationship to individual events (Addison, 1992).

Source: Conroy, 2003, p. 11 (emphasis added)

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Education

PhD Candidate		Adult Learning and HRD	Virginia Tech.
2000	MS.	Organizational Learning	George Mason Univ.
1987	MA	Telecommunications Policy	George Washington Univ.
1982	BA	Political Science	Dickinson College

Experience

2003-Present
Business Lecturer

- Teach in degree-completion programs (BGS) at ECSU and Univ. of Hartford (2005-present)
  Subjects include: Small Group Communication, Interpersonal Communication, Organizational Behavior, and Business Communication
- Design and construct an on on-line course in Organizational Development (masters/doctoral level), Texas A&M (2004)
- Student Teacher:
  - Critical Issues in HRD (on-line, graduate course), Texas A&M (2003)
  - Organizational Consulting (graduate course), Virginia Tech (2000)

1998–2003 Falls Church, VA
Independent Consultant

- *Learning Consultant*, World Bank. Conduct an evaluation of technical and organizational learning needs, with emphasis on new employees.
- *E-Government Consultant*, PTI. Develop technical, organizational, financial, and political guidelines for designing e-government solutions.
- *Marketing Director and Program Planner,* Virginia Tech. Leadership Development Certificate.
- *Program Evaluation* (knowledge management). Evaluate the effectiveness of a knowledge management system designed to promote internal technical knowledge sharing.
- *Organizational Analysis*, National Non-profit. Guide an organization in using the appreciative inquiry model to foster organizational change.

1997 - 1998 MCI Vienna, VA
Manager, Local Market Initiatives

- Establish and manage national infrastructure development initiatives and develop new procedures. Pilot and document new processes.
- Manage technical and regulatory 911 programs. Serve as subject matter expert on network implementation portions of interconnect agreements.

1995 - 1997 Performance Engineering Corporation Fairfax, VA
Department Manager & Principal Member of the Technical Staff

- Manage professional staff of consultants providing management and information technology consulting to federal and local government clients.

1985 - 1995 Arlington County Government Arlington, VA
Telecommunications Manager

- Design, develop, and manage an integrated cabling and voice communications network that covered the entire County government, school, and judicial systems.
- Form and manage a telecommunications department of in-house and contract personnel to provide telecommunications and customer service 24 x 7.
- Chair Customer Service, Communications, Regulatory, and Emergency Management task forces.

Product Technology Analyst

- Serve as an internal consultant, providing technical and management consulting to agencies throughout the government.
- Represent Arlington County to other governments, associations, and private sector vendors; explaining current technical and programmatic needs; identifying new programs and opportunities; and sharing our successes and expertise.

1982 - 1985 Metropolitan Radio Telephone Systems Rockville, MD

Market Analyst

- Supervise data collection, market analyses, and demand studies.

Selected Presentations

Discussant: Using Experiential Learning in the Classroom (Institute of Behavioral and Applied Management, 2004)

Presenter: The Role of Faculty and Student Identity in Developing Integrated Academic Experiences, Adult Higher Education Alliance (2003)

Session Planner: Academy of Management: Cognition in the Rough (2001, 2002)

Discussant: Customer Service: Academic & Practitioner Perspective (IBAM, 2000)

Presenter: Double Loop Learning; Will it Revolutionize the MBA Curriculum? (Educational Innovation in Economics and Business Administration, 2000)

Selected Awards and Achievements

Communications Director, CT Branch, American Assoc. of University Women (AAUW)

Board Member, Inland Wetlands Commission, Bolton (2005-present)

Certified Moderator of Elections, State of Connecticut (current)

Recipient, Arthur Chickering Award, Adult Higher Education Alliance (2003)

All Star Award, MCI, 1997

Director, National Association of Mitel Users (NAMU) Board of Directors (1992 - 1995)

Chair, National Association of Mitel Users Annual Conference (1994)

Selected for Who's Who of American Women, 1989

Arlington County Recognition:
Departmental Superior Performer, Arlington County, 1993
Exceptional Employee, Arlington County, 1988, 1993

Certifications

Coaching for Success,
Productivity (program analysis)
Conflict Management
Interaction Management