

Development and Validation of an Instrument to Assess Employees' Perceptions of
Informal Learning Work Context

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Jane F. Marinka

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Dr. Kenneth R. Bartlett, Advisor

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DEDICATION

Mom, Dad, and Alys

ABSTRACT

The purpose of this study is to address the void in the informal learning literature by developing and validating an instrument to measure employees' perceptions of informal learning work contexts. Under the assumption that qualitative research findings have provided the literature with sufficient insights into informal learning work contexts, it was time to generalize the findings across a larger population. Thus, the following four components of informal learning work contexts identified in the literature were empirically examined: (a) perceptions of management support; (b) perceptions of peer support; (c) perceptions of a supportive organizational culture; and (c) perceptions of access to work resources.

There were four phases in the development and validation of the informal learning work context instrument. In the first phase, the initial item pool was created. In the second phase, content validity analysis resulted in the newly developed survey, which was administered to 2,500 working professionals online. A total of 477 participants completed the survey (a response rate of approximately 19%). In the third phase, a combination of confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) revealed a good model-fit for six final constructs: management support, peer support, a supportive organizational culture, access to work resources, impact of informal learning on performance, and impact of informal learning on engagement. In the fourth phase, correlation and multiple regression analyses revealed perceptions of peer support as the only construct of informal learning work contexts that was positively related to the impact of informal learning on performance. Management support, peer support, and a

supportive organizational culture were positively related to impact of informal learning on engagement.

The findings of this study confirm the value of continuing exploration - using both quantitative and qualitative research methods - on informal learning work contexts. Knowledge about how informal learning can be promoted and leveraged in work settings will enable HRD practitioners to help organizations achieve the status of learning organizations. In turn, the HRD field will gain recognition and will be acknowledged as a significant force in business settings

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CHAPTER ONE

INTRODUCTION

Survival in the ever-changing business environment in this new era of globalization, along with technological advances, requires organizations to be flexible and to learn quickly. While financial performance is necessary, it is not enough to set an organization apart from its competitors. In the current business climate, for-profit organizations gain competitive market advantage by building their capacity for continuous learning (Cho, Cho, & McLean, 2009); as a result, learning becomes one of the most important factors for an organization's success (Barrie & Pace, 1998; Miner & Mezias, 1996).

Argyris (1999) offered insight into how organizations learn by suggesting that “organizations do not perform the action that produces the learning. It is individuals [who are] acting as agents of organizations who produce the behavior that leads to learning” (p. 68). In order to build the capacity to learn, organizations must know how to promote and leverage the learning of their employees. Ideally, this is an opportunity for Human Resource Development (HRD) professionals to increase their credibility by becoming experts in workplace learning, particularly in how such learning can be advanced and promoted. However, this is easier said than done, as Evans and Rainbird (2002) pointed out, “workplace learning is poorly understood and under-researched” (p. 7).

The current literature on workplace learning distinguishes between formal and informal learning (Jacobs & Park, 2009; Marsick & Watkins, 1990; Tannenbaum, Beard, McNall, & Salas, 2010). Traditionally, workplace learning studies have focused more on

formal than informal learning, as reflected in six literature reviews published in the *Annual Review of Psychology* (Aguinis & Kraiger, 2009; Campbell, 1971; Goldstein, 1980, Salas & Cannon-Bowers, 2001; Tannenbaum & Yukl, 1992; Wexley, 1984). However, since Frazis, Gittleman, Horrigan, and Joyce (1998) reported the results of the Bureau of Labor and Statistics' (BLS) 1995 study, numerous other studies have reiterated that at least 70% of individual learning in the workplace is informal (Benson, 1997; Enos, Kehrhahn, & Bell, 2003; Hamilton, 2006; Leslie, Aring, & Brand, 1998; Lohman, 2005; Marsick, Watkins, Callahan, & Volpe, 2009; Tannenbaum, Eddy, D'Abate, Givens-Skeaton, & Robinson, 2006). Formal learning only tells part of the story, and knowledge about informal learning must be advanced in order to gain a more complete understanding of how individuals learn in the workplace.

Many believe that informal learning is one of the sources of sustainable competitive advantage crucial for the survival of modern organizations (Conner & Clawson, 2004; London & Smither, 1999; Westbrook & Veale, 2001). Yet, despite its prevalence for workforce advancement in the 21st century, there is a lack of knowledge about informal learning (Boud & Middleton, 2003; Skule, 2004; Tannenbaum et al., 2010), since it occurs in the absence of an established formal learning program and specific learning objectives. In other words, informal learning happens spontaneously in unstructured settings and can be difficult to observe. As Tannenbaum et al. (2010) described, “[the nature of informal learning is] dynamic, sporadic, and self-guided” (p. 312). Given that any attempt to provide informal learning with some degree of structure would violate its fundamental essence; thus, the informal learning construct remains

elusive, complex, messy, and thus, difficult to measure.

In the face of the challenges in defining, dissecting, and quantifying the informal learning construct, some scholars have changed their research focus to examine how informal learning can be promoted and encouraged in organizational settings (Doornbos, Jan-Simons, & Denessen, 2008; Ellinger, 2005; Hoekstra, Korthagen, Brekelmans, Beijaard, & Imants, 2009; Kyndt, Dochy, & Nijs, 2009; Lohman, 2005; Skule, 2004). On one hand, informal learning can be empowering for learners in supportive work contexts, as it induces a sense of responsibility and accomplishment for their own learning. On the other hand, it can become a scary, painful, and frustrating process for those without a supportive learning environment, as Conlon (2004) noted, “informal learning alone can leave an employee feeling helpless and directionless” (p. 289). Therefore, even though informal learning is an individualistic process that is hard to define and measure, organizations can play a major role by creating, shaping, and promoting a favorable learning environment that fosters its frequency and quality (Marsick et al., 2009).

A review of the literature indicates that individuals are more likely to learn in the absence of formal learning program activities when they perceive the work context as being supportive of their learning. Most of these studies used qualitative research methods. For example, Hoekstra et al. (2009) performed a qualitative study to explore how perceptions of work conditions influence teachers’ informal learning. They reported that teachers’ learning outcomes were contingent on how each individual perceived and interpreted learning support in their workplace. Ellinger (2005) conducted a qualitative case study to examine contextual factors conducive to informal learning and reported that

learning-committed leadership and management, an internal culture committed to learning, work tools and resources, and people who form relationship webs for learning were important factors that fostered informal learning. Lohman (2005) used a mixed-methods study with 166 public school teachers and 152 HRD professionals and found that an unsupportive organizational culture, others' unwillingness to participate, and inaccessibility to a subject matter expert inhibited informal learning.

Collectively, these studies provide some insight into the importance of informal learning work contexts; indeed, even if individuals are willing to learn, an unsupportive learning environment may inhibit productive informal learning. Yet, many informal learning studies and recent literature reviews continue to highlight the need to examine the relationship between perceptions of work contexts and informal learning in the workplace.

Problem Statement

The problem examined in this study is the absence of a metric to empirically operationalize informal learning work contexts. There is growing awareness of the value of informal learning in academic and business settings as executives begin to consider investing in workplace initiatives to promote informal learning. Among the many considerations for budget allocations, executives want quantitative evidence showing the impact of a supportive informal learning work context on business growth and profitability. Ideally, this is an opportunity for Human Resource Development (HRD) professionals to increase their credibility by becoming experts in workplace learning, particularly in how such learning can be advanced and promoted. Because there exists no

psychometrically sound informal learning work context instrument, it is difficult to operationalize this construct, and it is almost impossible to measure its impact on business.

Purpose of the Study

The purpose of this study was to address the void in the informal learning literature by developing and validating an instrument to measure informal learning work contexts, and to subsequently create a diagnostic tool that can be used by HRD practitioners to assess, manage, and shape learning environments at work. Two main assumptions guided the direction of this study. The first assumption was that qualitative research findings have provided the literature with sufficient insight into informal learning work contexts; thus, it was time to generalize these findings across a larger population of working professionals. Under this assumption, four components of informal learning work contexts identified in the literature were investigated: (a) perceptions of management support; (b) perceptions of peer support; (c) perceptions of a supportive organizational culture; and (d) perceptions of access to work resources (e.g., time and technology).

The second assumption was that the unit of analysis of this study was the individual, and that employees' perceptions should be employed as the basis of informal learning work context assessment. This notion was consistent with current findings in the informal learning literature, which suggested that employees' perceptions of a supportive work context were central to the willingness to engage in informal learning activities (Doornbos et al., 2008; Ellinger, 2005; Hoekstra et al., 2009; Leslie, Aring & Brand,

1998; Lohman, 2005; Marsick et al., 2009; Sawchuk, 2008).

The value of studying employees' perceptions to better understand the impact of organizational support has also been examined and validated by scholars in other fields, such as business and psychology. For example, Organizational Support Theory (OST) (Eisenberger, Huntington, Hutchinson, & Sowa, 1986; Shore & Shore, 1995) suggested a predictive relationship between employees' perceptions and behavioral outcomes. OST posed the notion that people assign an organization with humanlike characteristics and perceive how the organization treats them as a clue of whether it favors them or not (Eisenberger et al., 1986). Employees who feel encouraged and supported are more likely to be loyal and committed (Rhoades & Eisenberger, 2002).

An employee develops a personal relationship with an organization the same way he or she forms a relationship with another person (Eisenberger et al., 1986). Consistent with Gouldner's (1960) norm of reciprocity, people tend to help those who help them and not harm those who treat them kindly; consequently, employees form general beliefs about what the organization thinks of them by observing the organizational agents and exchange the favor accordingly (Eisenberger et al., 1986; Rhoades & Eisenberger, 2002).

The operationalized construct of OST, called the Perception of Organizational Support (POS), has been linked to positive work-related outcomes such as organizational commitment, job performance, job satisfaction, and job involvement (Rhoades & Eisenberger, 2002). POS studies have demonstrated that employees' perceptions determine what they would do for their organizations (Allen, Shore, & Griffeth, 2003; Eisenberger, Cummings, Armeli, & Lynch, 1997; Eisenberger, Fasolo, & Davis-

LaMastro, 1990; Raymond, Ngo, & Sharon, 2006; Rhoades & Eisenberger, 2002) and provide evidence for the power of employees' perceptions in predicting behavioral outcomes.

OST can be used to hypothesize the nature of work contexts in the informal learning literature: that the perception of a supportive work context is central to an individual's willingness to engage in informal learning activities. Employees who perceive their work context as supportive of their learning in the absence of formal training programs are more likely to participate in productive informal learning. By drawing on OST as a general framework to support the current findings in the informal learning literature, this study explored whether employees who perceived their work context as supportive were more likely to participate in productive informal learning.

Research Questions

The following overarching question guided the study: What is the relationship between employees' perceptions of informal learning work contexts and informal learning in the workplace? Given that there was no existing tool to measure employees' perceptions of informal learning work contexts, the first step was to create a metric to quantify this construct. Upon the development of an informal learning work context instrument, the relationship between the perception of an informal learning work context and participation in informal learning – measured by frequency and impact – could then be examined. Accordingly, two main research questions were offered:

Research Question 1: Can a sound psychometric instrument to measure perceptions of informal learning work contexts be developed and generated?

Research Question 2: Is there a relationship between the four factors of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and informal learning at work?

Significance of the Study

The potential implications from this study for both HRD scholars and practitioners could be significant. Qualitative research on the topic has provided insight into informal learning work contexts and their influence on productive informal learning. However, the absence of an instrument to validate and generalize these findings empirically continues to thwart progress in this research area. Without a psychometrically sound measurement to operationalize the construct, it is difficult to verify the components of an informal learning work context identified in the literature, and it is almost impossible to assess their relationship with productive informal learning. By developing and validating an instrument to assess employees' perceptions of informal learning work contexts, this study opens up possibilities for new directions in informal learning research and enables future scholars to advance the field's understanding of how informal learning can be promoted in organizational settings.

For HRD practitioners, having a tool to help organizations assess and design work environments to promote informal learning is important because it provides a mechanism for strategic positioning of human capital in modern organizations. Despite the growing awareness of the need to better understand how workplace learning can be encouraged and promoted, informal learning initiatives are implemented on a trial-and-error basis (Marsick et al., 2009). A sound metric to measure informal learning work contexts

provides HRD practitioners with a powerful tool that can be used to shape, manage, and facilitate productive learning environments.

Limitations of the Study

There were several limitations to this study. First, the use of a nonrandom sampling strategy, while common in HRD (Dooley & Lindner, 2003), limits the generalization of the findings to the entire population of working professionals. The sample population was drawn from a company database containing over 2,000 working professionals coming from various demographics and therefore, provided the study with sufficient variance and sample sizes. However, the database was limited to white-collar professionals working in for-profit organizations. Consequently, caution must be exercised when generalizing the study's outcomes to workers in non-profit organizational settings, or working professionals in the public sector.

Second, the data were collected at one time only, and there was no pilot study conducted prior to the data analysis. A pilot study would have enabled the author to test and refine the survey prior to sending it to the sample population (Dillman, 2000; Teijlingen & Hudley, 2002), and possibly could have improved the research findings.

Third, the use of self-reported data, including in the operationalization of the impact of informal learning on engagement and performance, might have biased the findings. Although the individualistic nature of informal learning, as well as the purpose of the current study - to examine the relationship between employees' perceptions of informal learning work contexts and informal learning at work – lends itself to the self-report type of data collection, it is necessary to consider the possibility of data

inaccuracy, due to social desirability and other confounding factors (Howard, Schmeck, & Bayer, 1979).

Fourth, the lack of universality in how informal learning at work is defined and understood limits the generalizability of this study. It is important to note that the development and validation of the instrument of this study was based on the conceptual frameworks and definition proposed by the author and thus, should not be interpreted and generalized beyond the context of this study.

Definition of Key Constructs

This study aimed to develop an instrument to measure and validate informal learning work contexts quantitatively. The following key constructs were examined in this study.

Informal Learning in the Workplace - Drawing from a synthesis of previous research (Eraut, 2004; Jacobs & Park, 2009; Leslie, Aring, & Brand, 1998; Livingstone, 2000; Marsick & Watkins, 2001), this study defined informal learning at work as work-related learning that happens in the absence of a pre-established learning program that is systematically planned by the organization. While the learning process is unstructured and elusive, the impact of such learning can be planned and evaluated.

Perception of Management Support - Employees' perceptions of the willingness of their direct supervisors to facilitate informal learning (Ashton, 2004; Enos, Kehrhahn, & Bell, 2003; Ellinger, 2005; Eraut, 2004; Macneil, 2001; Sambrook, 2005; Sambrook & Stewart, 2000; Skule, 2004; Tannenbaum et al., 2010).

Perception of Peer Support - Employees' perceptions of having proximity and

access to others with similar interests and professional expertise; openness and knowledge-sharing among peers that encourage informal learning (Boud & Middleton, 2003; Conlon, 2003; Cunningham & Hillier, 2012; Doornbos et al., 2008; Ellinger, 2005; Eraut, 2004; Lohman, 2005; Tannenbaum et al., 2010).

Perception of a Supportive Organizational Culture - Employees' perceptions of how the organization supports and tolerates trial-and-error activities that promote their informal learning (Argyris, 1999; Ellinger, 2005; Eraut, 2004; Leslie, Aring, & Brand, 1998; Lohman, 2005; Macneil, 2001; Sambrook, 2005; Sambrook & Stewart, 2000; Tannenbaum et al., 2010).

Perception of Access to Work Resources - Employees' perceptions of access to work resources (time and technology) to help them learn informally (Ellinger, 2005; Lohman, 2005; Tannenbaum et al., 2010).

Frequency in Informal Learning Activities - One of the few instruments to measure informal learning that exists today was developed by Lohman (2005). As a point of comparison to past research, eight items from Lohman's (2005) study that measure the frequency of informal learning at work were included in this study.

Impact of Informal Learning Activities -The effect of productive informal learning on individuals, measured through employees' perceptions of the impact of productive informal learning at work.

Chapter Summary

This chapter provided a summary of the study and positions the necessity for research to develop a metric to measure employees' perceptions of informal learning

work contexts. Given the growing interest in business settings on the impact of shaping and designing work environments, leading to more productive informal learning, HRD practitioners now have the opportunity to assert their credibility as strategic champions of learning and development. Previous qualitative research findings have identified four components of supportive informal learning work contexts: perceptions of management support, perceptions of peer support, perceptions of a supportive organizational culture, and perceptions of access to work resources. The lack of a psychometrically sound instrument to measure informal learning work contexts has made empirical validation and generalization of these findings difficult. This study addressed this problem by developing a standardized metric to quantify and empirically validate informal learning work contexts.

CHAPTER TWO

REVIEW OF THE LITERATURE

The purpose of this chapter was to review the literature on informal learning in order to identify work contexts that support or inhibit informal learning. There are five sections to this chapter. The first section describes the method used to conduct this literature review. The second section examines the definitions of informal learning within HRD and proposes a unified framework that merges these definitions. The third section discusses three theoretical frameworks that support the need to investigate work contexts in the informal learning literature. The fourth section presents four aspects of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) that emerged from the literature review. The fifth section summarizes the chapter.

Informal Learning Literature Review Methods

In order to ensure a comprehensive and integrative synthesis of the informal learning literature, both refereed and non-refereed publications were reviewed. A broad database search (Academic Search Premiere, Business Source Premiere, ERIC, SAGE Online, and PsychINFO) was performed through the University of Minnesota library database. The following major keywords were employed in the database search: *informal learning*, *informal learning in the workplace*, *workplace informal learning*, *contextual factors and informal learning*, and *workplace learning*. The review also included conference proceedings, where papers on informal learning were likely to have been presented.

In the beginning of the review process, a wide range of articles on informal learning in the workplace published in various fields was examined. The focus of the study was narrowed only after a point of saturation was reached. Each model and theoretical framework presented in this proposal was traced back to its origins to capture the fundamental concepts (Torraco, 2005). In the final step, each article and book was reviewed and selected based on its relevance to the purpose of the study.

In the next sections, different definitions of informal learning were examined to generate a new definition that captures key elements from the existing literature. Then, three theoretical frameworks found in the informal learning literature were reviewed to position the need for a greater understanding of informal learning work contexts. Finally, the four components of informal learning work contexts were presented as a framework to guide this proposed study.

Research Synthesis around the Definition of Informal Learning in the Workplace

Defining informal learning in the workplace is challenging because the concept is elusive and not directly observable. There are many ways informal learning can be defined, contingent upon how the concept is perceived by the researcher (Carliner, 2012; Conlon, 2004; Cunningham & Hillier, 2012; Ellstrom, 2010; Eraut, 2004; Frazis et al., 1998; Hoekstra et al., 2009; Jacobs & Park, 2009; Leslie, Aring, & Brand, 1998; Livingstone, 2000; Lohman, 2005; Marsick et al., 2009; Skule, 2004; Tannenbaum et al., 2010). Nonetheless, certain attributes consistently emerged in terms of the various ways it has been described. This section examined the different definitions of informal learning to identify the characteristics that universally overlap across these definitions.

To date, there have been three quantitative studies on informal learning. The first was conducted by Frazis, Gittleman, Horrigan, and Joyce in 1998. Using data from the Bureau of Labor Statistics' survey of employer-provided training, this study was among the first to claim that people spent more time learning informally than formally at work. What is not often mentioned in the literature is how informal learning was defined and operationalized in this study. Frazis et al. (1998) measured the amount of informal learning by asking participants to keep a ten-day employee log. In the report, participants were told to identify what they learned, from whom, and how they learned something new on the job to improve their performance. All learning activities that were "unstructured, unplanned, and easily adapted to situations and individuals" (p. 4) were described as informal training. In contrast, formal training was defined as "training that is planned in advance and that has a structured format and a defined curriculum" (p. 4). Subsequently, according to their definition, any learning activities occurring outside of the classroom setting that were not formally planned or established by the organization should be regarded as informal. This definitional approach focused on structure and the degree of planning as characteristics to differentiate informal and formal learning.

The second quantitative study was conducted by Livingstone (2000) as part of a country-wide Canadian survey. Telephone interviews with 1,562 Canadian adults (18+ years old) were conducted to assess the hours spent on informal learning at work, at home, and in the community. Livingstone (2000) reported that individuals spent, on average, 15 hours per week learning informally, of which about 6 hours were spent for employment-related purposes. In this study, each participant was presented with the

following definition of informal learning:

Everybody does some informal learning outside of formal classes or organized programs. You may spend little time or a lot of time at it. It includes anything you do to gain knowledge, skill, or understanding from learning about your health or hobbies, household tasks, or paid work, or anything else that interests you.

(Livingstone, 2000, p.17)

Additionally, to assess the hours spent on informal learning activities for work-related purposes, the following question was posed:

First, let's talk about any informal learning activities outside of courses that have some connection with your current or possible future paid employment. This could be any learning you did on your own or in groups with co-workers, that is, any informal learning you consider to be related to your employment.

(Livingstone, 2000, p. 17)

In short, Livingstone, like Frazis et al. (1998), also viewed informal learning in terms of the structure and degree of planning. He viewed informal learning at work as unstructured (taking place outside of an organized learning program) and self-directed. However, in contrast to Frazis et al., Livingstone's definition implied that it was possible for informal learning objectives to be determined prior to learning.

The third quantitative study, often cited as support for the need to better understand informal learning at work, was conducted by the Education Development Center (EDC) in a project often referred to as "The Teaching Firm" (Leslie, Aring, & Brand, 1998). This study examined informal learning in seven learning organizations in

the manufacturing sector, including Motorola, Boeing, Data Instruments, Ford Electronics, and Siemens. Specifically, the researchers sought to define informal learning, to explore why it happens, and to identify the factors that influence its productive occurrence.

In the EDC study, informal learning was defined as “any workplace learning in which the process through which workers learn is neither determined nor designed by the organization, regardless of the goals, toward which the learning is directed, or the settings or activities in which learning occurs” (p. 210). The researchers noted that the measurement used in the study was specific to each organization under investigation, and thus, there was no standard method for operationalizing informal learning. For example, informal learning in Motorola was measured by project-based team participation rates, as the researchers reasoned, “Teaching Firm researchers observed considerable informal learning associated with the teams at this manufacturing site, compelling several examples of how informal learning occurs in teams” (p. 227). Leslie, Aring, and Brand (1998) concluded that structure and the degree of planning were important in defining informal learning in the workplace. Therefore, they made a clear distinction between the informal learning process (unstructured, self-directed, and unplanned) and informal learning outcomes (which can be planned and evaluated).

These three quantitative studies signal the need to better understand informal learning at work. Since then, subsequent research has offered various theoretical definitions in an attempt to refine the construct of informal learning. One of the most prominent definitions of informal learning in HRD was offered by Marsick and Watkins

in 1990. By differentiating informal and formal learning by the degree of structure of the learning program, Marsick and Watkins (1990) defined informal learning as “[any] learning outside formally structured, institutionally sponsored, classroom-based, activities” (pp. 6-7). Moreover, to further characterize informal learning, they proposed the term “incidental learning” and reasoned that the difference between the two constructs rested on the difference in the degree of planning. While incidental was unintentional, random, unstructured, and unplanned, informal learning tended to be intentional and planned (Marsick et al., 2009).

Eraut (2004) framed his discussion by drawing on cognitive learning theory to analyze the structure of informal learning. He added to the literature by suggesting that informal and formal learning should be conceptualized along the same continuum that displayed the possibilities of overlapping characteristics, as he asserted, “I prefer to define informal learning as learning that comes closer to the informal end than the formal end of the continuum. Characteristics of the informal end of the continuum of formality include implicit, unintended, opportunistic and unstructured learning” (p. 250).

In a more recent review of the workplace learning literature, Jacobs and Park (2009) indirectly provided new insight into informal learning characteristics. These researchers offered a new framework for workplace learning and proposed three key variables: (a) location of the learning (at work versus away from work); (b) the degree of planning (structured versus unstructured); and (c) the role of the facilitator (passive versus active). Consistent with previous conceptualizations of informal learning, Jacobs and Park (2009) acknowledged that the degree of structure and planning are important

distinctions between informal learning and other types of workplace learning. They further contributed to the literature by clearly defining the degree of planning as “the extent to which a systems approach [is] used to ensure the intended learning outcomes [are] made explicit or presumed” (p. 145).

The synthesis above shows that despite numerous definitions of informal learning, structure, or the degree of planning, consistently emerged as a key factor. Although most of the definitions distinguished informal learning from formal learning, this proposed study perceives the two constructs as having overlapping characteristics located along the same continuum. The difference between informal and formal learning lies in the degree of planning in the learning process. In comparison to formal learning with an established learning process (well-designed learning materials), the learning process in informal learning is often unplanned and self-directed. Accordingly, drawing from a synthesis of previous research (Eraut, 2004; Jacobs & Park, 2009; Leslie, Aring, & Brand, 1998; Livingstone, 2000; Marsick & Watkins, 1990), the current study proposed a new definition of informal learning at work:

“work-related learning that happens in the absence of a pre-established learning program that is systematically planned by the organization. While the learning process is unstructured and elusive, the impact of such learning can be planned and evaluated.”

A conceptual model of informal learning that guided this study is shown below:

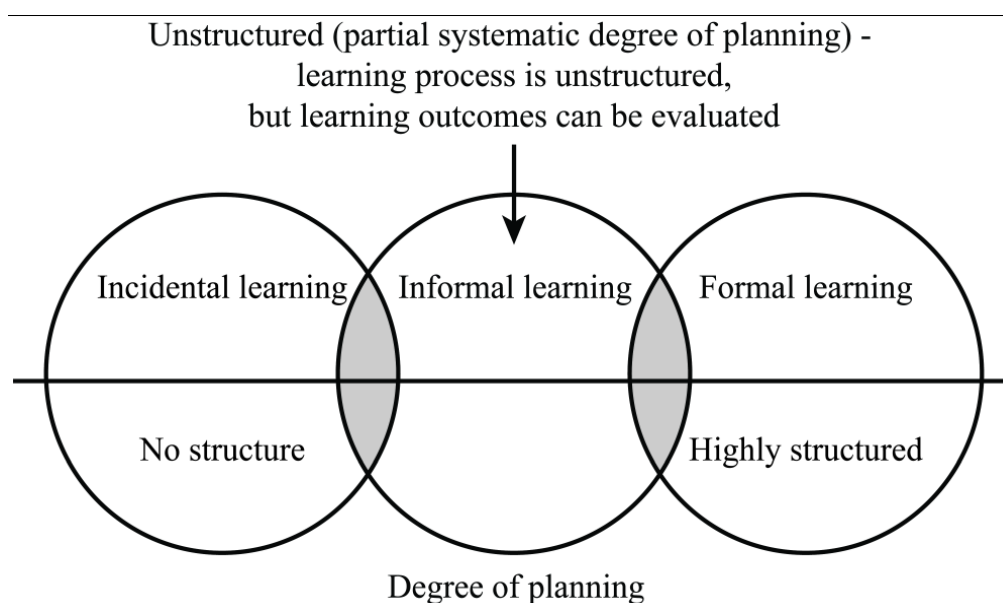


Figure 1. Proposed conceptual definition of informal learning in the workplace. *Note:* formal learning = highly structured degree of planning; incidental learning = no structure in the degree of planning; and informal learning = unstructured and is located between formal and incidental learning. Areas of overlap indicate that these types of learning are located on a continuum as opposed to being distinct entities. (figure is created by the study author and researcher, J. Maringka, using Microsoft PowerPoint)

Figure 1 shows formal learning at the far right end of the continuum, which is characterized as being highly structured (a systematically planned learning program with a well-defined learning process and learning outcomes). An example of formal learning would be a formal training program. On the far left end of the continuum, incidental learning is characterized as having no structure in degree of planning (the learning process and learning outcomes are not clearly defined). An example of incidental learning would be learning about something new while browsing the Internet, in which learning happens spontaneously without any prior planning. Informal learning is located

between the formal and incidental realms and is positioned as work-related learning that happens in the absence of a pre-established learning program systematically planned by the organization; while the learning process is unstructured and elusive, the outcomes of this form of learning can be planned and evaluated. Examples of informal learning include both structured and unstructured on-the-job training (OJT), as well as using the Internet to complete specific work objectives (e.g., how to generate an Excel spreadsheet).

Theoretical Frameworks in Support of Informal Learning Work Contexts

Although individuals engage in informal learning at their own discretion, the literature has given the impression that context should be considered when investigating informal learning. Under this assumption, this section reviews three theoretical frameworks in the informal learning literature to provide support for a study on informal learning work contexts.

The first informal learning model was developed by Cseh, Marsick, and Watkins (1999). This model was developed to explain how one learns informally and was originally created by Marsick and Watkins in 1990 under the influence of Lewin's (1947) theory of individual-environment interaction, action science (Argyris & Schon, 1978), the pragmatic cycle of problem solving (Dewey, 1938), and other various adult learning theories applied to the workplace context. In the original model, context was employed only to determine possible solutions to the problem (Coyle & Ellinger, 2001). In 1997, Marsick and Watkins revised the informal learning model and concluded that it was too linear and prescriptive.

The model was once again revised in 1999 as a result of new findings in Cseh's 1998 dissertation. Applying Marsick and Watkins' model of informal learning as the theoretical foundation of her study, Cseh (1999) studied how Romanian and Hungarian owner-managers of small private companies successfully lead in the changing business environment by engaging in informal learning (Cseh, 1999). From face-to-face critical incident interviews with 18 owner-managers, Cseh found that perceptions of context played an even greater role, as each new business environment challenge was interpreted as a "threat or opportunity" at every step of the learning process (Cseh, 1999, p. 59). Perceptions of opportunity resulted in the use of informal learning strategies, whereas perceptions of threat caused major business losses. Based on this new insight, context was incorporated into all aspects of the informal learning process, as depicted in Figure 2

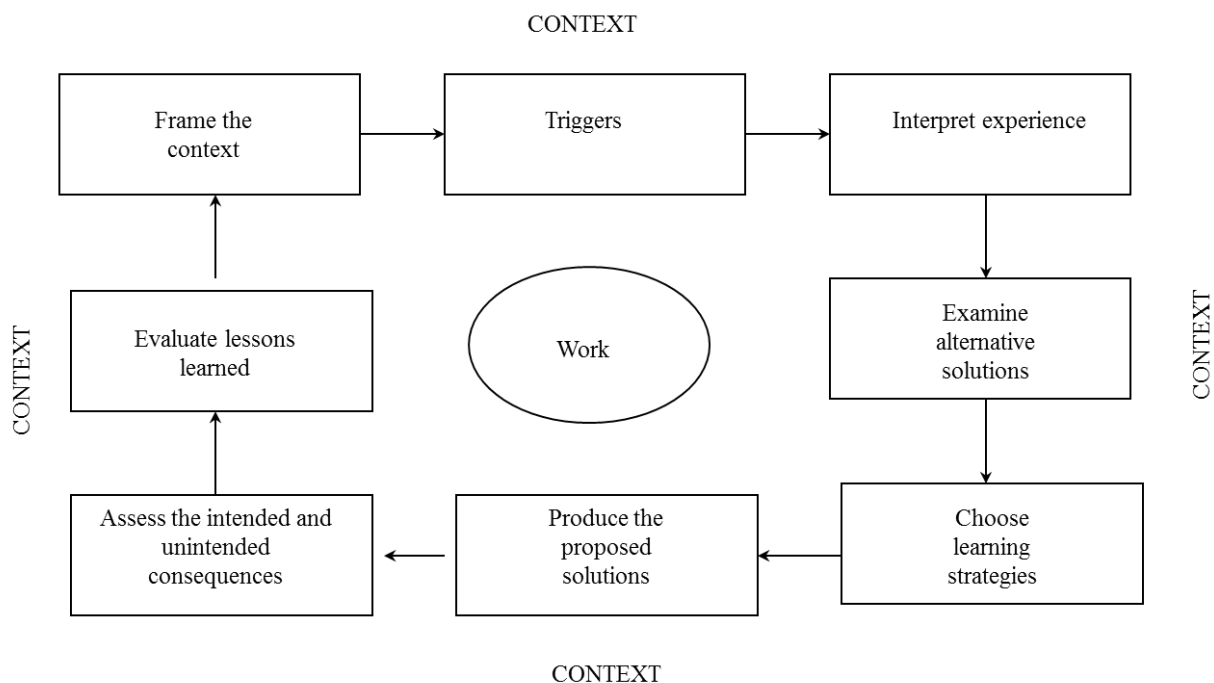


Figure 2. Cseh, Marsick, and Watkins' (1999) model of informal learning

The premise behind the model is as follows. The learning process gets triggered when people experience an unprecedented situation at work (e.g., sudden loss of a project manager). The first attempt is to make sense of the situation by examining the work context (e.g., despite the loss of the project manager, an employee who perceives high support from the rest of the team might be more willing to do what it takes to complete the project). This perception of the work context will lead to an examination of alternative solutions, in which prior experience, existing knowledge, or trial-and-error is used to address the problem. Sometimes the solutions might require new skills and learning strategies. Once the solution is generated, an evaluation is performed to determine whether it leads to the expected outcomes. At the end of the cycle, people reflect and draw on the lessons learned from the new experience. Consequently, they develop a new understanding to help them in the future as they encounter new

challenging problems.

Cseh et al.'s (1999) model of informal learning shows the value of the work context. It suggests that individual perceptions of an unsupportive work context could result in unproductive informal learning outcomes. In concurrence, Marsick, Volpe, and Watkins (1999) added, "informal learning from experience cannot be left completely to chance. Conscious planning can help learners to prioritize and meet the learning goals" (p. 93). The revised informal learning model by Cseh et al. (1999) provided theoretical support for employees' perceptions of informal learning work contexts. Furthermore, this model explained that the effectiveness of informal learning is influenced by perceptions of the work contexts in which learning takes place. Productive informal learning outcomes can be encouraged by clarifying the objectives of learning and by ensuring that individuals perceive their work contexts as supportive.

The second model was presented by Eraut (2004). In his informal learning model, Eraut recognized the value of perceptions of informal learning work contexts, both at the individual and organizational levels. In Eraut's model, informal learning is depicted by two triangles, one representing learning factors at the individual level, and the other representing context at the organizational level. The learning factors include confidence and commitment, feedback and support, and the challenges and value of work. The context factors, on the other hand, encompass encounters and relationships with people at work, allocation and structuring of work, and expectations of each person's role, performance and progress, as displayed in Figure 3 below

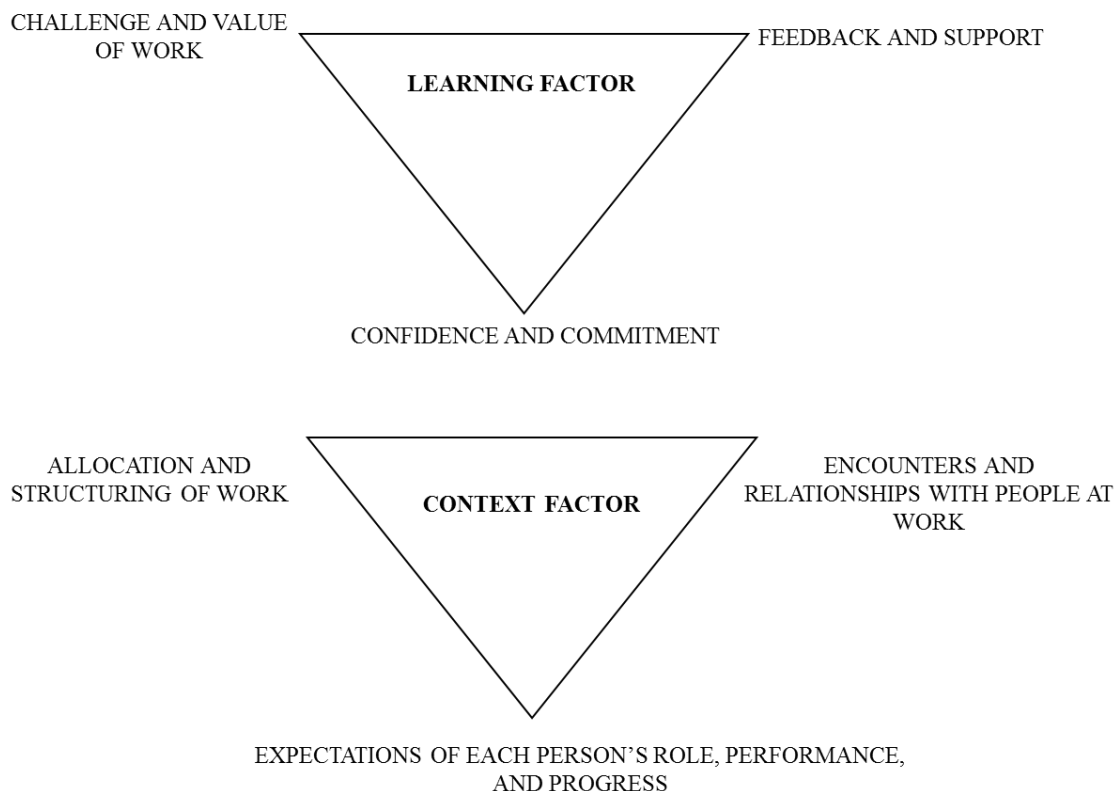


Figure 3. Eraut's (2004) model of informal learning.

The learning factors in Eraut's (2004) model focus on how one's willingness to informally learn is influenced by one's perceptions of the surrounding environment. As Eraut (2004) explained, "confidence [is] related more to relationships than to the work itself... This [is] dependent on whether they perceived their more significant working relationships as mutually supportive, generally critical, faction ridden, or overtly hostile" (p. 270). Confidence is paired with commitment, under the assumption that people who are confident are more likely to commit to the learning process. The triangle shows how perceptions of work challenge the value of work, combined with perceptions of adequate feedback and support from the surroundings, which influence confidence and commitment, and in turn, influence one's willingness to informally learn. In other words,

these learning factors provide a theoretical framework for the role that perceptions of social relationships play in influencing informal learning.

The context factors capture the context in a broader sense – beyond the individual level (Eraut, 2004). This is where organizations can make a difference. Concerning the allocation and structuring of work, Eraut (2004) proposed that it “affected both: 1) the difficulty or challenge of the work and the extent to which it was individual or collaborative, and 2) the opportunities for meeting, observing, and working alongside people who had more or different expertise” (p. 270). This factor was linked to the second and third factors: expectations of each person’s role, performance, progress, encounters and relationships with people at work, respectively. Therefore, contextual factors provide a conceptual framework, suggesting the need to structure the work environment to promote positive perceptions of the work context, which in turn, encourage people to learn informally at work.

A third theoretical framework was offered by Lohman (2005). Consistent with Cseh et al. (1999), Lohman acknowledged the value of perceptions of work contexts, as well as the possibility for informal learning to be unproductive. In her discussion, Lohman referred to Jarvis’ (1987) theory of adult learning. According to Jarvis, when faced with unfamiliar situations, there are three possible ways that individuals may respond: non-learning, non-reflective learning, and reflective learning. Non-learning takes place when an individual displays resistance to learning and a tendency toward inertia. Non-reflective learning happens when an individual learns superficially by memorizing information and practicing skills without a clear understanding about what

he or she is really learning. Reflective learning is a situation when an individual engages in self-reflection and makes a conscious effort to learn from a situation at hand. Among the three types of learning, informal learning falls into the reflective learning category and is recommended as the most effective and ideal. Nevertheless, Lohman (2005) pointed out that Jarvis' theory was insufficient in explaining informal learning, as it was unable to explain what led to one's decision to learn informally.

To fill the gap in Jarvis' theory, Lohman (2005) used McClusky's Theory of Margin to explain the decision to informally learn, stating that "the concept of margin is significant to informal learning in that people require ample margins to engage in growth-enhancing learning experiences" (p. 504). While individual characteristics, such as motivation and self-efficacy, influence the willingness to learn informally, there are factors outside of individuals (e.g., access to work resources, proximity to co-workers, etc.) that can be constructed in such a way as to foster informal learning at work. To test this theory, Lohman (2005) conducted a survey with 312 participants consisting of HRD professionals and teachers and found that certain environmental characteristics inhibited the frequency of informal learning activities. For example, on a scale of 1 (never inhibits engagement in learning activity) to 5 (always inhibits engagement in learning activity), both HRD professionals and teachers reported that a lack of time could be an inhibitor to their informal learning (mean rating: 3.1). Additionally, she also reported that 21 HRD professionals and 10 teachers reported not having organizational support as a hindrance to informal learning at work. While Lohman's study was descriptive in nature, it was an important first step toward the development of an informal learning instrument and

verified the need for further examination of informal learning work contexts.

To summarize, each of the informal learning theoretical frameworks discussed provides insights about the perceptions of informal learning work contexts. Cseh et al.'s (1999) model of informal learning shows how perceptions of context infuse all aspects concerning the decision to learn informally at work. Eraut's (2004) model suggests the value of examining social relationships and encourages the consideration of a broader view to explain what organizations can do in shaping positive perceptions of informal learning work contexts, particularly by encouraging social relationships and work access. Lohman (2005) offers a theoretical framework supported by quantitative data highlighting the need to better understand employees' perceptions of informal learning contexts. Based on these three informal learning frameworks, the author of this study looked at previous studies on informal learning to identify the types of work contexts to induce productive informal learning outcomes. The findings are presented and discussed in the next section.

Components of Work Contexts in the Informal Learning Literature

A critical element in advancing HRD is to gain a clear understanding about what organizations can do to create and shape the work environment to support productive informal learning. The first step is to identify the components of a work context that most influence productive informal learning at work and to assess them in organizational settings. Given that most informal learning research has been performed qualitatively, an empirical assessment of this construct is not yet possible. This study assumed that qualitative research findings have provided the literature with sufficient insights into

informal learning work contexts, and that it was time to generalize these findings across a larger population of working professionals. Subsequently, this section discusses the following four components of informal learning work contexts identified in the literature: (a) management support; (b) peer support; (c) a supportive organizational culture; and (d) access to work resources (e.g., time and technology).

Management Support: Supervisor as Facilitator of Learning

Management support has consistently surfaced as one of the most important elements of informal learning work contexts (Ashton, 2004; Enos, Kehrhahn, & Bell, 2003; Ellinger, 2005; Eraut, 2004; Macneil, 2001; Sambrook & Stewart, 2000; Skule, 2004; Tannenbaum et al., 2010). A principal topic in this area was the shifting managerial role from that of an expert who monitors and supervises subordinates' performance to that of a learning facilitator who helps create a supportive learning climate to encourage subordinates' learning, especially in the absence of a formal learning program.

Macneil (2001) posited that globalization and technological advancement are the reasons behind the shift in the managerial role in today's rapidly changing business environment. A manager as a learning facilitator is defined as "someone who creates a learning environment, and is responsible for providing the resources which will enable people to learn" (Macneil, 2001, p. 249). Similarly, Eraut (2004) pointed out that the manager's role has deliberately changed from managing productivity to supporting learning, allocating work, and ensuring a climate supportive for learning.

In a qualitative case study with 13 participants of a specific learning organization referred to as "Reinventing Itself Companies" or RIC, Ellinger (2005) examined informal

learning work contexts and found that learning-committed leadership and management were ranked first among the four organizational contextual factors (internal organizational culture committed to learning, work tools and resources, and social relationships). Based on the findings, Ellinger (2005) proposed that managers could influence informal learning by: (a) providing opportunities to learn; (b) acting as coaches or mentors; (c) visibly providing support and space for learning; (d) allowing risk-taking and learning from mistakes; (e) emphasizing the importance of knowledge-sharing; (f) providing positive feedback and recognition; and (g) acting as role models.

In summary, supportive managers provide their subordinates with a supportive informal learning environment. They know how to assist their employees in transforming challenging work situations into learning opportunities. These managers understand the learning curve, and that mistakes are part of the learning process, which can become a powerful learning tool when complemented with support, sufficient feedback, and guidance. Under this assumption, perceptions of management support should lead to more productive informal learning at work.

Peer Support: Proximity and Access

The influence of peer support on productive informal learning has also been repeatedly emphasized in the informal learning literature (Boud & Middleton, 2003; Conlon, 2003; Cunningham & Hillier, 2012; Doornbos et al., 2008; Ellinger, 2005; Eraut, 2004; Lohman, 2005; Tannenbaum et al., 2010). Two critical elements of peer support are proximity and access.

Discussing the impact of social interaction for learning at work, Enos, Kerhhahn,

and Bell (2003) stated that “informal learning is a social process that is largely dependent on social interaction with other individuals in the workplace and is situated in the organization” (p. 381). While they did not find a significant relationship between informal learning and co-worker support in their study, Enos et al. attributed their findings to the fact that the managers in their study were already highly proficient, and that they did not need their co-workers’ support to solve their work problems. In light of their discussion, Enos et al. regarded their findings as unique and advised future informal learning researchers to continue exploring the relationship between peer support and informal learning.

In her qualitative study, Ellinger (2005) reported that informal learners formed learning networks among themselves. Productive informal learning happened when learners felt that their co-workers were supportive and willing to share their knowledge, and that they had access to people with necessary information when faced with challenges at work. Ellinger (2005) also found that informal learning was thwarted when people felt that their co-workers were not supportive (e.g., did not want to share knowledge, and did not want to accept new ideas).

Lohman (2005) arrived at a similar conclusion and found three situations where peer interaction hampered informal learning: 1) a lack of proximity with colleagues of similar expertise; 2) others’ unwillingness to participate in learning activities; and 3) inaccessibility to experts in the subject matter. As a result, Lohman (2005) proposed the following:

Human Resource Developers should strategically design work areas so that

employees...[are] located near colleagues in the same technical or professional areas. Strategically assigning work situations in this way should decrease the strength of two environmental inhibitors to informal learning (lack of time and proximity to other's work areas) and thereby, promote collegial interaction and sharing. (p. 524)

In short, although the findings surrounding peer support appear inconclusive, proximity and access to others with similar interests and professional expertise should be considered as an important aspect of a supportive informal learning work context. When faced with an unfamiliar problem, individuals look for answers by seeking the opinions or advice from subject matter experts (SMEs) nearby. This formation of social learning networks with an emphasis on openness and knowledge-sharing would reduce the time it takes for individuals to find the information they need alone. Thus, it is possible that peer support would propel individuals to continue learning, even when there is no pre-established formal learning program.

A Supportive Organizational Culture

A supportive organizational culture toward learning should also be considered as an element of informal learning work contexts (Argyris, 1999; Ellinger, 2005; Eraut, 2004; Leslie, Aring, & Brand, 1998; Lohman, 2005; Sambrook & Stewart, 2000; Macneil, 2001; Tannenbaum et al., 2010). The rationale is that even if the manager is highly supportive of learning, it would still be challenging for informal learning to take place without a supportive organizational culture that allows learning from mistakes and double-loop learning (Argyris, 1999). Ellinger (2005) maintained that even though managerial support for learning was ranked first in her study, "internal organizational

culture committed to learning” (p. 401) is just as important, and that both should be in alignment in shaping positive perceptions of informal learning work contexts. In the Teaching Firm Study, Leslie, Aring, and Brand (1998) reported that the organizational culture was the most important factor in promoting informal learning. Lohman (2005) also found support for this assertion, as she reported that having an unsupportive organizational culture discouraged HRD professionals from engaging in informal learning.

Macneil (2001) proposed that there are two types of organizational learning culture: adaptive and generative. An adaptive learning culture punishes mistakes because they are considered as damaging, whereas a generative learning culture appreciates mistakes and deems them as opportunities for learning, change, and growth. Therefore, to encourage productive informal learning outcomes, an organization has to consider adopting a generative learning culture that allows risk-taking and learning from mistakes.

Access to Work Resources: Time and Technology

Ellinger (2005) stated, “[work resources were] a broad theme that influenced informal learning and included employees’ use of their computers, help menus, the Internet, software, the telephone, books, and financial resources to support their informal learning endeavors” (p. 403). Access to work resources allows learners to “consider alternative strategies for learning, influences the type of learning strategies selected, and is also instrumental in producing some kind of actual outcomes of learning” (p. 404). Consistent with this assertion, Lohman (2005) reported that in the case where the organizational culture and work colleagues are unsupportive of learning, HRD

professionals turn to independent learning (e.g., searching the Internet, scanning magazines, or reading journals). In the absence of other informal learning work contexts, motivated informal learners utilize technologies to satisfy their own learning needs for work purposes.

Another factor conducive to informal learning under work resources was time. A lack of time or time pressure was reported to inhibit individuals' participation in informal learning activities (Ellinger, 2005; Lohman, 2000; Lohman, 2005; Marsick & Volpe, 1999; Sambrook & Stewart, 2000). One possible explanation is that individuals do not have enough time to be retrospective and to obtain sufficient feedback (Tannenbaum et al., 2010); thus, they do not have time to learn informally (Ellinger, 2005).

In summary, in the case when the other components of a supportive informal learning work context are not present, access to work resources, such as technology and time, gives employees an opportunity to learn informally. Considering that participation in this type of learning is self-directed and solely up to the discretion of individuals, several researchers have pointed out that it could produce negative results if not well-planned (Ellinger, 2005; Lohman, 2005). Therefore, they suggested that employees should be provided with guidelines and regulations as to how to use their "free time" effectively and productively. Accordingly, Lohman (2005) maintained, "[an] increased amount of unencumbered time, with discretion over how that time is used, would provide professionals with greater opportunity for informal learning" (p. 524).

Chapter Summary

This chapter provides a synthesis of the informal learning literature. The review

revealed that despite numerous definitions of informal learning, the structure or degree of planning consistently emerged as a key factor. Most of the definitions distinguished informal from formal learning by the degree of structure (unstructured versus structured). This study offers new insight into the literature by refining the definition of structure as the degree of planning, and the difference between formal and informal learning lies in the degree of planning in the learning process. Subsequently, this study presents a new definition of informal learning at work as work-related learning that happens in the absence of a pre-established learning program that is systematically planned by the organization. While the learning process is unstructured and elusive, the impact of such learning can be planned and evaluated.

The literature review suggested that there are four components of informal learning work contexts. The first component is management support, where managers facilitate subordinates' informal learning by creating a supportive learning environment at work. While learners are responsible for their own informal learning, this study assumed that employees' perceptions of management support would lead to more productive informal learning. The second component is peer support. When faced with challenging work situations, employees look for solutions by seeking advice from their peers. Therefore, this study proposed that proximity and easy access to others with similar interests and professional expertise would increase productive informal learning.

The third component of informal learning work contexts is a supportive organizational culture. Existing studies highlight that organizations should emphasize a generative learning culture that allows questions, feedback, and reflection. Of importance

is the alignment between the espoused value and the actual organizational behavior. It is not enough for the organization to claim that it supports learning. It has to show real efforts by developing an organizational system that encourages informal learning. Thus, this study presumed that employees' perceptions of a supportive organizational culture would result in more productive informal learning. The final component is access to work resources. In the absence of the other three components of informal learning work contexts, access to work resources, such as time and technology, gives employees an opportunity to learn informally. Thus, this study extended the view that perceptions of easy access to time and technology would produce more productive informal learning at work.

In summary, the review of the literature alluded that there is sufficient information about informal learning work contexts, and it appears to be an appropriate time for an empirical study to generalize these findings across a larger population of working professionals. However, the absence of a psychometrically sound instrument to measure informal learning work contexts has thwarted progress in informal learning research. Based on the literature review findings, this study addressed the void in the informal learning literature by developing and validating an instrument to measure the four components of informal learning work contexts.

CHAPTER THREE

METHODS

This study was designed to develop a psychometrically sound instrument to assess the relationship between employees' perceptions of informal learning work contexts and informal learning in the workplace (measured by frequency and impact). This chapter is organized into five sections. The first section addresses the appropriateness of the selected research design. The second section describes the criteria used to generate the item-pool. The third section explains the examination of the content validity of the instrument and provides a description of how the data were collected and analyzed. The fourth section discusses how the construct validity was assessed and presents the sampling strategy, data collection method, and data analysis. The fifth section elaborates how the relationship between perceptions of work contexts and participation in informal learning activities were evaluated, while taking the potential effects of demographic variables on this relationship into consideration.

Research Questions

The primary purpose of this study was to explore the relationship between employees' perceptions of informal learning work contexts and informal learning activities. The following overarching question guided this study: What is the relationship between employees' perceptions of informal learning work contexts and informal learning in the workplace? Given that no tool to measure employees' perceptions of informal learning work contexts currently exists, the first step was to generate a valid instrument to measure and quantify this construct. Thus, two research questions were

examined:

Research Question 1: Can a psychometrically sound instrument to measure employees' perceptions of informal learning work contexts be developed and generated?

Furthermore, the literature suggested that each factor of the work context relates to informal learning at work. However, it is not yet known which work context factors contribute most to informal learning at work. In light of this ambiguity, the second research question was considered:

Research question 2: Is there a relationship between the four factors of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and informal learning at work? In accordance with research question 2, four hypotheses were proposed:

H1: Employees' perceptions of management support are positively related to informal learning at work, as measured by frequency and impact.

H2: Employees' perceptions of peer support are positively related to informal learning at work, as measured by frequency and impact.

H3: Employees' perceptions of a supportive organizational culture are positively related to informal learning at work, as measured by frequency and impact.

H4: Employees' perceptions of access to work resources are positively related to informal learning at work, as measured by frequency and impact.

Research Design

The decision to conduct a quantitative instrument development and validation research study was consistent with the primary question that sought to answer, “what is

the relationship between employees' perceptions of informal learning work contexts and informal learning in the workplace?" Employees' perceptions of a supportive work context have been considered as a key determinant in employees' willingness to learn informally, as Marsick, Volpe, and Watkins (1999) indicated:

What is striking in all of these studies is that neither the size nor complexity of the work context nor the magnitude of the changes taking place in the environment makes substantial differences in terms of informal learning. Rather, what appears to be the most significant is how employees in changing or challenging circumstances perceived their work context. (p. 80)

As of date, there is no empirical evidence to support this statement because of the absence of a valid quantitative metric.

Hinkin (2009) pointed out that one of the difficulties in understanding organizational phenomena is the lack of measurement. DeVellis (1991) advised that in the absence of a psychometrically sound instrument to assess a social science construct, the most effective alternative is a "carefully developed questionnaire" (p. 7). This view was corroborated by Korman (1974), who emphasized the importance of having a measure by stating, "the point is not that adequate measurement is 'nice.' It is necessary...without it, we have nothing" (p. 194). Grounded on these assertions regarding the importance of a metric to enable an empirical examination of informal learning theoretical frameworks and the advancement of knowledge in the field, the decision to conduct an instrument development and validation study was considered as both timely and appropriate.

The purpose of this study was to develop and validate an instrument to measure perceptions of informal learning work contexts. Six factors were measured in this study. Four of these factors represented the four components of informal learning work contexts identified from previous qualitative studies (management support, peer support, a supportive organizational culture, and access to work resources). The two other factors assessed informal learning at work by looking at the frequency and productive impact. There were four phases in this study. A detailed research procedure for each phase is presented below.

Study Phase I: Item-Pool Generation

The first step was to create an initial item-pool, following DeVellis' (1991) recommendation that "it would not be unusual to begin with a pool of items that is three or four times as large as the final scale. Thus, a 10-item scale might evolve from a 40-item pool" (p. 57). Correspondingly, following this ratio of 1:4 for final item retention, 16 items were constructed for each of the four components of the informal learning work context, for a total of 64 items in the initial item-pool. Each of the 64 items measured employees' perceptions of informal learning work contexts on a scale from 1 (strongly disagree) to 5 (strongly agree).

In constructing each item, the following criteria were followed: (a) each statement had to be short, simple, and consistent with a 6th – 7th grade reading level, in accordance with DeVellis' (1991) suggestion that "aiming for a reading level between fifth-to seventh grades is probably an appropriate target for most instruments that will be used with the general population" (p. 58); (b) each sentence contained only one idea; (c)

negatively worded items would be avoided; and (d) some item redundancy was allowed to ensure internal consistency reliability.

Additionally, following DeVellis' (1991) advice to develop questionnaire items based on a clear theoretical framework, the item-pool was created by drawing on the literature of informal learning in the workplace. The following six constructs were examined in this study:

Perception of Management Support - Employees' perceptions of the willingness of their direct supervisors to facilitate informal learning (Ashton, 2004; Enos, Kehrhahn, & Bell, 2003; Ellinger, 2005; Eraut, 2004; Macneil, 2001; Sambrook, 2005; Sambrook & Stewart, 2000; Skule, 2004; Tannenbaum et al., 2010).

Perception of Peer Support - Employees' perceptions of having proximity and access to others with similar interests and professional expertise; openness and knowledge-sharing among peers that encourage informal learning (Boud & Middleton, 2003; Conlon, 2003; Cunningham & Hillier, 2012; Doornbos et al., 2008; Ellinger, 2005; Eraut, 2004; Lohman, 2005; Tannenbaum et al., 2010).

Perception of a Supportive Organizational Culture - Employees' perceptions of how the organization supports and tolerates trial-and-error activities that promote their informal learning (Argyris, 1999; Ellinger, 2005; Eraut, 2004; Leslie, Aring, & Brand, 1998; Lohman, 2005; Macneil, 2001; Sambrook, 2005; Sambrook & Stewart, 2000; Tannenbaum et al., 2010).

Perception of Access to Work Resources - Employees' perceptions of access to work resources (time and technology) to help them learn informally (Ellinger, 2005;

Lohman, 2005; Tannenbaum et al., 2010).

Frequency in Informal Learning Activities - One of the few existing instruments to measure informal learning was developed by Lohman (2005). Therefore, in order to provide a point of comparison to past research, eight items from Lohman's (2005) study that measured the frequency of informal learning at work were included in this study. These items were:

In learning about something new on the job, how often do you...

(1) talk with others; (2) collaborate with others; (3) observe others; (4) share materials and resources with others; (5) search the Internet; (6) scan professional magazines and journals; (7) use the trial-and-error method; and (8) reflect on your actions.

A scale ranging from 1 (almost never use the learning activity) to 5 (almost always use the learning activity) operationalized the frequency of the eight learning activities. Because Lohman reported a low internal consistency (.68) for the items to measure the eight informal learning activities, it was necessary to generate a new set of items to measure the impact of informal learning activities.

Impact of Informal Learning Activities - Ten items were created to measure employees' perceptions of the impact of productive informal learning at work, based on information found in scholarly and practitioner publications, informal conversations with practitioners and colleagues, as well as the author's own work experience. Each item measured perceptions of the impact of informal learning on a scale ranging from 1(strongly disagree) to 5(strongly agree).

Demographics - Expanding on the literature (Ellinger, 2005; Lohman, 2005), eight variables were used to gather information about the participants' gender, age, country of origin, current residence, tenure at their company, highest educational achievement, job level, and work function.

Study Phase II: Content Validity Analysis

In Phase 2 of the study, a content validity analysis with the purpose of retaining only items most representative of the four factors was performed. Data collection procedures and analysis are described below.

Data Collection Procedures

The purpose of the content validity analysis was to verify that the items generated in the initial item-pool were representative of the four factors under investigation. There were 16 members of the expert panel consisting of four academic scholars, three scholar-practitioners, and nine working professionals. Each panel expert was asked to review a total of 80 items (consisting of 64 independent variable items and 16 dependent variable items) and was given the option to complete the survey electronically or in person.

The overall document consisted of 18 pages containing: (a) information about the study; (b) a definition of each of the four factors of informal learning work contexts without titles (Tracey & Tews, 2005); and (c) a step-by-step instruction of how to complete the survey. For the independent variables, the panel experts were asked to categorize each of the 64 items under one of the definitions of the four informal learning work contexts and to determine whether an item should be kept or not by rating it as (1) essential-definitely keep; (2) good item – keep as a 2nd option; or (3) bad item – remove

from the survey. For the dependent variable, the panel experts were asked to review each of the 16 items using the criteria provided.

Data Analysis

The author employed three rules in determining item retention. First, a minimum of 50% of the panel had to agree on the item classification (item-category correctness). The percentage was rank ordered to determine the best items to keep. Second, the item had to pass Lawshe's (1975) Content Validity Ratio (CVR) test – considered as one of the most often used methods for content validity analysis. This ratio can be represented as:

$$\frac{[(\text{Number of panelists indicating "essential"} - (\text{total number of panelists}/2))] / (\text{total number of panelists}/2)}$$

The minimum CVR value is dependent on the size of the panel (Lawshe, 1975), and for this study, the value was .49. However, Lawshe's (1975) formula excluded items that were rated as 2 or "good item – keep as second option"; thus, the author decided to include items rated as 2 into the formula. Third, an average rating for item-retention was calculated and then rank ordered; items with the highest ranking for average item retention were retained in the final prototype.

This analysis resulted in 7 items per each of the 4 informal learning work context factors, for a total of 28 items. These items were then included in the newly developed survey, called "the informal learning work contexts survey," which consisted of the following: 1) 8 items to measure the frequency of informal learning, based on Lohman (2005); 2) 28 items to measure the 4 factors of informal learning work contexts; 3) 10

items to measure the impact of informal learning at work; and 4) 8 demographic-related questions. The next step was to send the newly developed survey – consisting of 54 items in total – to the population sample for further empirical validation.

Study Phases III & IV: Construct Validity Analysis and Predictive Validity Analysis

A series of inferential analyses were performed to address Phases III and IV of this study. Mplus Version 7 was initially used to perform Confirmatory Factor Analysis (CFA). A decision to use SPSS v20.0 to conduct Exploratory Factor Analysis (EFA) was later made to improve the outcome by removing bad items and to further refine the constructs. Confirmatory Factor Analysis was then performed again to arrive at the final outcomes.

Phase IV employed SPSS v20.0 to conduct multiple regression on the final constructs developed in Phase III to test the predictive validity of the four independent variables related to employee perceptions (management support, peer support, a supportive organizational culture, and access to work resources) on the two dependent variable outcomes of frequency of informal learning and impact of informal learning. Details on the sampling strategy, data collection procedures, and data analysis are provided below.

Sampling Strategy

The population of this study included all working professionals who had informally learned at least one time in their careers. In this study, a sample of working professionals was drawn from the proprietary research pool database of Wilson Learning – a global leader in sales training, leadership development, workforce development, and

performance improvement solutions – based in Minneapolis. This sampling strategy was considered to be appropriate, as Yang (2005) reported that the nonrandom sampling strategy is commonly used in organizational research. As a result, such a strategy should not be problematic, as long as the variance and sample size are considered. The Wilson Learning research pool database provided this study with adequate variance because most of the employees listed were salespeople, mid-level managers, and HR professionals from different organizations with diverse demographic backgrounds.

There are various guidelines of how to determine estimates for an adequate sample size. For example, in his book *Applied Factor Analysis*, Rummel (1970) suggested 1:4 for an item-to-response ratio, which for this survey, would mean a sample of approximately 200 people. Nunnally (1978) recommended a ratio of 10 to 1, which would mean a sample of approximately 500 people. Fabrigar, MacCallum, Wegener, and Strahan (1999) stated that under moderate conditions of commonalities, a sample size of 200 might be more adequate, whereas Guadagnoli and Velicer (1988) recommended a minimum sample size of 150 to generate an accurate solution in the factor analysis. Additionally, Krejcie and Morgan (1970) suggested that “as the population increases the same size increases at a diminishing rate and remains relatively constant at slightly more than 380 cases” (p. 610). A total of $n = 477$ participants completed this study, with a response rate of approximately 19%.

Data Collection Procedure

This study was reviewed by the University of Minnesota’s Institutional Review Board (study number 1109E05101) (see appendix A). All 2,500 people listed in the

Wilson Learning research pool database were asked to participate in this study because they had agreed to participate in any work learning-related research associated with Wilson Learning. All communication was done via email, and there were a total of two email correspondences.

The initial email invitation (see appendix B) contained the following information: (a) the background and purpose of the study in simple, clear language; (b) the approximate time required for survey completion; (c) a link to a one-page consent statement describing that participation was voluntary and that withdrawal from the study could be done at any time without penalty (see appendix C); (d) assurance that responses were confidential, and that all data would be stored securely; (e) an incentive to participate in an opportunity to win one of three \$50 gift certificates from American Express and a free summary of the findings; (f) the author's email for any questions or concerns during the study; and (g) a link to the Informal Learning Work-Context survey in Zoomerang (see appendix D).

One to two weeks after the initial email invitation was sent, an email reminder containing exactly the same information as the initial email was sent to non-respondents to remind them about the study and to ask for their willingness to participate. After completion of the data collection, participants' identification was replaced with numerical codes to maintain their confidentiality. The collected data were stored in a computer that was password protected and could only be accessed by the author. The data would be archived in the computer for five years before being permanently deleted.

Data Analysis

In phases III and IV, various data analysis techniques were used to address the two research questions.

Construct Validity Analysis. In study phase III, the items were further refined through confirmatory factor analysis. A total of four independent variable constructs and two dependent variable constructs were developed to measure the impact of informal learning activities, using the steps taken in Phase I (Item-Pool Generation) and Phase II (Content Validity Analysis) of the study. The newly developed survey consisted of 49 items, including the independent variable constructs of (a) management support, (b) peer support, (c) a supportive organizational culture, and (d) access to work resources; and the dependent variable constructs of (a) frequency of informal learning and (b) impact of informal learning. In addition, questions related to demographics and employment status were given to the study participants for completion. Detailed procedures and findings are presented in the next chapter.

Multiple Regression Analysis. In the final phase of the study, the predictive validity of employees' perceptions of informal learning work contexts was evaluated by using multiple linear regression analysis. The purpose of this analysis was to explore the relationship between the components of informal learning work contexts, which were treated as independent variables (perceptions of management support, perceptions of peer support, perceptions of a supportive organizational culture, and perceptions of access to work resources), and the frequency and impact of informal learning activities as the dependent variables. The hypothesized relationship is presented in the diagram below:

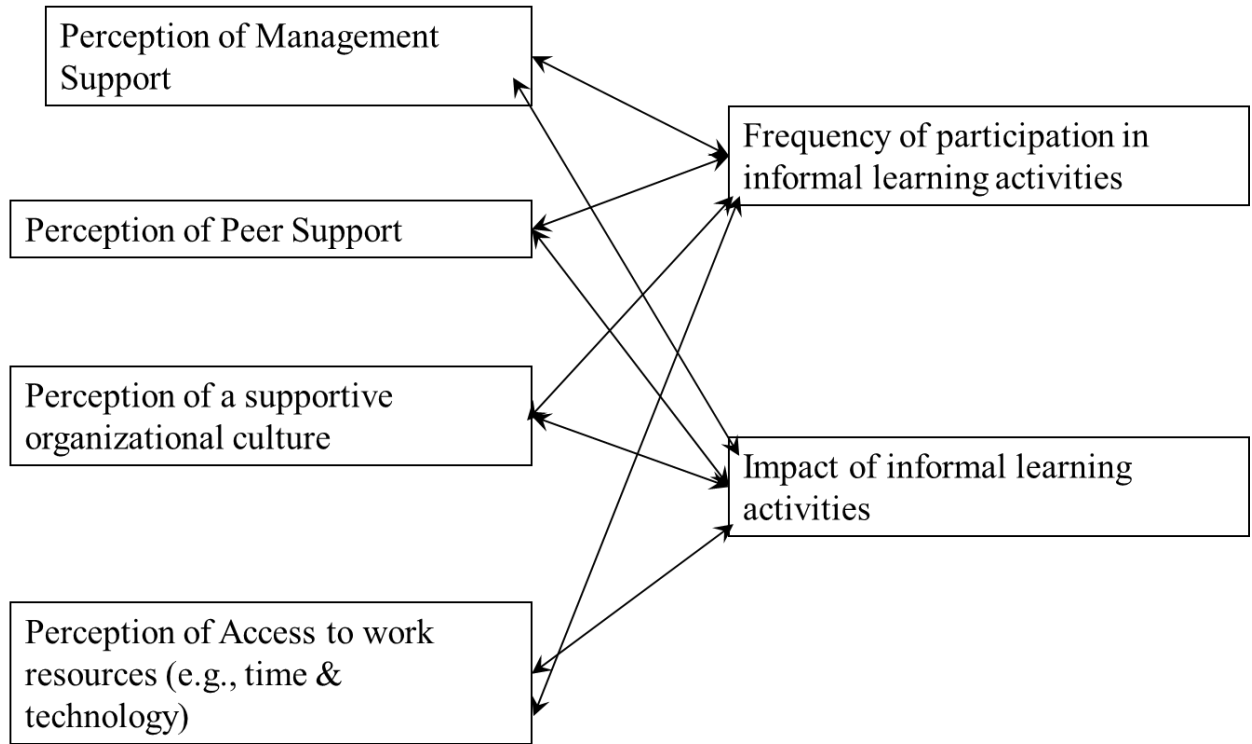


Figure 4. Hypothesized relationship between informal learning work contexts and frequency of participation and impact of informal learning activities at work (figure is created by the study author and researcher, J. Maringka, using Microsoft PowerPoint).

Multiple regression analysis is often used to determine the predictive power of the independent variables to that of the dependent variables. This technique was appropriate for this study, as it enabled the author to determine the predictive value of each factor of the informal learning work context in relation to the frequency and impact of informal learning at work. To answer research question 2, “to what degree does each factor of the informal learning work context (management support, peer support, a supportive organizational culture, and access to work resources) relate to informal learning at work?” simultaneous variable entry, in which all independent variables were entered at the same time, was used first to gauge the relative predictive power of the independent variables.

To evaluate the goodness of fit to the model, the adjusted R^2 value was examined. The adjusted R^2 value minimizes the error due to population bias by adjusting the number of predictors and variance in the sample size. The significance of the model was determined using the F statistic. Moreover, beta coefficients were used to determine the extent to which each factor of the informal learning work context was associated with participation in informal learning activities. Use of the beta coefficient is consistent with Bates (2005), who suggested the following:

Beta coefficients also provide information about the relative predictive power of the independent variables by allowing a direct comparison across the independent variables in terms of the extent to which each contributes to R^2 - higher beta values indicate more predictive power. (p. 122)

Chapter Summary

The current literature on informal learning suggests that each factor of the informal learning work context positively relates to productive informal learning. This assertion has been mostly based on qualitative research analyses. Under the main assumption that it was time to generalize these findings across a larger population of working professionals, this chapter described the methods that would be used to develop and validate an informal learning work context instrument. This instrument would enable a quantitative analysis of the relationship between employees' perceptions of informal learning work contexts and informal learning activities (measured by frequency and impact).

There were four phases in the development and validation of an informal learning work context instrument. The first phase involved the creation of a total of 64 items representing the four components of an informal learning work context. The second phase entailed a content validity analysis with the purpose of retaining the best items representative of the four factors. An expert panel consisting of sixteen people (four academic scholars, three scholar-practitioners, and nine working professionals) took part in this phase of the study. The third phase assessed the construct validity of the newly developed instrument to verify that the items held together as a good measure of the construct. The sampling strategy, data collection procedures, and data analysis were presented. The fourth phase assessed the relationship between employees' perceptions of informal learning work contexts and informal learning at work (measured by frequency and impact) while taking demographic variables into account.

CHAPTER FOUR

RESULTS

Chapter 4 presents the results of this study and is divided into four sections. The first section reports the population and demographic findings of the dataset. The second section provides an investigation of the assumptions as they relate to the inferential analyses. The third section presents the findings from phase III & IV analyses. The fourth section presents the results of hypotheses testing. The chapter concludes with a summary of the results. Mplus Version 7 was used to conduct confirmatory factor analysis (CFA), whereas SPSS v20.0 was used for exploratory factor analysis (EFA) and multiple regression. All inferential analyses were set at a 95% level of significance.

The purpose of this study was to address the void in the informal learning literature by developing and validating an instrument to operationalize informal learning work contexts, and to subsequently create a diagnostic tool that can be used by HRD practitioners to assess, manage, and shape learning environments at work. The following core question guided this study: What is the relationship between employees' perceptions of informal learning work contexts and informal learning in the workplace? Given that no tool currently exists to measure employees' perceptions of informal learning work contexts, the first step was to generate a valid instrument to measure and quantify this construct. Thus, two research questions were offered:

Research question 1: Can a psychometrically sound instrument be developed and generated to measure employees' perceptions of informal learning work contexts?

Research question 2: Is there a relationship between the four factors of informal

learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and informal learning at work? In accordance with research question 2, four hypotheses were proposed:

H1: Employees' perceptions of management support are positively related to informal learning at work, as measured by frequency and impact.

H2: Employees' perceptions of peer support are positively related to informal learning at work, as measured by frequency and impact.

H3: Employees' perceptions of a supportive organizational culture are positively related to informal learning at work, as measured by frequency and impact.

H4: Employees' perceptions of access to work resources are positively related to informal learning at work, as measured by frequency and impact.

Population and Demographic Findings

The population of this study included all working professionals who had informally learned at least one time in their careers. In this study, a sample of working professionals was drawn from the proprietary research pool database of Wilson Learning – a global leader in sales training, leadership development, workforce development, and performance improvement solutions – based in Minneapolis. All 2,500 people listed in the WL research pool database were asked to participate in this study because they had agreed to participate in any work learning-related research associated with Wilson Learning. A total of $n = 477$ participants completed the study, with a response rate of approximately 19%. Table 1 presents descriptive statistics for the demographic and employment variables of the study. The participants were almost evenly divided between

males (49.3%) and females (50.3%). Approximately half of the participants (222 participants, 46.5%) were between the ages of 25 and 34 years. A majority of the participants were born in and/or resided in North America (83.2% and 89.1%, respectively). Three hundred and sixty-eight participants (77.1%) had completed a four-year education or greater, and more than half of the participants (54.7%) were non-management employees. The participants' tenure in their current organizations ranged from 0 to 40 years ($M = 5.83$ years, $SD = 6.75$ years).

Table 1

Demographic Characteristics of Participants (n = 477)

Characteristics	n	%
Gender		
Female	240	50.3
Male	235	49.3
Others	2	0.4
Age Group (years)		
Under 20	8	1.7
20-24	81	17.0
25-29	116	24.3
30-34	106	22.2
35-40	39	8.2
41-44	29	6.1
45-49	20	4.2
50-54	33	6.9
55-59	29	6.1
60 or more	13	2.7
Missing	3	0.6
Region of the World – Origin		
North America	397	83.2
South America	13	2.7
Africa	4	0.8
Europe	26	5.5
Asia	29	6.1
Australia/Oceania	8	1.7
Region of the World – Current Residence		
North America	425	89.1
South America	8	1.7

		55	
	Africa	3	0.6
	Europe	16	3.4
	Asia	15	3.1
	Australia/Oceania	10	2.1
Highest Level of Education Completed			
	High School Diploma	14	2.9
	Some College	65	13.6
	Two-year degree/certificate	30	6.3
	Four-year degree/certificate	211	44.2
	Master's degree	130	27.3
	Doctoral degree	27	5.7
Level in Organization			
	Non-management	261	54.7
	Supervisor/first-line manager	73	15.3
	General/middle manager	98	20.5
	Senior manager/executive	39	8.2
	Owner/CEO/Work for self	6	1.3
Role/Function in Organization			
	Production and Manufacturing	22	4.6
	Sales	30	6.3
	Marketing	21	4.4
	Customer Service	53	11.1
	IT/software/hardware	88	18.4
	Research and Development	71	14.9
	Finance	27	5.7
	Human Resources	43	9.0
	Consultant	30	6.3
	Other	91	19.1
	Missing	1	0.2

Note. Frequency of each demographic characteristic is based on n = 477

Instrumentation

A total of four independent variable constructs and two dependent variable constructs were developed to measure the impact of informal learning activities using the steps taken in Phase I (Item-Pool Generation) and Phase II (Content Validity Analysis) of the study. The analysis resulted in 7 items per each of the four informal learning work context factors, or a total of 28 items. These items were then included in the newly

developed instrument called the “informal learning work contexts survey” (ILWC), which consisted of the following: 1) 8 items to measure the frequency of informal learning, based on Lohman (2005); 2) 28 items to measure the four factors of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources); 3) 10 items to measure the impact of informal learning at work; and 4) 8 demographic-related questions. The next step was to send the newly developed survey – consisting of 54 items in total - to the population sample for further empirical validation.

Measures of Central Tendency and Cronbach’s Alpha Coefficients

Mean scores were derived for each of the six constructs for each participant. The range of possible scores for each of the six variable constructs was 1 to 5, with higher scores indicating greater perceptions, frequency, or impact of informal learning at work. Table 2 presents the measures of central tendency and Cronbach’s alpha coefficients for internal consistency reliability of the six latent variable constructs. A Cronbach’s coefficient alpha value of .70 or greater indicates good reliability of an instrument with the data collected (Tabachnick & Fidell, 2007). With the exception of Lohman's construct involving the frequency of informal learning ($\alpha = .664$), the internal consistency reliability of the latent variable constructs with the data collected from the participants was above the .70 threshold.

Table 2

Initial Measures of Central Tendency and Cronbach's Alpha Coefficients for Latent Variable Constructs Developed for Study and Used for Confirmatory Factor Analysis (n = 477)

Variable	<i>M</i>	<i>SD</i>	<i>Mdn</i>	Range	α
Management support	3.50	0.81	3.57	1.29 – 5.00	.865
Peer support	4.06	0.59	4.14	1.43 – 5.00	.818
Supportive organizational culture	3.71	0.68	3.71	1.29 – 5.00	.771
Access to work resources	4.01	0.78	4.14	1.00 – 5.00	.898
*Frequency of informal learning	3.80	0.58	3.88	1.88 – 5.00	.664
Impact of informal learning	3.88	0.69	4.00	1.00 – 5.00	.858

Note. *M* = Mean; *SD* = Standard Deviation; *Mdn* = Median; α = Cronbach's Alpha Coefficient; Management support, peer support, supportive organizational culture, access to work resources, and impact of informal learning used 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; *Lohman's frequency of informal learning used 1 = Almost never use the learning activity to 5 = Almost always use the learning activity

Phase III & IV Findings

A series of inferential analyses were performed to address Phases III and IV of this study. Confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) were used in Phase III to perform construct validity tests and to further refine the six latent variable constructs of (a) management support, (b) peer support, (c) a supportive organizational culture, (d) access to work resources, (e) frequency of informal learning, and (f) impact of informal learning. Phase IV of the study included the refined constructs developed in Phase III to test the predictive validity of the four independent variables related to employees' perceptions (management support, peer support, a supportive

organizational culture, and access to work resources) on the two dependent variable outcomes of the frequency of informal learning and the impact of informal learning via multiple regression analysis.

Assumptions

Confirmatory factor analysis assumes that measured variables (latent variable constructs) are continuous. Each of the six latent variable constructs of (a) management support, (b) peer support, (c) a supportive organizational culture, (d) access to work resources, (e) frequency of informal learning, and (f) impact of informal learning were derived from Likert-type scaled items that were ordinal in scale. However, computing the averages of all items to obtain a score allowed the derived construct to be considered as continuous in scale. Therefore, the assumption of a continuous scale of measurement for the six latent variable constructs was met.

Additional assumptions for CFA, EFA, and multiple regression include the absence of outliers, normality, linearity, homoscedasticity, and/or the absence of multicollinearity. Outliers in a dataset have the potential to distort results of an inferential analysis. A check of boxplots for the six latent variable constructs used during the inferential analysis was performed to visually inspect for outliers. Univariate outliers were present for peer support (11 outliers, 2.3% of cases), a supportive organizational culture (3 outliers, 0.6% of cases), access to work resources (16 outliers, 3.4% of cases), frequency of informal learning (4 outliers, 0.8%), and impact of informal learning (6 outliers, 1.3% of cases). The values of the six variables were standardized to check for the presence of extreme outliers (z-score of +/- 3.3). Only one extreme outlier was found

for the peer support variable, and 2 extreme values were found for the impact of informal learning. Further investigation of the outliers indicated that all outlying values were within the possible ranges of each variable (between the values of 1 to 5). Additionally, the means and medians for each of the six latent variable constructs were close in value, further indicating that outliers were not negatively impacting the data distributions of the variables. Multivariate outliers were investigated via computation of Mahalanobis distance measurements and associated probability values. Values with a probability of $< .001$ were classified as multivariate outliers. A total of 12 multivariate outliers were detected. Comparisons of the values of the six variable constructs as a group relating to the 12 multivariate outlier cases did not indicate anomalous or nonsensical values among the six variables. The outliers were within acceptable ranges of the variables, and less than 5% of the data on any given variable was classified as an outlier. Thus, all records were retained for analysis, as the outlier assumption had not been violated.

Normality for the scores of the six variable constructs was investigated with SPSS Explore. The Kolmogorov-Smirnov (K-S) test for normality indicated that none of the variable constructs were normal ($p < .01$). However, the K-S test is sensitive to larger sample sizes (> 50) and will return a significant value when, in fact, the data are normally distributed (Tabachnick & Fidell, 2007). A visual check of histograms for most of the six variable constructs did not indicate skewness, but the histograms for the variables of peer support, access to work resources, and impact of informal learning showed a left skew. The normal Q-Q plots indicated normality or near-normality for all six variable constructs. The tests used for inference in this study are robust to deviations from

normality when most of the other assumptions are met. Therefore, the assumption of normality was considered not to have been seriously violated, and parametric tests were used on all six of the continuous variables during the inferential analysis, without transformation of the variables.

Assumptions of linearity between study variables and homoscedasticity, requirements for correlational and multiple regression analysis, were checked with scatterplots of the data. The assumptions of linearity and homoscedasticity were not violated. Further, multicollinearity diagnostics for the CFA, EFA, and multiple regression analyses were performed using SPSS. No violations were noted, and the assumption of the absence of multicollinearity was met.

It is common in research to have missing data for certain respondents, so remedial methods are often necessary to treat the missing values (Fink, 2003). Pairwise and listwise deletions of missing values are common ways to deal with this problem in research (Byrne, 2012). However, these methods are sometimes criticized because of the dubious underlying assumption that the data are missing at random. A statistical rule of thumb suggests that missing data can be considered missing completely at random (MCAR) if the missing observations for a given variable are less than or equal to five percent (Byrne, 2012; Fink, 2003). In this case, it can be assumed that the loss of MCAR data will not affect the results of the analysis. In this study, none of the six latent variable constructs investigated in this study had greater than 5% missing data. Still, to handle the common occurrence of missing data, listwise deletion (records with missing data were excluded from the study) was performed in Mplus Version 7, as well as with SPSS. 20.0.

Construct Validity Analysis

Initially, two confirmatory analyses (CFAs) were performed on the six latent variable constructs. Given that the model fit indices of the hypothesized and modified CFA models did not indicate a good fit, a series of exploratory factor analyses (EFAs) were conducted to remove bad items and to ensure that each of the constructs under examination had high reliability. A series of CFA analyses were then performed to arrive at the model with the best fit. A detailed analysis and findings are presented below.

Confirmatory Factor Analysis Findings – Hypothesized Model. In order to assess the construct validity of the instrumentation completed by the participants, a confirmatory factor analysis (CFA) was initially performed to test whether measures of the six latent variable constructs developed were indicative of employees' perceptions of informal learning (management support, peer support, a supportive organizational culture, access to work resources), the frequency of informal learning and the impact of informal learning. Mplus Version 7 was used to run the full hypothesized CFA model. The full model converged. The χ^2 test of model fit was statistically significant, indicating a poor fit of the model with the participant data. This is not uncommon because for models with more cases (400 or more), the chi square is almost always statistically significant (Jackson, Dezee, Douglas, & Shimeall, 2009).

Chi square is also affected by the size of the correlations in the model, i.e., the larger the correlations, the poorer the fit. For these reasons, alternative measures of fit were also assessed. The relative χ^2 value, also referred to as the normed χ^2 value, was computed by dividing the χ^2 index value of the fitted model into the model degrees of

freedom ($3848.5/974 = 3.95$). A value of 5 or less is considered to be a good model fit (Schumacker & Lomax, 2004). However, other fit indices were not good. The root mean square error of approximation (RMSEA) value of .08 was higher than the desired cut-off value of .05 (Hu & Bentler, 1999). The confirmatory fit index (CFI) of the model was .71. A CFI value of .90 or larger is desirable for an indication of a good model fit (Hu & Bentler, 1999). The values of the Akaike information criteria (AIC = 51,208.3) and the Bayesian information criteria (BIC = 51,835.3) were both quite large. However, AIC and BIC are used for comparisons between models and are not of much use in assessing the fit of a single model.

Mplus provides a listing of model modification indices that can be used to modify a model in order to encourage a better fit. However, one must be careful not to over-fit the model to the study dataset. The author, therefore, investigated non-significant regression coefficients and model fit indices to determine which variable relationships would improve the fit indices, while also keeping in mind that theory supersedes the model adjustments of a computer program.

The analysis showed problems with the items used to measure frequency of informal learning. For instance, the item of “How often do you search the Internet?” did not significantly load on the variable construct involving the frequency of informal learning ($r = .114$, $p = .062$), and negative covariances were noted between items of the construct representing frequency of informal learning and other survey items and constructs. The R^2 values of items 5 through 8, used to measure frequency of learning, were also small, with each being less than .10. The construct representing frequency of

informal learning also had a lower than acceptable Cronbach's alpha coefficient (.664), indicating a poor fit of the construct with the participant data. Modification indices suggested by the Mplus software would have complicated the model more than desired and did not improve the model fit within acceptable fit index standards. Consequently, the author decided to remove the variable construct involving the frequency of informal learning from the rest of the analysis in Phase III so as to possibly improve the model fit.

Confirmatory Factor Analysis Findings – Modified Model. After removing the variable construct involving the frequency of informal learning, the modified model returned to a slightly improved fit over the hypothesized one. The relative χ^2 value, 3.85 ($2518.94/655 = 3.85$), was less than the good model fit cut-off value of 5 or less, thereby indicating a good model fit. The RMSEA value of .080 did not meet the desired cut-off value of .05. The CFI of the model was .779, which was above the hypothesized model's CFI of .71, but still below the recommended value of .90 or larger. The values of the Akaike information criteria (AIC = 41,523.4) and the Bayesian information criteria (BIC = 42,032.7) were both less than the values for the full hypothesized model, but remained quite large. The model coefficients and modification indices were investigated for possible inclusion or exclusion of factors for model improvement, but none were found to improve the fit further.

Exploratory Factor Analysis Findings. The model fit indices of the hypothesized and modified CFA models, using theoretical hypothesized and modified solutions, did not indicate a good fit of the models to the data. Therefore, an exploratory factor analysis (EFA) was performed in SPSS v20.0 to obtain empirical factor loadings

using the data collected (Pallant, 2010). Due to the low Cronbach's alpha coefficient, poor factor loadings, and minimal R² values for the items comprising the variable representing frequency of informal learning, the survey items for the variable involving frequency of informal learning were not included in this analysis.

Prior to performing EFA, the suitability of the data for the factor analysis was assessed. An inspection of the correlation matrix on the 38 items comprising the factors of management support, peer support, a supportive organizational culture, access to work resources, the frequency of informal learning, and the impact of informal learning revealed the presence of many coefficients of .3 and greater. The Kaiser-Meyer-Olkin (KMO) value was .92. The recommended minimum of the KMO value is .6 (Kaiser, 1970); therefore, the KMO value was above the acceptable minimum value. Bartlett's Test of Sphericity was performed on the 38-item matrix and returned a significant value ($p < .0005$), thus supporting the factorability of the correlation matrix.

Exploratory factor analysis revealed the presence of eight components with eigenvalues exceeding 1, explaining a total of 64% of the variance. An inspection of the scree plot revealed a leveling after the fifth or sixth component. Using Cattell's (1966) scree test, six components were retained for further investigation. The use of 38 items compiled into six components was further supported by the results of a parallel analysis, which showed six components with an eigenvalue exceeding the corresponding criterion values for a randomly generated data matrix of the same size (38 variables X 448 respondents). To aid in the interpretation of the six components, varimax rotation was performed. The rotated solution revealed the presence of a simple structure (Field, 2009;

Thursstone, 1947), with the six components showing a number of strong loadings. The six-component solution explained a total of 58% of the variance. Under the assumption that the factors were interrelated, obliminal rotation was also performed on the six-component solution, and similar findings were found.

Of the 38 items included in the factor rotation, eight did not load strongly on any of the six components. The six survey items that did not load onto the six-component solution were removed, and the six-component factor analysis was performed with the remaining 30 items. The 30-factor six-component solution explained 63% of the variance in the model. This solution was considered to be the best. The impact of informal learning factors loaded onto two components instead of the originally hypothesized one component used in the survey. The two components were named (a) impact of informal learning on performance and (b) impact of informal learning on engagement.

Table 3 presents the 30 survey statements and their associated factor loadings for the six-component solution. The factor loadings are the correlation coefficients between the survey items (rows) and factors (columns). Analogous to Pearson's correlation coefficient, the squared factor loading is the percent of variance in a particular survey item explained by the factor (component). Cronbach's alpha values of the six-component solution were all above the .70 threshold for good internal consistency reliability. These values are presented in Table 3.

Table 3

Summary of Exploratory Factor Analysis Loadings for Oblimin Six-Factor Solution for Informal Learning Work Contexts Study (n = 448)

Variable / Statement	Factor Loading	α
Management Support (MS)		.865
MS1	When I make a mistake, my supervisor encourages me to reflect so I can learn from it.	.521
MS2	My supervisor is a role model for my learning.	.752
MS3.	I ask my supervisor for help when I encounter challenges at work.	.598
MS4	My supervisor provides me with constructive feedback for my learning.	.856
MS5	My supervisor assigns me with challenging tasks that support my informal learning.	.527
MS6	My supervisor promotes the value of informal learning at work.	.564
MS7	When I need to update my knowledge and skills, my supervisor directs me to the appropriate learning resources.	.772
Peer Support (PS)		.818
PS1	When faced with a challenging work situation, I ask my peers for help.	.711
PS2	My peers are willing to share their expertise.	.739
PS3	My peers provide me with guidance when I face challenging work situations.	.717
PS4	My peers share their lessons learned from making mistakes in work-related problems.	.454
PS5	My peers direct me to other relevant resources when they cannot help me with my work-related problems.	.656
PS6	I have direct access to my peers with the necessary expertise when I have a work-related question.	.635
PS7	My peers are supportive of my informal learning.	.531
Supportive Organizational Culture (SOC)		.771
SOC1	My organization allows risk-taking in the process of finding solutions.	.906
SOC3	Learning new ways to perform my job is valued in my organization.	.404
SOC6	In my organization, a mistake is tolerated as long as we learn something from it.	.506
SOC7	In my organization, risk-taking is considered important for us to learn.	.865

Table 3 cont'd

Summary of Exploratory Factor Analysis Loadings for Oblimin Six-Factor Solution for Informal Learning Work Contexts Study (n = 448)

Variable / Statement	Factor Loading	α
Access to Work Resources (AWR)		.898
AWR4	When faced with challenging work situations, I can use the Internet to find answers.	.875
AWR5	I can use the Internet when I need to find information to help me perform my job.	.895
AWR6	I use the Internet to learn informally on the job.	.885
AWR7	I have access to the Internet to solve work-related problems.	.832
Impact of Informal Learning on Performance (IIL-P)		.780
IIL-P1	I have the knowledge and skills required to perform my job well.	.709
IIL-P2	I am satisfied with my performance at work.	.866
IIL-P4	I meet or exceed the performance standards for my role.	.857
Impact of Informal Learning on Engagement (IIL-E)		.889
IIL-E1	If given the opportunity, I would like to work in my organization for a long time.	.896
IIL-E2	Most days, I look forward to coming to work.	.875
IIL-E3	I would recommend my organization as a great place to work.	.753
IIL-E4	I am proud to be part of my organization.	.750
IIL-E5	I am highly engaged at my work.	.707

Note. All items used 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Confirmatory Factor Analysis Findings - Incorporating EFA Findings. The next step was to re-run the CFA on the new items found in the EFA. Various CFAs were conducted to find the best model fit. For this study, three additional CFA were reported: 1) the CFA on the four informal learning work context constructs (independent variables); 2) the CFA on the impact of informal learning (dependent variable); and 3) the CFA on the six newfound constructs (management support, peer support, a supportive organizational culture, access to work resources, impact of informal learning on performance, and impact of informal learning on engagement).

The first CFA model included the four independent variables of study, which were derived from exploratory analysis factor loadings of (a) management support, (b) peer support, (c) a supportive organizational culture, and (d) access to work resources. The model relative χ^2 value was 3.56 ($721.95/203 = 3.56$), a bit lower than the good model fit cut-off value of 5 or less, thereby indicating a good model fit. The RMSEA value of .075 did not meet the desired cut-off value of .05. The CFI of the model was .887, which was above the hypothesized model's CFI of .71, and only slightly below the recommended value of .90 or larger. The values of the Akaike information criteria (AIC = 23,878.3) and the Bayesian information criteria (BIC = 24,175.465) were both less than the values for the full hypothesized model, thus indicating a better model fit. It is important to note that this model did not include the dependent variables. The model coefficients and modification indices were investigated for the possible inclusion or exclusion of factors for model improvement, but none were found to improve the fit further.

The second CFA included the two dependent variables of study, which were derived from exploratory analysis factor loadings of (a) impact of informal learning on performance, and (b) impact of informal learning on engagement. The model relative χ^2 value was 5.1 ($96.94/19 = 5.1$), slightly higher than the good model fit cut-off value of 5 or less, thereby indicating a poor model fit. The RMSEA value of .094 did not meet the desired cut-off value of .05. The CFI of the model was .957, which was above the hypothesized model's CFI of .71, and was also above the recommended value of .90 or larger. The values of the Akaike information criteria (AIC = 9,021.2) and the Bayesian information criteria (BIC = 9,124.9) were both less than the values for the full hypothesized model, thus indicating a better model fit. It is important to note that this model did not include the independent variables. The model coefficients and modification indices were investigated for the possible inclusion or exclusion of factors for model improvement, but none were found to improve the fit further.

As a final step, CFA was performed on the four independent variables of study (management support, peer support, a supportive organizational culture, and access to work resources), as well the two newly found dependent variables of the impact of informal learning on performance and the impact of informal learning on engagement. The model relative χ^2 value was 2.82 ($1097.971/390 = 2.8$), thereby indicating a good model fit. The RMSEA value of .063 did not meet the desired cut-off value of .05. The CFI of the model was .894, which was above the hypothesized model's CFI of .71, and was very close to the recommended value of .90 or larger. The values of the Akaike information criteria (AIC = 32,002.970) and the Bayesian information criteria (BIC =

32,434.674) were both less than the values for the full hypothesized model, thus indicating a better model fit. However, AIC and BIC are not of much use in assessing the fit of a single model. The model coefficients and modification indices were investigated for the possible inclusion or exclusion of factors for model improvement, but none were found to improve the fit further. A summary of the CFA models is presented in Table 4.

Table 4

Summary of CFA Findings

Model	Description	χ^2	Df	χ^2/df	RMSEA	CFI	AIC	BIC
1	Originally hypothesized model: MS, PS, SOC, AWR, FIL, IIL	3848.50	974	3.95	.081	.710	51208.33	51835.33
2	MS, PS, SOC, AWR, IIL	2518.94	655	3.85	.080	.779	41523.44	42032.43
3	MS, PS, SOC, AWR	721.95	203	3.56	.075	.887	23878.33	24175.46
4	IIL-P and IIL-E	96.94	19	5.10	.094	.957	9021.21	9124.92
5	MS, PS, SOC, AWR, IIL-P, and IIL_E	1097.97	390	2.82	.063	.900	32002.97	32434.70

Note. MS = Management Support; PS = Peer Support; SOC = Supportive Organizational Culture; AWR = Access to Work Resources; IIL-P = Impact of Informal Learning on Performance; IIL-E = Impact of Informal Learning on Engagement; for χ^2 or chi-square, the smaller, the better; df = degree of freedom; χ^2/df or relative $\chi^2 \geq .05$ for goodness-model fit; RMSEA or Root Mean Square Error Approximation $\leq .06$ to $.08$ for acceptance; CFI or Comparative Fit Index $\geq .90$ for acceptance; AIC or Akaike Information Criterion and BIC or Bayes Information Criterion, the smaller, the better, used for model comparison

Correlational and Regression Analysis

A total of 14 variables were included in the correlational analysis. The nominal and ordinal variables were re-coded in order to achieve more uniform sizes of each variable classification and to better meet the assumptions of the correlation and regression models. Table 5 presents the variable codings of the six nominal and ordinal variables used for the correlations and multiple regressions; these variables were used as independent variables in the multiple regression analyses. A total of eight continuous variables were also used in the correlation and regression analyses. Independent variables for the multiple regressions included (a) time in the organization in years, and the six variable constructs derived from the factor analysis (see Table 3) as (b) management support, (c) peer support, (d) a supportive organizational culture, and (e) access to work resources. The three multiple regressions included each of the three variables of (a) impact of informal learning on engagement, (b) impact of informal learning on performance, and the variable construct of (c) frequency of informal learning. Although the frequency of formal learning did not indicate an acceptable Cronbach's alpha level for reliability of the construct with the data collected, it was included in a regression to meet the methodological criteria described in Chapter 3

Table 5
Nominal and Ordinal Codings of the Demographic Variables for Use in Correlation and Multiple Regression Analyses

Variable	Scale	Codings
Gender	Dichotomous	Male = 0 (reference) Female = 1
Age Group	Ordinal	24 years and less = 1 25 – 29 years = 2 30 – 34 years = 3 35 years and older = 4
Highest level of education completed	Ordinal	Two-year degree or less = 1 Four-year degree = 2 Graduate or advanced degree = 3
Level in the organization	Dichotomous	Non-management = 0 (reference) Management = 1
Region of the World of Origin	Dichotomous	North America = 0 (reference) Other = 1
Region of the World of Current Residence	Dichotomous	North America = 0 (reference) Other = 1

Note. One more demographic variable called "Time in organization" was treated as a continuous variable and thus, was not listed in this table.

Correlation Analyses. A series of Pearson's product moment correlations were performed to compare bi-variate associations between the 14 variables operationalized for hypothesis testing. If either of the variables in a pair were ordinal in level, then Spearman's Rank Order correlation was used in lieu of Pearson's product moment correlation. The results of the correlational analyses are presented in Table 6. Cohen (1988) defined strength of association by correlation coefficients (effect size) as small (+/- .10 - .29), medium (+/- .30 - .49) and large (+/- .50 to 1.0). Many significant

correlations were noted. However, none of the correlations were above the cut-off value of .90 for multicollinearity. Table 6 shows many significant small correlations; however, only correlations with medium and large effects were reported in this chapter.

Region of the world of residence had a strong direct correlation with region of the world of origin ($r = .699, p < .0005$). The majority of participants were born and currently reside in North America; therefore, it was anticipated that a strong direct correlation would exist. There was a medium-strength direct correlation between age group and time in organization ($r = .527, p < .0005$), indicating that older participants had worked longer in their organizations than their younger participant counterparts. Age group had a medium-strength direct correlation with level in the organization ($r = .306, p < .0005$), indicating that participants in management positions were older than those in non-management positions.

Management support was strongly and directly correlated with peer support ($r = .551, p < .0005$), a supportive organizational culture ($r = .549, p < .0005$), impact of informal learning on engagement ($r = .577, p < .0005$), and had a medium direct correlation with frequency of informal learning ($r = .391, p < .0005$). The directions of the relationships indicated that when scores on the management support variable increased or decreased, scores for peer support, a supportive organizational culture, impact of informal learning on engagement, and frequency of informal learning moved in a similar manner.

Medium direct correlations were noted between peer support and a supportive

organizational culture ($r = .420, p < .0005$), frequency of informal learning ($r = .403, p < .0005$), impact of informal learning on engagement ($r = .428, p < .0005$), and impact of informal learning on performance ($r = .302, p < .0005$). The directions of the relationships indicated that when scores on the peer support variable increased or decreased, scores for a supportive organizational culture, frequency of informal learning, impact of informal learning, and impact of informal learning on performance moved in an analogous pattern.

Frequency of informal learning had medium direct correlations with a supportive organizational culture ($r = .384, p < .0005$) and access to work resources ($r = .368, p < .0005$), and the direct relationship indicated that when scores increased or decreased for frequency of informal learning, scores for a supportive organizational culture and access to work resources moved in parallel.

Finally, the impact of informal learning on engagement was directly correlated with a supportive organizational culture ($r = .453, p < .0005$) and frequency of informal learning ($r = .391, p < .0005$), and the direct relationship indicated that when scores increased or decreased for the impact of informal learning on engagement, scores for a supportive organizational culture and frequency of informal learning moved in a similar manner.

Table 6

Correlations Between All Variables Used in Multiple Regression Analysis

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Gender													
2 Origin	-.085												
3 Current residence	-.073	.699**											
4 Time in organization	.070	-.018	.036										
5 MS	.067	.032	.004	-.037									
6 PS	.112*	-.074	-.100	-.033	.551**								
7 SOC	.028	.038	.025	.062	.549**	.420**							
8 AWR	.008	.001	.020	.042	.141**	.132**	.280**						
9 FIL	.165**	-.043	-.056	.087	.367**	.403**	.384**	.368**					
10 IIL-E	.078	-.059	-.037	.160**	.577**	.428**	.453**	.211**	.391**				
11 IIL-P	.097*	-.193**	-.119*	.089	.115	.302**	.129**	.120**	.249**	.274**			
12 Age group	.166**	-.118*	-.049	.527**	-.119**	-.071	.024	.135**	.164**	.205**	.117*		
13 Education	.187**	.002	-.008	.035	.061	-.035	.009	.045	.098*	.065	-.071	.267**	
14 Level in the organization	.059	.018	.096*	.232**	.049	-.065	.065	.021	.100*	.136**	.113**	.306**	.119**

Note: * = $p < .05$ (2-sided test); ** = $p < .01$ (2-sided test); for ordinal variables "age group" and "highest level of education," Spearman Rank Ordered correlation is reported in this table; MS = Management support; PS = Peer Support; SOC= Supportive Organizational Culture; AWR = Access to Work Resources; FIL = Frequency of Informal Learning; IIL-E = Impact of Informal Learning on Engagement; IIL-P = Impact of Informal Learning on Performance

Multiple Regression with Dependent Variable of Impact of Informal

Learning on Engagement. A multiple linear regression was used to regress the dependent variable of the impact of informal learning on engagement on the predictors, which included the four independent variables of employee perceptions and seven independent variable controls. Results of the multiple linear regression are presented in Table 7 and include the unstandardized model coefficients (B) and associated standard errors (SE B), standardized regression coefficients (β), and t-statistics and significance values for the predictor variables.

The model indicated that at least one predictor was significantly different from zero [$F(11, 459) = 33.31, p < .0005$], with an R^2 of .444 (.431 adjusted). The adjusted R-square value of .431 indicated that approximately 43% of the variability in the dependent variable of impact of informal learning on engagement was predicted by the 11 independent variables in the model. Four predictors were significant for the outcome of impact of informal learning on engagement: (a) management support [$t(459) = 9.74, p < .0005$; 95% CI (0.43, 0.65)]; (b) peer support [$t(459) = 3.10, p = .002$; 95% CI (0.08, 0.36)]; (c) a supportive organizational culture [$t(459) = 2.76, p = .006$; 95% CI (0.04, 0.26)]; and (d) age group [$t(459) = 4.70, p < .0005$; 95% CI (0.10, 0.25)].

The squared semi-partial correlation for the predictor of management support was .11, indicating that this variable contributed 11% of the unique variance to the model. The squared semi-partial correlation for the predictor of age group was .03, indicating that 3% of the unique variance on the outcome of impact of informal learning on engagement could be attributed to the age group variable. The squared semi-partial

correlations for the predictors of peer support was .012, and a supportive organizational culture was .009, suggesting that the variables provided 1.2% and 0.9% of the unique variance, respectively, to the model. The size and direction of the relationship between the impact of informal learning on engagement and the predictors of management support, peer support, and a supportive organizational culture suggest that the impact of informal learning on engagement increased when the values of the predictors increased. Additionally, the positive value of the coefficient regarding the predictor of age group suggests that the impact of informal learning on engagement increased as a participant's age increased.

Table 7

Multiple Regression Results for Impact of Informal Learning on Engagement

Variable	B	SE B	β	T	Sign
Management support	.539	.055	.458	9.737	<.0005
Peer support	.219	.071	.134	3.100	.002
A supportive organizational culture	.154	.056	.121	2.760	.006
Access to work resources	.062	.041	.056	1.504	.133
Age group	.174	.037	.205	4.683	<.0005
Highest level of education completed	-.034	.048	-.026	-0.709	.479
Level in the organization	.073	.072	.038	-1.014	.311
Gender	-.021	.069	-.011	-0.299	.765
Region of the world of origin	-.144	.127	-.056	-1.135	.257
Region of the world of current residence	.049	.153	.016	0.321	.748
Time in organization	.009	.006	.067	1.672	.095
Constant	-.362	.292	---	---	---

Model summary:

F = 33.31, p <.0005

n = 471

R² = .444

Adjusted R² = .431

Note. B = unstandardized coefficients; SE B = standard error B; β = standardized coefficients; t = t-testing; Sign = significance

Multiple Regression with Dependent Variable of Impact of Informal

Learning on Performance. A multiple linear regression was used to regress the dependent variable of the impact of informal learning on performance on the predictors, which included the four independent variables of employee perceptions and seven independent variable controls. The results of the multiple linear regression are presented in Table 8.

The model indicated that at least one predictor was significantly different from zero [$F(11, 459) = 8.31, p < .0005$], with an R^2 of .166 (.146 adjusted). The adjusted R-square value of .146 indicated that approximately 15% of the variability in the dependent variable of the impact of informal learning on performance was predicted by the 11 independent variables in the model. Four predictors were significant for the outcome of the impact of informal learning on performance: (a) peer support [$t(459) = 6.05, p < .0005$; 95% CI (0.25, 0.50)]; (b) highest level of education completed [$t(459) = -2.30, p = .022$; 95% CI (-0.18, -0.01)]; (c) level in the organization [$t(459) = 2.50, p = .013$; 95% CI (0.03, 0.28)]; and (d) region of the world of origin [$t(459) = -2.91, p = .004$; 95% CI (-0.54, -0.11)].

The squared semi-partial correlation for the predictor of peer support was .07, revealing that this variable contributed 7% of the unique variance to the model. The squared semi-partial correlation for the predictor of region of the world of origin, .02, indicated that 2% of the unique variance on the outcome of impact of informal learning on performance could be attributed to the region of the world of origin variable. The squared semi-partial correlations for the predictors of highest level of education

completed and level in the organization were both .01, showing that these variables each contributed 1% of the unique variance to the model. The size and direction of the relationship between the impact of informal learning on performance and the predictors of peer support and level in the organization suggested that the influence of impact of informal learning on performance increased when the values of peer support increased, and when the participant reported a higher level in the organization. The negative value of the coefficient of the predictors of level of education and region of the world of origin imply that the impact of informal learning on performance decreased as participants' level of education increased, and decreased for participants whose region of the world of origin was other than North America.

Table 8

Multiple Regression Results for Impact of Informal Learning on Performance

Variable	B	SE B	β	t	Sign
Management support	-.050	.049	-.059	-1.028	.305
Peer support	.375	.062	.320	6.048	<.0005
Supportive organizational culture	-.002	.049	-.002	-0.044	.965
Access to work resources	.065	.036	.083	1.814	.070
Age group	.043	.033	.072	1.334	.183
Highest level of education completed	-.097	.042	-.104	-2.297	.022
Level in the organization	.159	.063	.115	2.502	.013
Gender	.069	.061	.050	1.132	.258
Region of the world of origin	-.324	.111	-.175	-2.908	.004
Region of the world of current residence	.062	.134	.028	0.463	.643
Time in organization	.003	.005	.033	0.675	.500
Constant	2.577	.256	---	---	---

Model summary:

F = 8.31, p < .0005

n = 471

R² = .166

Adjusted R² = .146

Note. B = unstandardized coefficients; SE B = standard error B; β = standardized coefficients; t = t-testing; Sign = significance

Multiple Regression with Dependent Variable of Frequency of Informal

Learning. A multiple linear regression analysis was used to regress the dependent variable of frequency of informal learning on the predictors, which included the four independent variables of employee perceptions and seven independent variable controls. Results of the multiple linear regression are presented in Table 9.

The model indicated that at least one predictor was significantly different from zero [$F(11, 459) = 20.85, p < .0005$], with an R^2 of .333 (.317 adjusted). The adjusted R-square value of .317 indicated that approximately 32% of the variability in the dependent variable of frequency of informal learning was predicted by the 11 independent variables in the model. Six predictors were significant for the outcome of frequency of informal learning: (a) management support [$t(459) = 2.52, p = .012$; 95% CI (0.02, 0.16)]; (b) peer support [$t(459) = 5.05, p < .0005$; 95% CI (0.14, 0.33)]; (c) a supportive organizational culture [$t(459) = 2.73, p = .007$; 95% CI (0.03, 0.17)]; (d) access to work resources [$t(459) = 6.34, p < .0005$; 95% CI (0.12, 0.23)]; (e) age group [$t(459) = 2.21, p = .028$; 95% CI (0.01, 0.10)]; and (f) gender [$t(459) = 2.51, p = .012$; 95% CI (0.03, 0.20)].

The squared semi-partial correlation for the predictor of access to work resources was .06, indicating that this variable contributed 6% of the unique variance to the model. The squared semi-partial correlation for the predictor of peer support was .04, indicating that 4% of the unique variance on the outcome of frequency of informal learning could be attributed to peer support. The squared semi-partial correlation for the predictor of a supportive organizational culture was .01, indicating that the variable contributed 1% of the unique variance to the model. The three remaining significant predictors of

management support, age group, and gender each contributed less than 1% of the unique variance to the model. The size and direction of the relationship between frequency of informal learning and the predictors of management support, peer support, a supportive organizational culture, and access to work resources suggest that the frequency of informal learning increased when the values of management support, peer support, a supportive organizational culture, and access to work resources increased.

The positive value of the coefficients involving the predictors of age group and gender suggest that the frequency of informal learning also increased when the participants were older, or when they were female. Even though there was a positive relationship between the four informal learning work context constructs and frequency of learning, it should be noted that the frequency of informal learning did not meet the criteria of a psychometrically sound construct. Therefore, these findings must be interpreted with caution.

Table 9

Multiple Regression Results for Frequency of Informal Learning

Variable	B	SE B	β	t	Sign
Management support	.092	.036	.130	2.52	.012
Peer support	.235	.046	.239	5.049	<.0005
Supportive organizational culture	.100	.037	.131	2.727	.007
Access to work resources	.172	.027	.259	6.340	<.0005
Age group	.054	.024	.106	2.211	.028
Highest level of education completed	.006	.032	.007	0.179	.858
Level in the organization	.067	.048	.057	1.400	.162
Gender	.114	.046	.099	2.512	.012
Region of the world of origin	.027	.084	.018	0.327	.744
Region of the world of current residence	-.087	.101	-.046	-0.860	.390
Time in organization	.001	.004	.012	0.280	.780
Constant	1.190	.192	---	---	---

Model summary:

F = 20.85, p <.0005

n = 471

R² = .333

Adjusted R² = .317

Note. B = unstandardized coefficients; SE B = standard error B; β = standardized coefficients; t = t-testing, Sign = significance

Tests of Hypotheses

The four research hypotheses of this study were investigated as they related to Research Question 2: Is there a relationship between the four factors of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and informal learning at work?

Each of the four research hypotheses is presented separately with the null and alternative statistical hypotheses, a summary of supporting evidence from inferential analyses, and associated conclusions.

Research Hypothesis 1 (H1)

Employees' perceptions of management support are positively related to informal learning at work, as measured by frequency and impact.

Null Hypothesis 1a. There is not a statistically significant relationship between the variables representing management support and the frequency of informal learning.

Alternative Hypothesis 1a. There is at least one statistically significant relationship between the variables representing management support and the frequency of informal learning. Pearson's product moment correlation coefficient between the variables of management support and frequency of informal learning revealed a statistically significant direct relationship ($r = .367$, $p < .0005$), indicating that when scores increased or decreased for management support, scores moved in a similar manner for frequency of informal learning (see Table 6). The multiple regression analysis with the dependent variable of frequency of informal learning revealed that the independent variable of management support was a statistically significant predictor of frequency of informal learning ($B = .092$, $SE B = .036$; $p = .012$; see Table 9). The positive value of the regression coefficient for the management support variable suggests that when scores increased for management support, scores also increased for frequency of informal learning.

Conclusion as it Relates to Null Hypothesis 1a. Reject Null Hypothesis 1a. There was sufficient evidence to indicate at least one statistically significant relationship between the variables representing management support and frequency of informal learning. Caution is advised when interpreting this conclusion, given that the construct

representing frequency of informal learning had low reliability.

Null Hypothesis 1b. There is not a statistically significant relationship between the variables representing management support and impact of informal learning on engagement.

Alternative Hypothesis 1b. There is at least one statistically significant relationship between the variables representing management support and the impact of informal learning on engagement. Pearson's product moment correlation coefficient between the variables of management support and impact of informal learning on engagement produced a statistically significant direct relationship ($r = .577, p < .0005$), indicating that when scores increased or decreased for management support, scores moved in a likewise manner for the impact of informal learning on engagement (see Table 6). The multiple regression analysis with the dependent variable of impact of informal learning on engagement showed that the independent variable of management support was a statistically significant predictor of the impact of informal learning on engagement ($B = .539, SE B = .055; p < .0005$; see Table 7). The positive value of the regression coefficient for the management support variable suggested that when scores increased for management support, scores also increased for the impact of informal learning on engagement.

Conclusion as it Relates to Null Hypothesis 1b. Reject Null Hypothesis 1b. There was sufficient evidence to indicate at least one statistically significant relationship between the variables representing management support and impact of informal learning on engagement.

Null Hypothesis 1c. There is not a statistically significant relationship between the variables representing management support and the impact of informal learning on performance.

Alternative Hypothesis 1c. There is at least one statistically significant relationship between the variables representing management support and the impact of informal learning on performance.

Pearson's product moment correlation coefficient between the variables of management support and impact of informal learning on performance generated a statistically significant direct relationship ($r = .115$, $p = .012$), indicating that when scores increased or decreased for management support, scores moved in a likewise manner for the impact of informal learning on performance (see Table 6). However, the multiple regression analysis with the dependent variable of impact of informal learning on performance revealed that the independent variable of management support was not a statistically significant predictor of impact of informal learning on performance ($B = -.050$, $SE B = .049$; $p = .305$; see Table 8).

Conclusion as it Relates to Null Hypothesis 1c. Fail to reject Null Hypothesis 1c. This hypothesis testing was based on the regression finding only, although Pearson's correlation coefficient between the variables of management support and impact of informal learning on performance was statistically significant.

Research Hypothesis 2 (H2)

Employees' perceptions of peer support are positively related to informal learning at work, as measured by frequency and impact.

Null Hypothesis 2a. There is not a statistically significant relationship between the variables representing peer support and the frequency of informal learning at work.

Alternative Hypothesis 2a. There is at least one statistically significant relationship between the variables representing peer support and frequency of informal learning.

Pearson's product moment correlation coefficient between the variables of peer support and frequency of informal learning resulted in a statistically significant direct relationship ($r = .403, p < .0005$), indicating that when scores increased or decreased for peer support, scores moved in a similar manner for the frequency of informal learning (see Table 6). The multiple regression analysis with the dependent variable of frequency of informal learning revealed that the independent variable of peer support was a statistically significant predictor of frequency of informal learning ($B = .235, SE B = .046; p < .0005$; see Table 9). The positive value of the regression coefficient for the peer support variable suggests that when scores increased for peer support, scores also increased for the frequency of informal learning.

Conclusion as it Relates to Null Hypothesis 2a. Reject Null Hypothesis 2a. There was sufficient evidence to indicate at least one statistically significant relationship between the variables representing peer support and the frequency of informal learning at work. Caution is advised when interpreting this conclusion, given that the construct representing frequency of informal learning had low reliability.

Null Hypothesis 2b. There is not a statistically significant relationship between the variables representing peer support and impact of informal learning on engagement.

Alternative Hypothesis 2b. There is at least one statistically significant relationship between the variables representing peer support and impact of informal learning on engagement.

Pearson's product moment correlation coefficient between the variables of peer support and impact of informal learning on engagement generated a statistically significant direct relationship ($r = .428, p < .0005$). When scores increased or decreased for peer support, scores moved in a parallel direction for the impact of informal learning on engagement (see Table 6). The multiple regression analysis with the dependent variable of impact of informal learning on engagement suggests that the independent variable of peer support was a statistically significant predictor of impact of informal learning on engagement ($B = .219, SE B = .071; p = .002$; see Table 7). The positive value of the regression coefficient for the peer support variable implies that when scores increased for peer support, scores also increased for impact of informal learning on engagement.

Conclusion as it Relates to Null Hypothesis 2b. Reject Null Hypothesis 2b. There was sufficient evidence to indicate at least one statistically significant relationship between the variables representing peer support and the impact of informal learning on engagement.

Null Hypothesis 2c. There is not a statistically significant relationship between the variables representing peer support and impact of informal learning on performance.

Alternative Hypothesis 2c. There is at least one statistically significant relationship between the variables representing peer support and impact of informal

learning on performance.

Pearson's product moment correlation coefficient between the variables of peer support and impact of informal learning on performance produced a statistically significant direct relationship ($r = .302$, $p < .0005$), indicating that when scores increased or decreased for peer support, scores moved in a similar manner for the impact of informal learning on performance (see Table 6). The multiple regression analysis with the dependent variable of impact of informal learning on performance revealed that the independent variable of peer support was a statistically significant predictor of impact of informal learning on performance ($B = .375$, $SE B = .062$; $p < .0005$; see Table 8). The positive value of the regression coefficient for the peer support variable indicated that when scores increased for peer support, scores also increased for the impact of informal learning on performance.

Conclusion as it Relates to Null Hypothesis 2c. Reject Null Hypothesis 2c.

There was sufficient evidence to indicate at least one statistically significant relationship between the variables representing peer support and impact of informal learning on performance.

Research Hypothesis 3 (H3)

Employees' perceptions of a supportive organizational culture are positively related to informal learning at work, as measured by frequency and impact.

Null Hypothesis 3a. There is not a statistically significant relationship between the variables representing a supportive organizational culture and the frequency of informal learning at work.

Alternative Hypothesis 3a. There is at least one statistically significant relationship between the variables representing a supportive organizational culture and the frequency of informal learning.

Pearson's product moment correlation coefficient between the variables of a supportive organizational culture and frequency of learning exhibited a statistically significant direct relationship ($r = .384, p < .0005$), indicating that when scores increased or decreased for a supportive organizational culture, scores moved in the same manner for the frequency of informal learning (see Table 6). The multiple regression analysis with the dependent variable of frequency of informal learning showed that the independent variable of a supportive organizational culture was a statistically significant predictor of frequency of learning ($B = .100, SE B = .037; p = .007$; see Table 9). The positive value of the regression coefficient for the supportive organizational culture variable suggested that when scores increased for a supportive organizational culture, scores also increased for the frequency of informal learning.

Conclusion as it Relates to Null Hypothesis 3a. Reject Null Hypothesis 3a. There was sufficient evidence to determine at least one statistically significant relationship between the variables representing a supportive organizational culture and the frequency of informal learning. Caution is advised when interpreting this conclusion, given that the construct representing the frequency of informal learning had low reliability.

Null Hypothesis 3b. There is not a statistically significant relationship between the variables representing a supportive organizational culture and the impact of informal

learning on engagement.

Alternative Hypothesis 3b. There is at least one statistically significant relationship between the variables representing a supportive organizational culture and impact of informal learning on engagement.

Pearson's product moment correlation coefficient between the variables of a supportive organizational culture and impact of informal learning on engagement yielded a statistically significant direct relationship ($r = .453, p < .0005$), indicating that when scores increased or decreased for a supportive organizational culture, scores of impact of informal learning on engagement moved in the same direction (see Table 6). The multiple regression analysis with the dependent variable of impact of informal learning on engagement demonstrated that the independent variable of a supportive organizational culture was a statistically significant predictor of impact of informal learning on engagement ($B = .154, SE B = .056; p = .006$; see Table 7). The positive value of the regression coefficient for the supportive organizational culture variable pointed out that when scores increased for a supportive organizational culture, scores also increased for impact of informal learning on engagement.

Conclusion as it Relates to Null Hypothesis 3b. Reject Null Hypothesis 3b. There was sufficient evidence to indicate at least one statistically significant relationship between the variables representing a supportive organizational culture and the impact of informal learning on engagement.

Null Hypothesis 3c. There is not a statistically significant relationship between the variables representing a supportive organizational culture and the impact of informal

learning on performance.

Alternative Hypothesis 3c. There is at least one statistically significant relationship between the variables representing a supportive organizational culture and the impact of informal learning on performance.

Pearson's product moment correlation coefficient between the variables of a supportive organizational culture and impact of informal learning on performance resulted in a statistically significant direct relationship ($r = .129, p = .005$), suggesting that when scores increased or decreased for a supportive organizational culture, impact of informal learning on performance scores moved in a similar direction (see Table 6). In contrast, the multiple regression analysis with the dependent variable of impact of informal learning on performance did not show that a supportive organizational culture was a statistically significant predictor of impact of informal learning on performance ($B = -.002, SE B = .049; p = .965$; see Table 8).

Conclusion as it Relates to Null Hypothesis 3c. Fail to reject Null Hypothesis 3c. This hypothesis testing was based on the regression finding only, although Pearson's correlation coefficient between the variables of a supportive organizational culture and impact of informal learning on performance was statistically significant.

Research Hypothesis 4 (H4)

Employees' perceptions of access to work resources are positively related to informal learning at work, as measured by frequency and impact.

Null Hypothesis 4a. There is not a statistically significant relationship between the variables representing access to work resources and the frequency of informal

learning at work.

Alternative Hypothesis 4a. There is at least one statistically significant relationship between the variables representing access to work resources and the frequency of informal learning at work.

Pearson's product moment correlation coefficient between the variables of access to work resources and the frequency of informal learning indicated a statistically significant direct relationship ($r = .368, p < .0005$), indicating that when scores increased or decreased for access to work resources, scores of frequency of informal learning moved the same direction (see Table 6). The multiple regression analysis with the dependent variable of frequency of informal learning showed that the independent variable of access to work resources was a statistically significant predictor of frequency of informal learning ($B = .172, SE B = .027; p < .0005$; see Table 9). The positive value of the regression coefficient for the access to work resources variable indicated that when scores increased for access to work resources, scores also increased for the frequency of informal learning.

Conclusion as it Relates to Null Hypothesis 4a. Reject Null Hypothesis 4a. There was sufficient evidence to indicate at least one statistically significant relationship between the variables representing access to work resources and the frequency of informal learning. Caution is advised when interpreting this conclusion, given that the construct representing frequency of informal learning had low reliability.

Null Hypothesis 4b. There is not a statistically significant relationship between the variables representing access to work resources and impact of informal learning on

engagement.

Alternative Hypothesis 4b. There is at least one statistically significant relationship between the variables representing access to work resources and impact of informal learning on engagement.

Pearson's product moment correlation coefficient between the variables of access to work resources and impact of informal learning on engagement showed a statistically significant direct relationship ($r = .211$, $p < .0005$), indicating that when scores increased or decreased for access to work resources, scores moved in a similar pattern for impact of informal learning on engagement (see Table 6). The multiple regression analysis with the dependent variable of impact of informal learning on engagement indicated that the independent variable of access to work resources was not a statistically significant predictor of impact of informal learning on engagement ($B = .062$, $SE B = .041$; $p = .133$; see Table 7).

Conclusion as it Relates to Null Hypothesis 4b. Fail to reject Null Hypothesis 4b. This hypothesis testing was based on the regression finding only, although Pearson's correlation coefficient between the variables of access to work resources and impact of informal learning on engagement was statistically significant.

Null Hypothesis 4c. There is not a statistically significant relationship between the variables representing access to work resources and the impact of informal learning on performance.

Alternative Hypothesis 4c. There is at least one statistically significant relationship between the variables representing access to work resources and the impact

of informal learning on performance.

Pearson's product moment correlation coefficient between the variables of access to work resources and impact of informal learning on performance indicated a statistically significant direct relationship ($r = .120$, $p = .009$), showing that when scores increased or decreased for access to work resources, scores for impact of informal learning on performance moved in parallel (see Table 6). However, the multiple regression analysis with the dependent variable of impact of informal learning on performance did not show access to work resources as a statistically significant predictor of impact of informal learning on performance ($B = .065$, $SE B = .036$; $p = .070$; see Table 8).

Conclusion as it Relates to Null Hypothesis 4c. Fail to reject Null Hypothesis 4c. This hypothesis testing was based on the regression finding only, although Pearson's correlation coefficient between the variables of access to work resources and impact of informal learning on performance was statistically significant.

Table 10

Summary of Hypothesis Testing 1- Employees' perceptions of management support are related to informal learning at work, as measured by frequency and impact

Hypotheses	Description	Significant for...	Conclusion (based on regression findings only)
Hypothesis 1A	Management support and frequency of informal learning	$r = .367, p < .0005$ (see Table 6) $B = .092, SE B = .036, \beta = .130; p = .012$ (see Table 9)	Supported: Caution is advised when interpreting this conclusion, given that the frequency of learning construct was low in Cronbach's alpha (did not hang together as a construct).
Hypothesis 1B	Management support and impact of informal learning on engagement	$r = .577, p < .0005$ (see Table 6) $B = .539, SE B = .055, \beta = .458; p < .0005$ (see Table 7)	Supported
Hypothesis 1C	Management support and impact of informal learning on performance	$r = .115, p = 0.12$ (see Table 6) No significance found in multiple regression analysis (see Table 8)	Not supported

Table 11

Summary of Hypothesis Testing 2- Employees' perceptions of peer support are related to informal learning at work, as measured by frequency and impact

Hypotheses	Description	Significant for...	Conclusion (based on regression findings only)
Hypothesis 2A	Peer support and frequency of informal learning	$r = .403, p < .0005$ (see Table 6) $B = .235, SE B = .046, \beta = .239; p < .0005$ (see Table 9)	Supported: Caution is advised when interpreting this conclusion, given that the frequency of learning construct was low in Cronbach's alpha (did not hang together as a construct).
Hypothesis 2B	Peer support and impact of informal learning on engagement	$r = .428, p < .0005$ (see Table 6) $B = .219, SE B = .071, \beta = .134; p = .002$ (see Table 7)	Supported
Hypothesis 2C	Peer support and impact of informal learning on performance	$r = .302, p < .0005$ (see Table 6) $B = .375, SE B = .062, \beta = .320; p < .0005$ (see Table 8)	Supported

Table 12

Summary of Hypothesis Testing 3- Employees' perceptions of a supportive organizational culture are related to informal learning at work, as measured by frequency and impact

Hypotheses	Description	Significant for...	Conclusion (based on regression findings only)
Hypothesis 3A	A supportive organizational culture and frequency of informal learning	$r = .384, p < .0005$ (see Table 6) $B = .100, SE B = .037, \beta = .131; p = .007$ (see Table 9)	Supported: Caution is advised when interpreting this conclusion, given that the frequency of learning construct was low in Cronbach's alpha (did not hang together as a construct)
Hypothesis 3B	A supportive organizational culture and impact of informal learning on engagement	$r = .453, p < .0005$ (see Table 6) $B = .154, SE B = .056, \beta = .121; p = .006$ (see Table 7)	Supported
Hypothesis 3C	A supportive organizational culture and impact of informal learning on performance	$r = .129, p = .005$ (see Table 6) No significance found in multiple regression analysis (see Table 8)	Not supported

Table 13

Summary of Hypothesis Testing 4- Employees' perceptions of access to work resources are related to informal learning at work, as measured by frequency and impact

Hypotheses	Description	Significant for...	Conclusion (based on regression findings only)
Hypothesis 4A	Access to work resources and frequency of informal learning	$r = .368, p < .0005$ (see Table 6) $B = .172, SE B = .027, \beta = .259; p < .0005$ (see Table 9)	Supported: Caution is advised when interpreting this conclusion, given that the frequency of learning construct was low in Cronbach's alpha (did not hang together as a construct)
Hypothesis 4B	Access to work resources and impact of informal learning on engagement	$r = .211, p < .0005$ (see Table 6) No significance found in multiple regression analysis (see Table 7)	Not supported
Hypothesis 4C	Access to work resources and impact of informal learning on performance	$r = .120, p = .009$ (see Table 6) No significance found in multiple regression analysis (see Table 8)	Not supported

Chapter Summary

Chapter 4 began with a description of the population and demographic findings of the dataset. An investigation of the assumptions as they related to the inferential analyses was then presented. A series of confirmatory factor analyses (CFA) and a series of exploratory factor analyses (EFA) were performed to investigate Research Question 1, “Can a psychometrically sound instrument be developed and generated to measure employees' perceptions of informal learning work contexts?” The answer to research Question 1 is yes.

The first two confirmatory analyses performed on the hypothesized model (management support, peer support, a supportive organizational culture support, access to work resources, frequency of informal learning, and impact of informal learning containing) and on modified model (management support, peer support, a supportive organizational culture support, access to work resources, and impact of informal learning) did not generate a good fit. Thus, a series of exploratory factor analyses were performed to remove bad items and to ensure that each of the latent variable constructs under examination had high reliability.

The exploratory factor analysis revealed that the impact of informal learning should be broken down and treated as two separate constructs: the impact of informal learning on performance and the impact of informal learning on engagement. The resulting model containing the six final constructs (management support, peer support, a supportive organizational culture, access to work resources, informal learning impact on performance, and informal learning impact on engagement) demonstrated an improved fit

to the data.

Hypothesis testing was then conducted to test the four research hypotheses to address Research Question 2, “Is there a relationship between the four factors of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and informal learning at work?” Inferential analyses were performed on seven latent variable constructs, including the six above-mentioned constructs and the frequency of informal learning. Inferential tests included Pearson and Spearman’s correlations, and multiple linear regressions. A majority of the hypotheses were supported by the inferential analysis findings. The next chapter will discuss the theoretical and practical implications of these findings.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

This chapter summarizes and discusses the findings presented in Chapter 4. It is divided into four main sections. The first section presents a summary of the study. The second section highlights the key findings and discusses them in terms of the relationship between the variables hypothesized. The third section examines the results in light of the current research on informal learning and offers suggestions for future researchers. The fourth section discusses the practical implications of the findings for Human Resource Development professionals.

Summary of the Study

The purpose of this study is to address the void in the existing informal learning literature by developing and validating an instrument to measure informal learning work contexts and to create an organizational diagnostic tool that can be used by HRD practitioners to assess, manage, and shape learning environments at work. The following overarching question guided this study: What is the relationship between employees' perceptions of informal learning work contexts and informal learning in the workplace? Given that no tool currently exists to measure employees' perceptions of informal learning work contexts, the first step was to generate a valid instrument to measure and quantify this construct. Thus, two research questions were offered:

Research question 1: Can a psychometrically sound instrument be developed and generated to measure employees' perceptions of informal learning work contexts?

Research question 2: Is there a relationship between the four factors of informal

learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and informal learning at work?

There were four phases in the development and validation of the informal learning work context instrument. Following Devillis' (1991) ratio of 1:4 for final item retention, the first phase involved the creation of 16 items representing each of the four components of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources), for a total of 64 items in the initial item pool. Each of the 64 items measured employees' perceptions of informal learning work contexts on a scale from 1 (strongly disagree) to 5 (strongly agree). In the second phase, an expert panel of 16 (4 academic scholars, 3 scholar-practitioners, and 9 practitioners) was consulted. Each panel expert was asked to review a total of 80 items (consisting of 64 independent variables and 16 dependent variable items) and was given the option to complete the survey electronically or in paper-pencil version.

After the completion of the content validity analysis and removal of poor items, the newly developed instrument, called "the informal learning work context survey" (ILWC), was administered to 2,500 working professionals online. The population sample was accessed through the research database of Wilson Learning – a global leader in sales training, leadership development, workforce development, and performance improvement based in Minneapolis. The final version of the ILWC survey consisted of 49 items including: a) 28 items to operationalize the independent variable (7 items for each of the informal learning work context constructs); b) 8 items to measure the first dependent variable, referred to as the frequency of informal learning, derived from Lohman's survey

in 2005; and c) 10 items to operationalize the second dependent variable, referred to as the impact of informal learning. In addition, the survey included 8 demographic-related items. A total of 477 participants, composed of 50.3% females ($n = 240$) and 49.3% males ($n = 235$) completed the survey, with a response rate of approximately 19%. The majority of participants ranged between 25 and 34 years old and held a four-year degree. Additionally, 54.7% ($n = 261$) of the participants reported working in non-management positions, 15.3% ($n = 73$) worked at the supervisor/first-line management level, 20.5% ($n = 98$) worked at the general/middle management level, and 8.2% ($n = 39$) worked at the senior management/executive level. Combined, this sample provided the study with adequate variance.

In phases III and IV, numerous data analysis techniques were applied to address the two research questions. In phase III, after ensuring that the statistical assumptions were not violated, a series of confirmatory factor analyses (CFA) and a series of exploratory factor analyses (EFA) were employed to further refine the six latent variable constructs and to find the best model fit. In phase IV, correlation and regression analyses were used to test the hypotheses and to determine the relationship between the independent variable, consisting the four components of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and the dependent variables, consisting of frequency of informal learning, impact of informal learning on performance, and impact of informal learning on engagement.

Discussion of Findings

The following section highlights the four main findings from the analysis. First, the study concluded that the answer to research question 1, "Can a psychometrically sound instrument be developed and generated to measure employees' perceptions of informal learning work contexts?" is yes, it is possible. A combination of confirmatory factor analyses (CFA) and exploratory factor analyses (EFA) revealed the following six latent variable constructs: management support, peer support, a supportive organizational culture, access to work resources, impact of informal learning on performance, and impact of informal learning on engagement. In this dataset, the resulting six components had Cronbach's alpha values of more than .78 and had high factor loadings; thus, they appeared to show a good model fit to the data. Subsequently, the study presents the field with a new validated metric that can be used to measure informal learning work contexts.

Second, this study suggests the possibility that impact of informal learning overlaps with elements in work engagement and job performance outcomes. The separation of impact of informal learning into two separate constructs (impact of informal learning on performance and impact of informal learning on engagement) as a result of the EFA was unexpected. In phase I of the study – item-pool generation - the items on impact of informal learning were generated by the author, based on conversations with practitioners, business consultants, colleagues, information found in practitioner journals, and a literature review. For example, referring to Dale's study in 1999, Marsick et al. (2009) identified the benefits of informal learning at work as "flexibility, employability, adaptability of learning to context, rapid transfer to practice, and resolution of work

problems through regular review of work practices and performance" (p. 570). There was no predisposed assumption that the items would reflect elements of work engagement, job performance outcomes, or both. During phase II of the study - the content validity analysis - separation of the construct involving the impact of informal learning began to emerge. However, the items were kept together because as a whole, they represented what was considered as impacts of productive informal learning.

In phase III of the study – construct validity analysis - a series of exploratory analyses confirmed that the items on impact of informal learning loaded strongly into two separate factors. Oftentimes, practitioner-oriented journals, business consultants, and academics asserted that employee engagement helped organizations gain competitive advantage (Seijts & Crim, 2006), thereby giving the impression that employee engagement and job performance could be merged into one construct. Yet, recent studies have demonstrated that job performance and work engagement are two separate constructs (Bartlett, Quast, Wohkittel, Center, & Chung, in press; Kim, Kolb, & Kim, 2012; Rich, Lepine, & Crawford, 2010; Shuck, Ghosh, Zigarmi, & Nimon, 2013), thus providing support to the current findings.

Third, with regard to research question 2, “Is there a relationship between the four factors of informal learning work contexts (management support, peer support, a supportive organizational culture, and access to work resources) and informal learning at work?” the answer is a partial yes. In relation to the impact of informal learning on performance, peer support was the strongest predictor and the only construct of informal learning work contexts that showed a significant positive relationship ($r = .302$; $\beta = .320$,

$p < .0005$). The R^2 of .07 indicates that peer support explained 7% of the variance in impact of informal learning on performance. In association with impact of informal learning on engagement, manager support ($r = .577$; $\beta = .458$, $p < .0005$), peer support ($r = .428$; $\beta = .134$, $p = .002$), and a supportive organizational culture ($r = .453$; $\beta = .121$, $p = .002$) were positively significant. Further, the strongest relationship was found between management support and impact of informal learning on engagement ($R^2 = .11$), followed by peer support ($R^2 = .11$), and then a supportive organizational culture ($R^2 = .009$).

Fourth, an unexpected finding was that the correlation analysis generated a very weak positive relationship between access to work resources and impact of informal learning on performance, while the multiple regression analysis did not find any significant relationship. A similar pattern of a weak positive correlation and a non-significant outcome was found for the relationship between access to work resources and impact of informal learning on engagement.

Fifth, the data support concerns with regard to the low reliability in Lohman's (2005) items, given that frequency of informal learning as a construct had a low Cronbach's alpha of .664. Although the internal consistency reliability of frequency of informal learning as a construct was low, it was included in the phase IV - regression analysis - to meet the methods described in Chapter 3. Caution is advised when reading and interpreting the relationship between informal learning work contexts and frequency of informal learning reported in Chapter 4.

For the rest of this section, the data analysis findings will be discussed in terms of the relationship between employees' perceptions of the four informal learning work

contexts and informal learning at work, measured through impact on performance and impact on engagement.

Relationship between Employees' Perceptions of Informal Learning Work Contexts and Impact of Informal Learning on Performance

Of the four informal work contexts, the correlation and multiple regression analysis outcomes showed a positive significant relationship only between perceptions of peer support and impact of informal learning on performance ($r = .302$; $\beta = .320$, $p < .005$). This finding contributes to the existing literature by providing the first empirical validation for a positive relationship between employees' perceptions of peer support and impact of informal learning on performance at work. Participants who perceived their peers as supportive of their informal learning scored high in impact of informal learning on performance. They reported having the knowledge and skills required to perform their job well, felt more satisfied with their performance, and were able to meet or exceed the performance standards for their roles. This finding echoes previous studies (Cunningham & Hillier, 2012; Ellinger, 2005; Enos et al., 2003; Eraut, 2004; Lohman, 2005; Marsick et al., 2009) who asserted that productive informal learning takes place when informal learners feel that their co-workers are accessible, supportive, willing to share their knowledge and expertise, and able to direct them to necessary information when faced with challenges at work.

Notably, the multiple regression analysis also showed a small significant positive relationship between level in the organization (non-management and management) and impact of informal learning on performance. At the same time, it revealed a small

negative relationship between the level of education and impact of informal learning on performance.

Overall, these findings imply the value of work experience in accessing informal learning resources. Individuals at higher organizational levels are presumably more experienced and more likely to know how to seek and use informal learning resources, and consequently, are more likely to be able to reap benefits from such resources in comparison to new employees or individuals with less work experience. This study offers support to the notion of learning from experience and experiential learning theories, in which informal learning is grounded (Marsick & Watkins, 1990; Marsick, et al., 2009). Individuals cannot learn beyond their learning capacity and would benefit more from a learning facilitator. Without pre-existing knowledge or the presence of an expert peer to facilitate learning, individuals may not be able to build their readiness to learn; as a result, productive learning may not take place.

Furthermore, in this study, peer support was defined as the following: employees' perceptions of having proximity and access to others with similar interests and professional expertise; openness and knowledge-sharing among peers that encourage informal learning. However, the item that taps into the concept of proximity, "my work area is in close proximity to my peers with similar expertise," was not retained in the final survey because it was ranked lowest in comparison to the other peer support items. Proximity appears to be less important than direct access. One possible explanation is the technological advancements in the current era of globalization, which can be seen from the emergence of the virtual workplace environment (Bennett, 2010; Li, D'Souza, & Du,

2011; Nafukho, Graham, & Muyia, 2010; Short, 2010), and the utilization of e-learning in the workplace (Cheng, Wang, Yang, Kinshuk, & Peng, 2011; Derouin, Fritzsche, & Salas, 2005, Wang, Ran, Liao, & Yang, 2010). In other words, technology has enabled direct access to expert peers without literal physical proximity. Peers can provide support and guidance through emails and other electronic devices, without face-to-face interaction. Consequently, this study proposes that the definition of “perceptions of peer support” should be adapted to "employees' perceptions of having direct access to others with similar interests and professional expertise; openness and knowledge-sharing among peers who encourage informal learning."

The weak correlation and non-significance in the multiple regression outcomes between the three informal learning work contexts (management support, a supportive organizational culture, and perceptions of access to work resources) and impact of informal learning on performance was unanticipated. There are several possible explanations for this outcome.

First, it is possible that Argyris' (1999) observation and insight into the challenges faced by learning organizations are still relevant today. Organizations might aspire to become learning organizations, but find it very difficult to promote a generative learning culture (MacNeil, 2001) that facilitates critical reflection, tolerates trial-error activities, and remains lenient about mistakes for the sake of learning. Mistakes could be costly, and it seems unrealistic to presume that organizations would prioritize employees' informal learning over organizations' need to survive in the current unpredictable economy.

Additionally, managers who serve as the link between organizations and

employees may not have the necessary skills or competencies to become a learning and development champion. Despite suggestions from previous researchers (Ellinger, 2005; Eraut, 2004; MacNeil, 2001), managers still struggle to find a balance between focusing on performance (their traditional role of being experts who manage ROI and productivity) and facilitating their direct reports' learning and development to help them become high performers.

Reliance on access to the Internet and work resources can also be an issue, as this effort could lead to improved performance only if employees know where and how to find the right answers (such performance requires a certain level of knowledge and intelligence). Participation in this type of learning is self-directed and solely up to the discretion of individuals; if such learning is not well planned, negative consequences could result (Ellinger, 2005; Lohman, 2005). Thus, in the absence of other informal learning work contexts, access to work resources does not appear to be a substitute.

In addition to requiring skills when accessing work resources, using the Internet can be both intimidating and misleading. It seems more convenient, assuring, and less risky to ask a willing, knowledgeable, and experienced peer how to address work challenges instead of going to a manager (who might also rate their performance) or looking for the answers themselves by taking a risky trial-and-error strategy or browsing through the overwhelming array of information on the Internet.

This study does not dismiss the value of management support, a supportive organizational culture, or access to work resources in predicting the impact of informal learning on performance. Instead, it offers the possibility that the non-significant findings

might be a reflection of the present state of management and corporate culture – that as much as organizations aspire to embrace the concept of learning organizations, they are not ready for the challenges presented by this new era of globalization, along with technological advances. In light of this problem, this study confirms and validates the importance of supportive informal learning work contexts and the strong role that organizations play in promoting them.

Second, given that this study found a strong significant positive relationship between management support, peer support, and impact of informal learning on engagement, it is possible that the non-significant outcomes suggest multiple impacts of productive informal learning.

Third, there is the possibility that the items used to measure impact of informal learning on performance in this study have to be revisited and further refined. The impact of informal learning on performance consisted of three items only. Even though the dataset revealed an acceptable Cronbach's alpha coefficient of .780, it brings into question whether there are other job performance measures that might result in better outcomes. This is something that should be further investigated empirically.

Relationship between Employees' Perceptions of Informal Learning Work Contexts and Impact of Informal Learning on Engagement

The correlation and multiple regression analysis showed a significant relationship between impact of informal learning on engagement and management support ($r = .577$; $\beta = .458$, $p < .005$), peer support ($r = .428$; $\beta = .134$, $p = .002$), and a supportive organizational culture ($r = .453$; $\beta = .121$, $p = .006$). In this sample, when employees

reported high perceptions of management support, peer support, and a supportive organizational culture, their perceptions of impact of informal learning on engagement (e.g., willingness to work in the organization for a long time, looking forward to coming to work, recommending the organization highly, proud of being part of the organization, and feeling highly engaged at work) increased, as well. Management support explained 11% of the variance in impact of informal learning on engagement, while peer support and a supportive organizational culture attributed 1.2% and 0.9% to the variance in impact of informal learning on engagement, respectively. This study contributes to the growing literature by providing the first empirical evidence for the positive relationship between these variables and confirming the significance of supportive informal learning work contexts in ensuring impactful informal learning.

The value of studying employees' perceptions to better understand the impact of organizational support has been empirically investigated and validated by scholars in other fields, such as business and psychology. For example, Organizational Support Theory (OST) posed the notion that people assign an organization with humanlike characteristics and perceive how the organization treats them as a clue of whether it favors them or not (Eisenberger et al., 1986; Shore & Shore, 1995). Employees form general beliefs about what an organization thinks of them by observing the organizational agents, and they exchange the favors accordingly. The operationalized construct of OST, called the Perception of Organizational Support (POS), has been linked to positive work-related outcomes, such as organizational commitment, job performance, job satisfaction, and job involvement (Rhoades & Eisenberger, 2002), which is consistent with the

findings from the current study. It is possible that employees who perceived their managers, peers, and organizational culture as supportive toward their learning and development needs, even in the absence of an established program designed by the organization, felt that the organization cared and favored them, and therefore, felt more engaged. How much the construct of informal learning work contexts overlaps with Perception of Organizational Support (POS) studies should be further investigated.

The importance of a supportive work context was expressed by employee engagement researchers. For example, Shuck, Rocco, and Albornoz (2011) conducted a qualitative exploration and reported that the work climate influenced the participants' experience at work: "It was important to our participants to feel comfortable at work and to know that those they worked with cared about them as human beings" (p. 312). Employee engagement is defined as "the individual's involvement and satisfaction with, as well as enthusiasm for work" (Harter, Schmidt, & Hayes, 2002, p. 269). Most researchers credited Kahn's work in 1990 as the source of various definitions and understanding of the engagement construct as of date (Shuck, Rocco, & Albornoz, 2011). Kahn (1990) defined engagement as "emphatically connected to others in the service of the work they are doing in ways that display what they think and feel, their creativity, their beliefs and values, and their personal connections to others" (p. 700). Since then, there has been an ongoing conversation surrounding the topic of employee engagement; yet, it appears that the definition and psychometric property of this construct is still debatable (Kim, et al., 2012; Shuck, 2013). Further discussion on the employee engagement debate is beyond the scope of this study. To some degree, the concept of

employee engagement has been captured by the items used to operationalize impact of informal learning on engagement in this study. Thus, it might be beneficial for researchers in both areas to collaborate and learn from one another.

The non-significant findings for the relationship between access to work resources and impact of informal learning on engagement might be an indicator for the importance of social relationships. This notion resonates with Marsick et al. (2009), who proposed that the difference between their theory of informal learning, developed in 1990, with that of Knowles' principles of andragogy in 1950 was the emphasis on social relationships: "Knowles (1950) dealt more with educational method and did not take into consideration to the same degree social contract among individuals" (p. 573). The value of relationships was also depicted in Eraut's (2004) model of informal learning, as he proposed that organizations could make a difference by creating a balance between challenging work assignments and ensuring relationships by allowing "opportunities for meeting, observing, and working alongside people who had more or different expertise" (p. 270). Ellinger (2005) conducted a case study on contextual factors influencing informal learning at work and found "openness and accessibility to people" (p. 404) as one of the emerging themes. Therefore, this study reinforces the notion that, despite the current reliance on technology and the Internet, people's relationships are still highly valued and still influence the impact of informal learning on engagement.

Recommendations for Future Research

This study opens up possibilities for new directions in informal learning research. There is still much work to be done to advance the field's understanding pertaining to the

role that organizational context plays in relation to productive informal learning at work.

The following are recommendations for future researchers.

First and foremost, the findings of this study show that peer support is as important as management support. While there is a great deal of research focusing on management support, little is known about peer support and what HRD practitioners can do to develop people to become effective and supportive peers. Thus, future examination of peer support is warranted.

The findings of this study indicate that peers could provide support and guidance through emails and other electronic devices, without face-to-face interaction. Physical proximity was less important than having access to supportive peers. And consequently, this study proposes that the definition of peer support be modified in future examination to "employees' perceptions of having direct access to others with similar interests and professional expertise; openness and knowledge-sharing among peers who encourage informal learning."

Similar concepts to peer support have been examined in other literatures under different names, such as peer coaching (Lu, 2010; Parker, Hall, & Kram, 2008), peer mentoring (Bryant, 2005; Kram & Isabella, 1985), and peer assessment (Li, Liu, & Steckelberg, 2010; Topping, 2009; Zundert, Sluijsmans, Merrienboer, 2010). For instance, under the assumption that peer mentoring enables externalization (transformation of tacit to explicit knowledge) and socialization (transformation of tacit to explicit knowledge through demonstration), Bryant (2005) conducted an empirical study and reported that perception of peer mentoring was positively related to perceptions

of knowledge creation and sharing. Zundert, Sluijsmans, Merrienboer, (2010) conducted a literature review on peer assessment and asserted that the effectiveness of peer assessment could be improved through experience and training. Parker, Hall, and Kram (2008) surveyed MBA students and suggested five components of effective peer coaching: 1) actively participate in the same learning process; 2) have a certain level of commitment and emotional connection, although friendship is not a necessity; 3) create a “safe” working environment characterized by trust, mutual respect, professionalism, and a willingness to accommodate each other; 4) foster motivation to help and support one another’s learning; and 5) ensure successful past experience working with peers. Embedded in their discussion is the importance of feedback and reflection.

From the information in these studies, as well as the current findings, one may infer that peer relationships could be leveraged as a strategy to support learning in organizations. An inclusive literature review on peer coaching, peer mentoring, and peer assessment is out of the scope of this study. However, there seems to be enough evidence to show that in order to be effective, peers must know how to collaborate and to possess the skills to support one another, either through past work experience or training. The above-mentioned findings demonstrate the value of looking into studies in other disciplines to better understand peer support. Accordingly, this study proposes that future research conduct a literature review on concepts that are closely related to peer support. The field of education could be a good starting point.

Second, future research should replicate, refine, and re-validate the informal learning work context instrument by re-examining the relationship across the four

informal learning work contexts (manager support, peer support, a supportive organizational culture, and access to work resources) and the work-related outcomes (impact of informal learning on engagement, impact of informal learning on performance). For example, a path analysis study could be employed to determine how the constructs relate to each other, and how to improve the model fit.

Third, the items used to measure the impact of informal learning work contexts should also be revisited. The current study found that impact of informal learning overlaps with elements of job performance and employee engagement. Future researchers should test the items of impact of informal learning on performance and impact of informal learning on engagement by comparing their psychometric properties with the existing measures on performance and engagement. Future research should also consider a broad range of organizationally relevant outcome measures, such as job satisfaction, organizational commitment, positive mood, job involvement, turnover, and objective performance measures (e.g., productivity, and quality)

Fourth, both quantitative and qualitative research explorations on other informal learning work context factors, as well as other impacts of informal learning at work are highly encouraged. This study demonstrated that peer support, level of education, level in organization, and country of origin explained 14% of the variance in impact of informal learning on performance, whereas, manager support, peer support, a supportive organizational culture, and age explained 43% of the variance in impact of informal learning on engagement. These findings indicate that there are other informal learning work context factors, as well as other impacts of informal learning that have not been

accounted for, and reveal further research potential.

Fifth, future research should engage in efforts related to theory building to advance knowledge of the field about the role organizations play in promoting impactful informal learning. For example, one of the theories that attempt to explain the importance of employee perceptions of organizational support is “Organizational Support Theory” (OST) (Eisenberger, Huntington, Hutchinson, & Sowa, 1986; Shore & Shore, 1995). Research findings from other disciplines such as management studies, psychology, curriculum and instruction, or computer science and education could provide insights and guidelines for future research directions.

Sixth, it is imperative to note that the development and validation of the instrument for this study was based on the assumptions, conceptual framework, and definition proposed by the author. The sample was drawn from a company database containing 2,500 working professionals coming from various demographics; thus, it provided the study with adequate variance and sample sizes. However, the database was limited to white-collar professionals working in for-profit organizations. Furthermore, the data were collected at one time only, and there was no pilot study conducted prior to the analysis. Consequently, the findings of this study should not be interpreted and generalized beyond the dataset and parameters of this study. This opens up opportunities for potential research. Future informal learning scholars could extend the current findings by replicating, fine-tuning (perhaps, by collecting the data at different times), and re-validating this study with a different population to increase the generalization of the findings. A global or cross-cultural investigation is also highly recommended, especially

since informal learning might be viewed and defined differently in other cultures.

In conclusion, this study takes the first step into the empirical investigation of informal learning work contexts and their impact on organizational performance. The findings confirm the conclusion in existing literature that there is value for future investigation of informal learning. From here, there is much exploration – using both qualitative and quantitative research methods - that has to take place before we can claim expertise in this area. These recommendations for future studies are not inclusive and are only offered as potential research examples that may increase theoretical understanding of informal learning work contexts. In acknowledgment of the volatility of the current business environment, this study aims to enable HRD scholars and practitioners to continue fulfilling their strategic HRD mission – to help organizations gain and sustain their competitive advantage by leveraging the learning and development of their people.

Implications for HRD Practice

Learning (whether at the individual, group, organizational, or global levels) is at the core of HRD (Ardichvili, 2008; Swanson & Holton, 2009). HRD practitioners should direct their strategic efforts to fulfill their roles as champions for learning and workplace performance in the 21st century by becoming experts in all kinds of individual learning. There are two main ways this study aims to contribute to HRD practice: 1) by providing practitioners with a psychometrically sound organizational diagnostic tool to measure informal learning work contexts; and 2) by presenting empirical evidence that can be used to position and support the value of creating and shaping supportive informal learning work contexts.

First, this study presents HRD practitioners with a psychometrically sound organizational diagnostic tool that can be used to help organizations assess, shape, manage, and facilitate work environments to promote impactful informal learning. The lack of knowledge about informal learning and how it can be promoted in organizations have resulted in claims, various definitions, and ad hoc practices, as reflected in many webinars that the author has attended in the course of completing this study. HRD practitioners seem to feel more comfortable with the concept of structured and formal learning, considering that one of the most frequently proposed solutions for learning is to formalize informal practices. Given that any attempt to provide informal learning with some degree of structure would violate its fundamental essence, the findings of this study offer an alternative solution. Instead of trying to formalize informal learning, HRD practitioners should focus on helping organizations learn by structuring, shaping, and managing informal learning work contexts.

Second, this study presents HRD practitioners with empirical evidence that can help them position the value of creating and shaping supportive informal learning work contexts. The following are three points to consider when using the developed tool to recommend initiatives:

Of primary importance, HRD practitioners need to develop a training program on peer support. This training program should provide employees with the knowledge and skills to be supportive peers for each other. In this study, peer support was the only factor out of the four informal learning contexts (management support, peer support, a supportive organizational culture, and access to work resources) that was positively

related to impact of informal learning on performance, and it was the third most important informal learning work context factor in predicting impact of informal learning on engagement. When faced with challenging work assignments and a lack of job knowledge, employees intuitively seek help from their expert peers, and not their managers. They ask these peers for help and to share their expertise. Perceptions of having supportive peers create a more positive impact of informal learning on performance (having the knowledge and skills required to perform their jobs well, being more satisfied with their performance, and being able to meet or exceed the performance standards of their roles), as well as a more positive impact of informal learning on engagement (willingness to work in the organization for a long time, looking forward to coming to work, recommending the organization highly, feeling proud of being part of the organization, and feeling highly engaged at work).

The necessity for a training program on peer support becomes more pertinent, given that the findings of this study also suggests that when employees perceive their peers as less supportive of their informal learning, their perceptions of impact of informal learning on performance and impact of informal learning on engagement suffer. A similar conclusion – that successful peer relationships do not happen automatically - was reported by studies in other disciplines (Topping, 2009; Parker, Hall, & Kram, 2010).

HRD practitioners should also note that in structuring the workplace, physical proximity is less important than ensuring a collaborative versus competitive environment. This finding is consistent with the view expressed by Marsick et al. (2009), who stated, "the implications for organizations are to find ways to create safer yet stimulating

environments that prize collaboration over competitiveness" (p. 593).

Next, as expected, management support was the most important informal learning work context factor when the organizational objective was to encourage impact of informal learning on engagement (willingness to work in the organization for a long time, looking forward to coming to work, recommending the organization highly, feeling proud of being part of the organization, and feeling highly engaged at work). Subsequently, the findings of this study extend our current understanding by demonstrating the empirical evidence between management support and impact of informal learning on engagement. Ideally, a supportive manager provides subordinates with a supportive informal learning work context by transforming challenging work situations into learning opportunities. In turn, their subordinates may feel that the manager cares, and subsequently, they tend to experience a more positive impact of informal learning on engagement.

However, as previously discussed, this is not an easy task for managers, as they continue to struggle in balancing their traditional role of being experts who monitor and supervise, and their new roles as learning facilitators. HRD practitioners should use this opportunity to bring in their expertise and make a difference. For example, HRD practitioners can use recommendations by Ellinger (2005), who suggested that managers could influence informal learning by: a) providing opportunities to learn; b) acting as coaches or mentors; c) visibly providing support and space for learning; d) allowing risk-taking and learning from mistakes; e) emphasizing the importance of knowledge sharing; f) providing positive feedback and recognition; and g) acting as role models, as guidelines in their initiatives.

Finally, a supportive organizational culture was the second most important factor that positively related to impact of informal learning on engagement (willingness to work in the organization for a long time, looking forward to coming to work, recommending the organization highly, feeling proud of being part of the organization, and feeling highly engaged at work). Schein (1985) regarded organizational culture as the "[basic assumption] well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think, and feel" (p. 390). To this, Argyris (1995) added, "a learning leader must assess the adequacy of his organization's culture, detect its dysfunctionality, and promote its transformation ... first by making his own basic assumptions into 'learning assumptions' and then by fostering such assumptions into the culture of his organization." (p. 5). In other words, to create a generative culture, learning leaders have to take the first step in promoting these ideas throughout the organization. In order to assist organizations to create and shape their learning cultures, HRD practitioners should position themselves as strategic business partners, and should continue to espouse the importance of a generative learning culture and its long-term impact. Moreover, HRD practitioners should implement strategies and initiatives that can enable their message to be heard throughout the organization.

In summary, the challenges of the new era of globalization, technology advances, and the aging workforce will lead organizations to rely on employee learning to sustain competitive advantage. This opens up opportunities for HRD practitioners to position themselves more strategically in business settings. In 1991, Garavan defined HRD as "the creation of learning culture, within which a range of training development and learning

strategies both respond to corporate strategy and also help to shape and influence it” (p. 288). In addition, Garavan (2007) conducted a literature review on strategic HRD and concluded, "SHRD contributes to the creation of firm-specific knowledge and skills when it is aligned with the strategic goals of the organization” (p. 11). This study aims to help HRD practitioners in their strategic efforts and to contribute to current HRD practice by advancing knowledge about informal learning work contexts and by providing insights into how it can be measured, shaped, and encouraged to help HRD practitioners in their strategic efforts.

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APPENDICES

APPENDIX A: IRB

The IRB: Human Subjects Committee determined that the referenced study is exempt from review under federal guidelines 45 CFR Part 46.101(b) category #2
SURVEYS/INTERVIEWS; STANDARDIZED EDUCATIONAL TESTS;
OBSERVATION OF PUBLIC BEHAVIOR.

Study Number: 1109E05101

Principal Investigator: Jane Maringka

Title(s):

Dissertation proposal: Development and Validation of an Instrument to Assess Employees' Perceptions of Informal Learning Work Contexts

This e-mail confirmation is your official University of Minnesota RSPP notification of exemption from full committee review. You will not receive a hard copy or letter.

This secure electronic notification between password protected authentications has been deemed by the University of Minnesota to constitute a legal signature.

The study number above is assigned to your research. That number and the title of your study must be used in all communication with the IRB office.

Research that involves observation can be approved under this category without obtaining consent.

SURVEY OR INTERVIEW RESEARCH APPROVED AS EXEMPT UNDER THIS CATEGORY IS LIMITED TO ADULT SUBJECTS.

This exemption is valid for five years from the date of this correspondence and will be filed inactive at that time. You will receive a notification prior to inactivation. If this research will extend beyond five years, you must submit a new application to the IRB before the study's expiration date.

Upon receipt of this email, you may begin your research. If you have questions, please call the IRB office at [\(612\) 626-5654](tel:6126265654).

You may go to the View Completed section of eResearch Central at <http://eresearch.umn.edu/> to view further details on your study.

The IRB wishes you success with this research.

APPENDIX B: EMAIL INVITATION

Your input is requested for a doctoral dissertation study on informal learning and its impact at work. The study, co-sponsored by the University of Minnesota and Wilson Learning Worldwide, aims to gather information about informal learning, particularly how informal learning at work can be encouraged and facilitated. This study is the first attempt to quantitatively measure the informal learning environment.

The survey should take less than 15 minutes to complete. In appreciation for your survey completion, you will:

- Receive a free summary of the results
- Be entered into random drawings for an opportunity to win one of three American Express \$50 gift cards

For your reference, attached is a one-page statement of consent that describes this study and provides information about your involvement. Feel free to print a copy of this document for your personal records and read it carefully before making a decision to participate. If you have any questions, you may contact me at mari0112@umn.edu

To complete the survey, please click on the link below:

Start the survey now.

If you have colleagues who may be interested in participating in this study, please forward this message.

Your contribution to this study is significant, and I thank you for your assistance with my doctoral research.

APPENDIX C: CONSENT

STATEMENT OF CONSENT

Dear Participants,

My name is Jane Maringka, and I am a doctoral candidate in Human Resource Development at the University of Minnesota. In fulfillment of my Ph.D. requirements, I am conducting an academic research study with the purpose of developing and validating an organizational survey to assess informal learning work contexts. Given the burgeoning interest surrounding the value of informal learning at work, this study will advance our current understanding about its impact and how it can be promoted in organizational settings.

Your participation in this study is voluntary. You may withdraw from participation at any time. However, if you withdraw before the study is completed, you will not be entered into random drawings for an opportunity to win one of the three \$50 gift certificates. All reasonable efforts will be made to ensure that your personal records and individual responses remain confidential. Only aggregate statistics and summaries will be reported. There are no anticipated psychological or physical risks to participating in this study. However, should you have any questions or concerns, you may contact the researcher, Jane Maringka, at jane.maringka@gmail.com

This survey will take about 15 minutes to complete. In accordance with the University of Minnesota's research/ethics standards, this study will strictly adhere to the following:

- All information reported in this study will remain confidential and anonymous.
- Jane Maringka, the principal researcher, will be the only person with full access to the raw data.
- In any report that might be published, no information will be included that makes it possible to identify personal information or individual responses.
- Participation in this study is voluntary.
- There are no expected psychological or physical risks to participating in this study.
- The participant is entitled for a free summary of the results.

To begin the questionnaire, please go back to your email and click on the link to the survey.

Thank you!

Jane Maringka

Department of Organizational Leadership, Policy, and Development

University of Minnesota

Jane.maringka@gmail.com

APPENDIX D: INFORMAL LEARNING WORK CONTEXT SURVEY

Hello,

Thank you for participating in this survey. There are 49 questions, which should take you less than 15 minutes to answer.

Informal learning is defined as learning activities that happen outside of pre-established or structured learning programs.

This survey is designed to capture your perceptions of the informal learning environment and its impact for you at work.

Please fill out all of the questions. Your answers will remain confidential.

By clicking on the “start survey” button below, you are indicating that you agree to the following:

1. I have read the attached statement of consent and agree to participate in this study.
2. I am at least 18 years old.

The following questions ask about your perceptions of informal learning work contexts. Informal learning is defined as learning activities that happen outside of pre-established or structured learning programs.

Based on this definition, please select the answers that best fit you.

#	Items on Informal Learning Work Contexts	
<p>Please answer each of the following questions using:</p> <p>1: Strongly Agree 2: Agree 3: Neutral 4: Disagree 5: Strongly Disagree</p>		
1	I have direct access to my peers with needed expertise when I have a work-related question.	
2	I use the Internet to learn informally on the job.	
3	In my organization, a mistake is tolerated as long as we learn something from it.	
4	My peers are supportive of my informal learning.	
5	In my organization, we share lessons learned from our mistakes.	
6	When faced with challenging work situations, I can use the Internet to find answers.	
7	When faced with challenging work situations, I ask my peers for help.	
8	I have time to learn informally on a daily basis.	
9	I have time to read professional publications to stay current on topics related to my job.	

10	My organization allows risk-taking in the process of finding solutions.	
11	In my organization, risk-taking is considered important for us to learn.	
12	My supervisor assigns me with challenging tasks that support my informal learning.	
13	My peers are willing to share their expertise.	
14	My peers direct me to other relevant resources when they cannot help me with my work-related problems.	
15	I work in an environment that supports continuous learning.	
16	When I make a mistake, my supervisor encourages me to reflect so I can learn from it.	
17	My peers share the lessons learned from making mistakes at work.	
18	When I need to update my knowledge and skills, my supervisor directs me to the appropriate learning resources.	
19	I can use the Internet when I need to find information to help me perform my job.	
20	My company's culture creates a work environment that promotes informal learning.	

21	I ask my supervisor for help when I encounter challenges at work.	
22	My peers provide me with guidance when I face challenging work situations.	
23	I have time to seek information I need for my job.	
24	My supervisor provides me with constructive feedback for my learning.	
25	I have access to the Internet to solve work-related problems.	
26	My supervisor is a role model for my learning.	
27	Learning new ways to perform my job is valued in my organization.	
28	My supervisor promotes the value of informal learning at work.	
Please click "submit" to go to the next page.		

#	Items on Frequency of Informal Learning	
<p>The following questions assess the frequency of your participation in 8 informal learning activities.</p> <p>Please select the answers that best fit you using the following scale:</p> <p>1: Almost never use the learning activity 2: Infrequently use the learning activity 3: No opinion 4: Frequently use the learning activity 5: Almost always use the learning activity</p>		
29	In learning about something new on the job, how often do you ...:	
A	Talk with others (e.g., your boss, your coworkers, your peers)	
B	Collaborate with others (e.g., your boss, your coworkers, your peers)	
C	Observe others (e.g., your boss, your coworkers, your peers)	
D	Share materials and resources with others (e.g., your boss, your coworkers, your peers)	
E	Search the Internet	
F	Read professional publications	
G	Try different ways to solve a problem (trial and error)	

#	Impact of Informal Learning	
<p>Please answer each of the following questions using:</p> <p>1: Strongly Agree 2: Agree 3: Neutral 4: Disagree 5: Strongly Disagree</p>		
30	I have the knowledge and skills required to perform my job well.	
31	I am satisfied with my performance at work.	
32	I am advancing in my career.	
33	I exceed the performance standards for my role.	
34	I am more employable than when I started working here.	
35	If given the opportunity, I would like to work in my organization for a long time.	
36	Most days, I look forward to coming to work.	
37	I would recommend my organization as a great place to work.	
38	I am proud to be part of my organization.	
39	I am highly engaged at my work.	

Demographic Questions		
<p>The following questions include demographic information about you. Please use the drop down to select answers that best describe you.</p>		
40	<p>What is your gender?</p> <ul style="list-style-type: none"> A. Female B. Male C. I prefer not to answer 	
41	<p>What is your age?</p> <ul style="list-style-type: none"> • Under 20 • Between 20-24 • Between 25-29 • Between 30-34 • Between 35-39 • Between 40-44 • Between 45-49 • Between 50-54 • Between 55-59 • 60 or older 	
42	<p>Please indicate the REGION of the world of your origin (where you were born):</p> <ul style="list-style-type: none"> • North America • South America • Africa • Europe • Asia • Australia/Oceania 	
43	<p>Please indicate the region of the world in which you currently reside:</p> <ul style="list-style-type: none"> • North America • South America • Africa • Europe • Asia • Australia/Oceania 	

44	<p>What is the highest level of education you have completed?</p> <ul style="list-style-type: none"> • High school diploma • Some college • Two-year degree/certificate • Four-year college degree • Master's degree • Doctoral degree • Other, please specify 	
45	<p>How long have you been working in your current organization (in years)?</p>	
46	<p>Please select which of the following most closely describes your level in your organization:</p> <ul style="list-style-type: none"> • Non-management • Supervisor/1st-line manager • General/Middle Manager • Senior manager/executive • Owner/CEO/I work for myself 	
47	<p>Please select which of the following most closely describes your role/function in your organization:</p> <ul style="list-style-type: none"> • Production and manufacturing • Sales • Marketing • Customer Service • IT/Software/Hardware • Research/Development • Finance • HR • Consultant • Other, please specify 	
48	<p>To be entered into the random drawings for an opportunity to win one of the three \$50 gift certificates, please provide your email address:</p>	
49	<p>I'd like a copy of the research report. → Y/N</p>	

Survey End Page		
Your input and involvement is vital for the success of this study.		
Thank you for taking the time!		