

ADULT LEARNING: EVALUATION OF PREFERENCES FOR TECHNOLOGY AND
LEARNING SOURCES FOR WORKPLACE LEARNING

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The purpose of this research was to provide an initial investigation of the preferences for both technology and learning sources that are available today in the modern workplace at a large financial institution with a national presence in the USA. In addition to the preferences of the participants, the research includes insights about the culture of the learning organization by using the Dimension of Learning Organization Questionnaire (DLOQ) and two preference surveys. The research methods used in this study are categorized as mixed methods and include both quantitative and qualitative methods. This study is nonpositivist and descriptive. It is based on a triangulation design method which is comprised of analysis from data obtained from the DLOQ and preference surveys, as well as semi-structured interviews with several survey participants. The results of the studies provide the foundational information for an extended quantitative analysis.

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CHAPTER 1

INTRODUCTION

The purpose of this chapter is to present the research topic and to establish an adequate background, which supports the importance and purpose of the research. Three research questions are presented. The chapter ends with a summary, which defines the major elements of inquiry and highlights significant assumptions and limitations of the research methods used for this study.

Background

Technology advancement throughout the world is easily recognized. Look at the changes that have taken place within communication, medicine and manufacturing (Chandra & Skinner, 2011; Kotha & Swamidass, 2000; Meadows, Randers, & Meadows, 2004). Not only has significant and noticeable change taken place over time, but also the rate of change has been exponential within the category of technology. Most people do not understand the concept of exponential change, even though it is a simple mathematical concept (Swirski, 2007). It is an important concept, which is relevant to this research so an example of exponential growth is demonstrated with a simple visual metaphor.

A chessboard is eight rows by eight rows with a total of six square locations. If you were to place a single grain of rice on the first square and double the amount on each subsequent square, the amount of rice on the 41st square would be a trillion (10^{12}) grains. The rice on the 64th square would exceed all of the rice in the world. (Behrends, 2012; Brynjolfsson & McAfee, 2012; Meadows et al., 2004).

The rice example is an exact representation of exponential growth that has taken place in digital technology for the last thirty years. This extreme growth rate is being evidenced in genetics, nanotechnology and robotics (Grossman, 2011; Kurzweil, 2013). Managing the disruptive change associated with our fast changing world of technology is very challenging (Christensen, Roth, & Anthony, 2004). Some areas of our world are quick to adopt these changes and others are more guarded and cautious. Advances in medical treatments using gene therapy have been remarkable and welcomed (Sheridan, 2011). Genetic modified foods however have not received the same public endorsements (Verma, Nanda, Singh, Singh, & Mishra, 2011).

The rate of technology growth has created significant social change. Real time data, decision support products, and gadgets that we thought would only occur in science fiction now govern our lives. The world is changing fast and it is impacting the workplace. Technology adoption in education is a major subject of research and evaluation. The acceptance of advanced technology in education varies from individuals, instructors, academic institutions and the workplace. The cost of educational technology is no longer a major barrier (Masud & Huang, 2012; Norris & Soloway, 2011; Twigg, 2011). Advanced technology resources are creating a real-time educational environment, which is no longer, restricted by scheduling and location. The resistance of adopting the use of technology is predicated on the effectiveness of learning (Njenga & Fourie, 2010). The detractors and champions of the role and use of technology in education are not new. Socrates claimed that students should not be taught to write for it would diminish memory (Prensky, 2011). The Clark/Kozma debate challenges the

influences of media on learning against the synergies of media, content and interaction of the learner (Clark, 1983, 1994; Kozma, 1994).

The educational debate will continue and will eventually be mitigated by further research and developments in neuroscience. Neuroscience research is providing scientific evidence about the working of the brain (Jaeggi, Buschkuhl, Jonides, & Shah, 2011; Thagard, 2010). Memory categorization establishes sensory, working, and long-term memory. Working memory has revealed visual and textual channels that can suffer from cognitive overload. Cognitive science has defined the relationships of prior knowledge, deep understanding and metacognitive strategies and their impact on learning (Mayer, 2010). Prior knowledge is a function of memory. Deep understanding is related to both personal preferences and motivation. Metacognitive strategies is how one thinks about thinking. Personal preferences are an element of the metacognitive strategies too since it is a component directing the learner's attention.

Kurzweil (2013) predicts that computing ability will soon surpass the speed and memory capacity of the human mind (Brynjolfsson & Saunders, 2010). It is suggested that once we fully understand how the human mind works, the mind can be reverse engineered. With the exponential growth of many technologies, this could occur within the next fifteen years. Understanding how we learn is far from being totally understood. There will be ongoing debate and research as this body of knowledge is better defined.

From a background perspective, it is clear that the aspects of learning include physiological, cognitive, social and emotional components (Brackett, Rivers, & Salovey, 2011; Merrell & Gueldner, 2010; Pekrun, 2011). The personal preference of the

individual is a contributing factor for all four of those aspects. The knowledge gained from understanding the personal preferences for the use of technology sources and learning sources in the workplace can be part of the ongoing research in establishing the value of technology in education (Arnold & Paulus, 2010; Bao, Zheng, & Mokbel, 2012; Clayton, Blumberg, & Auld, 2010; Riding & Rayner, 2013; Woodcock, Middleton, & Nortcliffe, 2012).

Problem Statement

The life span in the United States in the 20th century has increased by 30 years (Bowman, 2010; Dychtwald, Erickson, & Morison, 2013; Singer, 2011). Consider this to be a longevity bonus that has made many social economic changes. Changes in the workforce demographics indicate for the first time in history there is a multigenerational workforce that includes four distinct social generations (Appel-Muelenbroek & Haynes, 2011; Kaifi, Nafei, Khanfar, & Kaifi, 2012; R. H. Stevens, 2010). Wide age spreads present significant challenges and barriers to businesses as they encounter issues pertaining to age bias and differing values and work habits among their multigenerational workforce (Lesser, 2006). The requirements for workplace continuing education are increasing every year and contribute to the success and viability of every company.

Workplace education creates a strategic advantage and it is critical for knowledge management to be deployed successfully within the dynamically changing workforce demographic. Understanding the diversity of learning styles and the preferences of adult learners for technology sources and learning sources is key to retaining organizational knowledge and fostering continuous improvement.

A one-size-fits-all approach for workplace education might have worked well in the past when a homogenous workforce was predominant. Today's multicultural, multigenerational workplace is characterized by high diversity (Jonsen, Tatli, Özbilgin, & Bell, 2013; Martín Alcázar, Miguel Romero Fernández, & Sánchez Gardey, 2013; Pitts & Wise, 2010). Understanding the preferences with respect to the workplace-learning environment can help to enable the workplace community to be both efficient and effective.

There is voluminous research on the topics of blended learning, learning motivation and generational worldviews (see Chapter 2), however there needs to be more discussion on employees and their preference for using technology sources and learning sources to accomplish workplace learning. Technology is outpacing the workplace and more emphasis on evaluating technology sources and learning sources is needed to address these changes.

The triangulation design method of this study provided insights to the workplace learning community about the technology sources and the learning sources available and the preferences associated with the multigenerational diverse workforce. The results of this study can be used to equip and engage the learning organization with insights to improve instructional design and deployment methods, resulting in improved efficiency, retention, and knowledge transfer.

Purpose of the Study

There is a large body of knowledge and research that helps to define and explain how learning occurs. There are many cognitive elements and many types of learning

which are independent of technology. With technology becoming more blended into modern pedagogy, a paradox of choice and preference for the use of technology is evident. These preferences might vary within the social generations. Understanding and identifying these preferences is the first step in a broader study of modern adult learning in the workplace. Two different qualitative instruments were used to study adult workers preferences in a modern workplace. The data from these instruments was triangulated with additional qualitative data extracted from semistructured interviews. The results provide insights that might improve the approach used to better equip the workplace-learning environment.

Research Methods

This study is nonpositivist using a triangulation design method. This method combines the analysis from three different data sources. The first survey is a pairwise comparisons instrument and is used to establish preferences for both technology sources and learning sources that are used in the workplace. Four categories of technology sources and four categories of learning sources were determined that were representative of the targeted learning environment of this large nationwide financial institution. The second instrument measures seven different dimensions of the learning organization's culture. It is a Likert-based survey and provided qualitative data to better understand the relationships between the learning organization score and demographic parameters such as gender, generation, educational level, and years of work experience. Detailed descriptive statistics are derived from this instrument.

Semistructured interviews provided additional details not acquired from the aforementioned instruments. The combination of data from the interviews and the instruments helped to formulate a more thorough reporting of the results, and a subsequent greater understanding and convergent view.

There were three stages of data gathering. The first stage collected demographic data and survey data from the short form of the Dimensions of the Learning Organization Questionnaire (DLOQ). This survey instrument presented 21 Likert-scaled questions that assessed the learning organization. Three questions were presented from each of the seven dimensions. These seven dimensions explore the learning culture in terms of Continuous Learning, Dialogue and Inquiry, Team Learning, Embedded System, Empowerment, System Connection, and Strategic Leadership. These dimensions are further discussed in greater detail in Chapter 4. Subject matter experts with prior survey experience with this sample population identified the appropriate type of demographic data needed to minimize survey fatigue.

The next stage of data gathering was independent of the DLOQ instrument. A pairwise comparisons instrument used in an earlier study of technology-based learning environments (Jones, Lin, Wright, & Rose, 2009) was modified and administered to establish students' preferences for technology sources and learning sources. This survey presented a list of four technology sources and a list of four learning sources. Instead of presenting all four choices at once for each category, six pairs were presented for each category. Four items result in six possible pairs for each category. The ranks for the preference for each of these two categories were determined from the votes given to

each of the six possible pairs. In addition to analysis using pairwise comparison, a second analytic method was used to identify any circular triads (CTs). CTs are formed whenever a participant selects inconsistent pairwise choices. The number of CTs was used as a measure of inconsistency for any particular participant.

The third stage gathered data from semistructured interviews. The candidates for this stage were determined by using purposive sampling based on representatives from the generational categories. The semistructured approach allowed for one interview with each candidate. The method of interviewing built rapport with the candidates and helped to obtain honest and open responses. Member checking was accomplished by sharing all of the findings with the participants involved. Their feedback helped to assure that the findings were authentic. The convergence of these three stages of data gathering helped to triangulate the findings and provide additional insights to better answer the research questions. Results from the semistructured interviews clarified and validated the learning organization culture information derived from the DLOQ. More details are presented in Chapter 4 regarding the descriptive coding process, which provided further analysis of the interview transcripts. No incentives could be offered to the participants. The code of ethics for the study population precluded the use of gifts or incentives according to legal, risk and compliance standards.

Research Questions

This section presents the research questions. There are three research questions. In this research, the term *adult learner* refers to people in the workplace, not in an

academic environment. Adult learners include a broad range of social generations.

Traditionalists represent those born before 1946. *Baby Boomers* (sometimes shorted to *Boomers*) include the population born between 1946 and 1964, *Gen Xers* represent those born from 1965 to 1980, and the *Millennials* (also called *Gen Yers*) were born from 1981 to 2000.

The four learning sources are:

- 1) *On Demand* - On-demand learning is online, self-directed, and self-study. The learner chooses from a wide variety of curated content (e.g., degreed.com).
- 2) *Live* - Live learning is instructor-led, whether delivered in-person or virtually (e.g., WebEx); the learner has collaboration and social engagement with others.
- 3) *Blended* - Blended learning is a mixture of on-demand and live educational experiences, not just one or the other.
- 4) *On The Job* - On-the-job learning refs to informal learning channels, not a structured course but instead job experiences and mentoring.

The technology sources are:

- 1) *Social Media* - Social media provides learning via YouTube, LinkedIn, Facebook, and so forth.
- 2) *Learning Hub* - A learning hub provides learning opportunities from a wide variety of curated content delivered by an LMS.
- 3) *MOOC* - MOOC stands for massive, open, and online courses that are offered free from universities and private entities.

4) *Basic Internet Search* - Google, Bing, and other Internet search platforms provide just-in-time info and job aids.

The three research questions that guided the current study are:

- Research Question 1. What is the preference for learning sources and technology sources by adults in the workplace for this limited population?
- Research Question 2. How does age, gender, educational level, and years of experience influence the overall score measured by the DLOQ for this limited population?
- Research Question 3. By using semistructured interviews, are there conceptual similarities that relate the DLOQ scores and the preferences for technology sources and learning sources for this limited population?

Value of the Study

How people learn as individuals, as teams and as an organization within a company can be the defining element of success and even survival. The workplace is a melting pot of diversity, social elements, generations, and technology. In addition to the many variables of the work place, the dynamics of change impose a challenge to creating the optimum learning environment. Understanding the culture of the learning organization and the preferences of the stakeholders with respect to the many learning sources and technology sources is essential.

This study is the preliminary assessment of the preferences and learning culture for a large financial services organization. It deals with a small sample of the overall organization and provides a qualitative descriptive analysis. It is a very important first

step in a much larger study. The output of this study could provide the initial foundation for the next phase of research. A follow-on study would provide a quantitative evaluation based on a random sample of the enterprise and might also include some additional qualitative (mixed methods) analysis.

The pace of technology advancement is not clearly recognized and assessed by the educational community at large or in the workplace. Technology is changing fast, however the rate of change needs to be better understood within the context of adoption by various social generations. The constructs of the mind of the Gen Xer and Millennial might be different in terms of cognition, social and emotional factors when compared to the mind constructs of the other generations within the workplace. Creating an awareness of diversity in the multigenerational workplace with respect to technology learning environments is very important in order to retain and share organizational knowledge in the workplace. This study is designed to provide valuable insights to better understand the importance of personal preferences and their effect on learning in a multigenerational workforce.

Assumptions

This study has been designed with a number of personal and phenomenological assumptions. The following conclusions are taken from tacit knowledge and are based on the personal experiences of this researcher that were gained during previous investigations utilizing a similar strategy for discovery.

The categories, which define the learning sources and technology sources in the survey, are assumed to be understood by the participants. The four technology sources

and learning sources were determined by interviewing many senior leaders in charge of learning and development at the financial institution.

The instruments used for variance rank sum analysis (RANKO and TRICER) are valid and reliable since they have been used successfully in a number of research studies. Also, the instrument used for measuring the seven dimensions of the learning organization DLOQ is assumed to be both valid and reliable since it has not been modified. Confidence in the use and repeatability of these two instruments is a major factor in the outcome of this study.

The expectation was that all of the participants would provide their honest opinion in answering the preference surveys and the learning culture survey. Every effort was made to establish a trusted relationship with the participants by ensuring a very high level of privacy, which eliminates any potential concerns for outside reprisal or interference.

This study is nonpositivist by design and there is no hypothesis or predicted outcomes. The results were derived from the triangulation of data from three different stages of data gathering and analysis. The framework of this triangulation approach is purely constructivist and builds upon previous knowledge and experience of similar research.

Limitations

Participants in this study are all from the same workplace environment and culture, so there should be no attempt to generalize these findings. The objects chosen for the preference evaluation were determined by the organization and may not be

totally representative of the preferences of the participants. The definitions of the items used in the preference ranking survey might not be clearly understood by all participants.

It will be the responsibility of the readers of this study to determine how to best use the information contained in this study with regard to their own personal educational contexts. This study was performed for the benefit of the organization involved with the intention to establish a high-level cursory assessment that might be used as a foundation for a more in-depth follow-on quantitative study. This research is limited to knowledge workers such as data analysts, product developers, planners, programmers, and researchers who are engaged primarily in acquisition, analysis, and manipulation of information, as opposed to production of goods or services. As such, it does not include any industrial and labor-intensive workers.

Summary

In this chapter, a syllogistic deduction was established. Technology is growing at an exponential rate. Preferences for technology sources and learning sources impact the learning organization. The culture of the learning organization is subject to tremendous dynamics and change. Investigating personal preference for technology sources and learning sources can help define some of the dimensions of the learning organization. The research questions are presented and positioned with respect to gaining better insights about the workplace learning culture. The next chapter presents a literature review that covers a few important topics associated with this research. The literature review supports the importance of this study. The literature review is used to explain

the modern workplace environment and the complexities of technology change, gender diversity, and working within a multigeneration workforce. From the first topic, the literature review moves to address the personalized aspect of the learning culture and addresses motivation, lifelong learning and career pathways. The final topic of the literature review brings attention to the learning sources and technology sources and their prevalence in the modern work environment.

CHAPTER 2

REVIEW OF RELATED LITERATURE AND THEORY

This chapter presents a discovery and fresh perspective on the modern workplace. The workplace has changed in recent times and would be unrecognizable today from a visitor of thirty years ago. Everything has changed from the work location (commuter and telecommuter), the people (ages, gender, and educational experience), benefits (healthcare and retirement), employment terms (contractor, part-time, job sharing) and most certainly technology. All of these factors contribute to the philosophy and culture associated with working in modern America. The modern workplace is built upon choices and personal preferences. These individual preferences collectively constitute a philosophy and personal point of view. The literature review covers three major topics and helps to address the research questions and identify the gaps in understanding the challenges that exist today in the modern workplace. The three topics are interrelated and not mutually exclusive. The topics are the modern workplace environment, learning perspectives, and workplace learning resources.

The first topic of this literature review introduces the modern workplace environment from the perspective of technology, multigenerational make-up and the gender diversity. The second topic of this literature review addresses the individual point of view and perspective of an adult workplace learner in terms of motivation, lifelong learning, and career pathways. New skills and competencies are required to succeed in a fast changing workplace. Insights to the various learning perspectives, motivation factors, and views on lifelong learning are reviewed. The third and final topic

of the literature review provides a cursory overview of learning sources and technology sources. Determining the preferences of these sources is a fundamental element of this research study. Learning sources include the topics of On Demand, Live, On The Job, and Blended Learning. Technology sources include the topics of Social Media, MOOC, Internet Search, and Learning Hubs.

This literature review is used to identify the modern day workplace environment and to emphasize the importance of understanding the culture of the learning organization and the personal preferences associated with a learning organization. Identifying personal preferences helps to focus attention to defining and determining individual, team, and organizational and global learning paths. As such, these three topics are put forward so that the reader may better interpret and understand the need for this research and subsequently benefit and utilize the results appropriately.

Modern Workplace Environment

The workplace environment is more complex and specialized than ever before. For the first time in history, the workforce in the United States is represented by extreme diversity. A dynamic age range crossing four generational categories is now in place and growing. Sexuality, racial, and gender equality initiatives have helped to create an increasingly supportive workplace that involves embracing differences. Technology changes that promote mobility are another powerful change agent.

A postwar historical review of the workplace reflects the many changes that occurred in transitioning from an industrial based economy into a knowledge-based economy. "Women in the Workplace" author Gini (1998) indicates that the single most

important event in the American labor market in the 20th century was the unprecedented entry of a large number of women into the workforce.

There is a tremendous amount of literature that covers the modern workplace environment. Three topics are presented in this section to emphasize one compelling element of the workplace environment—change. The rate of change taking place in the work place is very disrupting (Christensen et al., 2004). Technology, a multigeneration workforce, and gender diversity are used to illuminate the need to understand the value of creating an appropriate workplace learning environment.

Technology Change

The most significant factor associated with change, it the rate of change associated with technology. Technology change is exponential. Stating that it is exponential is an understatement. Exponential change is disruptive no matter where it happens. Humans are not accustomed to exponential change. The impact of rapidly changing technology in the workplace can be positive and accelerate business development or it can be disabling when ignored. A business process that was defined five years ago can become obsolete in a short period of time. There are many examples of new technology that change the competitive landscape. Representative examples include payment systems that no longer require paper (checks, invoices), customer management systems that are entirely based on mobile technology (virtual customer support centers), computing that no longer requires dedicated data centers (cloud computing), cars that no longer need drivers, and virtual learning environments that no

longer require on-premise attendance (Koulayev, Rysman, Schuh, & Stavins, 2016; Mell & Grance, 2011; U.S. Patent No. 9,294,62, 2016; Waldrop, 2015).

Keeping the organization current on these types of changes is no longer optional, but instead becomes table stakes to the current and future success of the company. It is easy to ignore the rate of change of technology and dismiss it as just another fad or a cute idea. It is also easy to ignore the rate of change and not seriously evaluate the impact it can have on the workplace. Efficient, user-friendly learning methods are required in order to adopt and integrate technology into the business process (Masud & Huang, 2012). Not only is learning required to introduce new information and business processes, but it is also required in order to sustain and maintain the historical and current knowledge base. A knowledge-based economy requires the preservation and protection of intellectual property. The fast pace of change in business requires a philosophy of staying current with new information and new technology. In the new millennium, there is a voluminous amount of new information made available on a daily basis, which requires new skills and new technology.

Infotoxology (Kaiser, 2000) is a term used to describe what happens when an overflow of information is no longer properly managed. Without proper filtering and personal selection, the content becomes overwhelming and unmanageable and instead of being helpful, it becomes toxic.

The literature review provided for this first topic is not exhaustive and complete but should be sufficient to identify the need to address workplace learning differently. The reason the workplace is being reviewed is to simply acknowledge that it is not a

steady, well defined constant, but instead a very dynamic variable that reflects the demographic, social, technical, and personal interest of the workers. The workplace offers many choices today and these choices are quite often based on the preferences of the workers and are often a component of the overall career decision making process and competitive battle for talent.

Multigenerational Adult Workplace Learners

A lot has been written on the diversity of the workforce with respect to multigenerational workers. Four categories have been defined: (a) Traditionalist, (b) Boomer, (c) Gen Xer and (d) Millennial. The name assigned to the generation following Gen Y would naturally be called the Z generation. To represent each of these generations within a timeframe creates segmentation based on age. To assume that each of these segments is homogenous in terms of social, education and technology usage would be in error. There are certain profiles and assumptions that can be established as general guidelines, but there is a great deal of diversity within each of the segments (Madera, Kapoor, Kapoor, & Solomon, 2011; Williams, Page, Petrosky, & Hernandez, 2010).

The term digital native and digital immigrant has been used to help differentiate the adoption and usage of digital technology within the generations. A digital native defines a person who has lived entirely in the era of digital technology. Digital technology takes on a broad scope of products, services, and content. Digital natives have been exposed to computers, smart phones, electronic media, and the Internet along with a variety of digital recording devices for music and video. These items have

been a consistent part of the digital native's life experience to some degree. A digital immigrant defines a person who has arrived into the world of technology but has a background that was not heavily influence with modern digital technology.

To assume that any generational segment had equal access to and usage of digital technology would be in error. Also, to assume that a digital immigrant is not as technically savvy and familiar with technology to the same degree as a digital native would be in error, too. It would be safe to assume that those who have used digital technology will have a different knowledge base and familiarity than those who have not been using the technology throughout their life. To assume that each generational segment has a strict homogenous profile would be a misread. However, there are characteristics from this diverse workforce that can be identified and provide insights that are representative of their interest. A Traditionalist or Boomer might have the same affinity and adoption of technology as a Millennial.

We do not want to assume an age category for digital natives and digital immigrants but instead let the research data better define who can be defined by those categories (Thompson, 2013).

In the workplace, there is a different culture for those who use technology as their primary method of communication and social interaction and for those who do not. Providing workplace learning to a diverse workforce is not a simple matter of providing the same method of learning to all participants, but instead understanding the learning preference and technology preference of the various generational segments.

Within a multigenerational workforce, there is a legacy of information and experience that has historical and intellectual value. Haynes, Erlich, & Bichard (2008) indicate that with the first wave of postwar Boomers now retiring, it is now accepted that many knowledge workers are older with a working lifetime of experience and expertise that may be lost. Drucker (2001) states,

Within 20 or 25 years, however, perhaps as many as half the people who work for an organization will not be employed by it, certainly not on a full-time basis. This will be especially true for older people. New ways of working with people at arm's length will increasingly become the central managerial issue of employing organizations, and not just of businesses (p. 1).

It is important to understand how to educate the workforce and maintain the organizational intellectual property. There are a lot of factors to take into consideration with a multigenerational workforce. Best practices need to be preserved and communicated to the next generation workforce and new technology needs to be shared with those who are not familiar and comfortable with its usage. The intellectual fidelity of a knowledge based workforce walks in and out of the door every day. The workers have become human capital. Investments in human capital need to be made in order to secure the integrity of the work environment.

Gender Diversity

Another significant change in the workforce is gender diversity. Women's participation in the workforce has greatly expanded since the end of World War II. Immediately following the war less than one third of women were in the labor force (Glass & Kilpatrick, 1998). By 1999, women reached the peak of their labor force participation at 60 percent. In addition, women have increasingly attained higher levels

of education: among women ages 25 to 64 who are in the labor force, the proportion with a college degree more than tripled from 1970 to 2012 (Autor & Wasserman, 2013).

Male labor force participation rates in the United States have been in steady decline since at least 1950 while women's labor market participation steadily rose before leveling off about a decade ago. MIT economists Autor & Wasserman (2013) write,

It is widely assumed that the traditional male domination of postsecondary education, highly paid occupations, and elite professions is a virtually immutable fact of the U.S. economic landscape. But, in reality, this landscape is undergoing a tectonic shift. Over the last three decades, the labor market trajectory of males in the U.S. has turned downward along four dimensions: skills acquisition; employment rates; occupational stature; and real wage levels.

There will continue to be shifts in the workforce in the future. The fastest growing population in the USA today is 65 and over (Dychtwald et al., 2006).

Learning Perspective of Adult Workplace Learners

The second topic of the literature review is related to the learning perspective of the adult workplace learner. This topic review motivational factors, the longevity bonus and career pathways available for the lifelong learner.

Motivation

Paying attention is one of the pillars of cognition (Elieson, n.d.). Motivation is a key factor in wanting to pay attention. Motivation has been studied at length over an extended period of time and many different theories have been developed and built upon. Motivation has been a factor in the learning process and will continue to have an impact on how we learn in the modern workplace (Ahl, 2006; Gegenfurtner & Vauras, 2012; A. R. Jones, 2013; Leen & Lang, 2013; Wlodkowski, 2011). This section reviews five

established theories on motivation (Sandilands, 2010) and also reviews some recent research that is relative to learning in the workplace. Understanding what motivated employees and how they were motivated was the focus of many researchers following the publication of the Hawthorne Study (S. R. G. Jones, 1992). The Hawthorne study was a study of workplace behavior at a Western Electric plant in the 1920s and 1930s, which claims the results of a study, can be altered by the participant's awareness that they are being studied. Lindner (1998) references the five major approaches that have led to our understanding of motivation. They are Maslow's need-hierarchy theory, Herzberg's two-factor theory, Vroom's expectancy theory, Adams' equity theory, and Skinner's reinforcement theory (Lindner, 1998; Terpstra, 1979).

The theory of a hierarchy of needs devised by (Maslow, 1943) states that all humans have five levels of needs. These are, from lowest to highest: physiological, safety, social, ego, and self-actualization. He theorized that each level of need must be met before the person can begin to focus on the level above. For example, physiological needs such as food, water, and shelter must be met, followed by personal safety, for the human to think about social activities. According to Maslow, once a person can begin to focus on ego and self-actualization, which are the levels that apply to the workplace environment, that person can be motivated by incentives that speak to those needs (Lindner, 1998).

The two-factor theory (Herzberg, Mausner, & Snyderman, 2011) divides motivation into two categories, which are referred to as motivating factors (achievement and recognition) and maintenance factors (compensation and job

security). The dual-factor theory was based on research finding that suggested man has two sets of needs: his need as an animal to avoid pain and his need as a human to grow psychologically (House & Wigdor, 1967). This theory suggests that the motivating factors are part of the work, and independent of the other factors.

The expectancy theory (V. Vroom, 1995) works on the assumption that workers are motivated by the expectation of success and that motivation is proportional to the level of expectancy. In the workplace, management needs to understand and provide the necessary items to allow workers to achieve success. This enables workers to feel more positive and subsequently positivity is motivational. The preference for learning sources and technology sources should be considered by management as necessary items to achieve success.

Going further with (V. Vroom, 1995), he states,

In choosing to deal with the interrelationship of work and motivation, we are selecting for examination both the effects of motivational variables on persons' behavior in work roles and the effects of work roles on motivational variables.

In V. Vroom's book, *Work and Motivation*, he integrates the work of hundreds of researchers and identifies three phenomena within this general field of inquiry.

- The choices made by persons among work roles.
- The extent of their satisfaction with their chosen work roles.
- The level of their performance or effectiveness in their chose work roles

(p. 8).

(V. H. Vroom, Deci, & Simon, 1970) realized that an employee's performance is based on the individual's factors such as personality, skills, knowledge, experience, and abilities. Once again preferences should be included as part of the individual's factors.

The equity theory of John Stacey Adams (Swinton, 2006) is based on the concept of fair treatment and the ways in which it helps to motivate workers. It takes into account the inputs and outputs in the work environment, and their effect on worker motivation. The Adams equity theory model therefore extends beyond the individual self, and incorporates influence and comparison of other people's situations—for example colleagues and friends—informing a comparative view and awareness of Equity, which commonly manifests as a sense of what is fair. The DOLQ addresses both the Vroom and Adams findings. When people feel fairly or advantageously treated, they are more likely to be motivated, and when they feel unfairly treated, they are highly prone to feelings of disaffection and demotivation. The way that people measure this sense of fairness is at the heart of equity theory. Fair treatment in terms of satisfying the preference for learning sources and technology sources can contribute to the motivation of the individual and also the team and the larger organization.

Skinner's theory simply states that those employees' behaviors that lead to positive outcomes will be repeated and behaviors that lead to negative outcomes will not be repeated (Skinner, 1953). Managers should positively reinforce employee behaviors that lead to positive outcomes. Managers should negatively reinforce employee behavior that leads to negative outcomes. According to (Skinner, 1953),

When we reinforce a response and observe a change in its frequency, we can easily report what has happened in objective terms. But in explaining why it has

happened we are likely to resort to theory. Why does reinforcement reinforce? One theory is that an organism repeats a response because it finds the consequences “pleasant” or “satisfying.” (p. 81)

If learning is pleasant or satisfying, then it becomes reinforced and subsequently a favored routine which benefits the individual, the team and the larger organization. If learning is mandated and not satisfying, the negative factors are reinforced and it becomes detrimental to the learning organization. Learning should provide value to the individual and contribute to their life’s interest in some form or fashion, or else it is rejected.

The basic theories of motivation were presented in order to help establish a framework that can define some of the key human elements of motivation. However, these elements, at best, help to formulate an understanding of motivation. It is clear that motivation is a very personal matter and as such is part of the personal preferences associated with learning. Additional review of the literature would provide more detailed perspectives on motivating adult learners. The next component of this topic addresses lifelong learning and the longevity bonus.

Lifelong Learning and the Longevity Bonus

It is best to start this with the longevity bonus. The longevity bonus is foundational to the concept of lifelong learning. If you do not believe you are going to have a long and fulfilling life, then it may not make sense to pursue a goal of extending your learning. The timeframe that has been historically established for life expectancy and the age of retirement is no longer valid. The age of old is being redefined. The longevity bonus has increased life expectancy thirty years from the beginning of the 20th

century through the end of the 20th century (Saharia, 2014). The question that each generation has to answer is how do they want to spend their longevity bonus? There are many options to incorporate the longevity bonus. Instead of working to the legacy retirement age and then having thirty years to play golf or leisurely travel, another pathway can be established. Options included designing a career that has time gaps for continuing education, new career pursuits, community service, and philanthropic involvement. We are going to have longer lives than what we have been conditioned to believe. There is a plethora of supporting evidence that confirms the longevity bonus.

The longevity bonus not only restructures our private personal life but also starts to redefine the workplace and the period of time that we are gainfully employed. The concept of lifelong learning becomes very relevant. Earlier, it was discussed that technology is changing at a very fast pace. In order to keep up with modern day business development, it will be necessary to be actively involved in continuing education both inside and outside the workplace. Businesses are interested in providing resources and guidance for continuing education. They also have programs in place to supplement the cost of continuing education. A well-educated workforce presents a competitive advantage and also enables a more efficient, safe and healthy work environment. The next two topics address four popular learning sources and four popular technology sources. These sources were used to determine preference for this study, so the literature review provides insights to the selection of the choices.

Career Pathways

This literature review is intended to share a story and guide the reader to a path of understanding the importance of this research. The review started by addressing the workplace environment and examining technology change, the growth of the multigeneration workforce and the increase in gender diversity. The focus then shifts away from the work environment to the individual. Individual needs are examined from the lens of motivation, lifelong learning, and career pathways.

The reason career pathways is so important is because it ties together all of the elements that define the dimensions of the workplace. Success for the company and for the individual can only be found if there is a pathway to use and apply what you learn and know. In the past, a career pathway would be perceived as predictable, secure and linear but today it is viewed as being more dynamic, unpredictable and multidirectional (Baruch, 2004). The idea of working for the same company for your entire life is an extreme idea. The world is more complex (Baruch, 2006) and is going through fast changes and becoming boundaryless (Ashkenas, Ulrich, Jick, & Kerr, 2015), global (Bartlett & Ghoshal, 1989) and competitive (M. E. Porter, 1998).

The term *boundaryless career* (DeFillippi & Arthur, 1994) implies that the career is not on a single path with a single employer but may go in many different directions. Examine the career path of many Boomers and Gen Xers that have been redefined with right sizing, downsizing, and technology changes to see that not only did employers change but even occupations have changed as well. The notion of the traditional career contract is no longer the norm.

The *Protean Career* is a shift from the traditional organizational career to one that the individual owns and directs (Hall, 1976, 1996, 2004). Hall (1976) described it this way,

The Protean career is a process which the person, not the individual is managing. It consists of all the person's varied experiences in education, training, work in several organizations, changes in occupational field, etc. The protean person's own personal career choices and search for self-fulfillment are the unifying or integrative elements in his or her life. (p. 201)

The word *protean* is adapted from the mythical Greek god Proteus who had the ability to change his form at will.

The element of a protean career is found in the seven dimensions of the learning organization and becomes a key connecting point in this research. The literature supports the growth of the protean career. The self-directed, individually owned career development is evident in the millennial philosophy of work engagement (Pardue & Morgan, 2008). Career is now being evaluated in terms of making a contribution to society and maintaining work-life balances and are shaped by observational and experiential learning (Sargent & Domberger, 2007).

Since the protean career is made up of personal preferences and choices, it makes sense that some of the most important choices will include the learning and technology sources that will enable the self-directed career pathway. This leads to the final and most important topic of the literature review, which is the learning sources and technology sources that are available today.

Learning Sources and Technology Sources

This study evaluates the preferences of four learning sources and four technology sources. Understanding these preferences is a key factor to a number of other elements associated with the learning culture. You can imagine how the choice of technology and the choice of learning sources can affect your relationship with multigenerational workers, your motivation, and your career path. These choices are interrelated to the seven dimensions of the learning organization. Think about how these choices might affect your teamwork and collaboration, your dialogue and inquiry and your systems that connect your learning environment. A review of a few of these technology and learning sources is in the next section.

The learning sources are On The Job, Blended, On Demand, and Live. The technology sources are Social Media, MOOC, Internet Search, and Learning Hub. Each of these topics is extremely large and could become expansive literature reviews on their own. Both learning and technology sources have broad expression into many disciplines, so the goal of this evaluation is to make them relevant to workplace learning. The top two learning sources, On The Job and Blended, and the top two technology sources, Internet Search and Learning Hub, are reviewed.

On The Job Learning

On-the-job learning is most relevant to the workplace. (Berings, Poell, & Simons, 2008) state, “according to the literature the most significant source of employee learning in addition to formal training and education are the challenges of work itself and interactions with other people in the work place” (p. 1; Eraut, 2004; Eraut, Alderton,

Cole, & Senker, 1998; Poell, Van Dam, & Van Den Berg, 2004). Since on-the-job learning is important, the question of much research is making employees aware of their learning styles and how to improve. (Berings, Poell, & Simons, 2005) indicate that on the job learning is represented by the four styles: (a) task-driven versus innovative (b) social (Dunn, Beaudry, & Klavas, 2002)—which means either alone, from others, or with others, (c) holistic (broad view) versus analytic (detailed view) and (d) reflection (Dunn et al., 2002). Reflection is an important learning style and is one of the three pillars of learning, following attention and association (Elieson, 2013).

There is a long history of adult learning theory. (Cyr, 1999) gives a history from the 70s to 2000 and refers to the attempt by (Knowles, 1973) to establish andragogy as a theory for self-directed adult learning. Andragogy is a theory of learning for adults as pedagogy is a theory of learning for children. From andragogy to heutagogy (Hase & Kenyon, 2000) defines a method of self-determined learning, which aligns well with the concept of a protean career. In the modern work environment where more control is being established for the individual, the potential for new methods of learning is high. On the Job was a top preference for this learning organization. A lot has been written about working conditions, resources, and challenging work, working relationships that stimulate on the job learning (Koopmans, Doornbos, & Eekelen, 2006).

Blended Learning

Blended learning combines both live and on-demand delivery systems. All of the learning sources find expression in the technology sources. The terms blended and hybrid learning are often used interchangeably (Bernard, Borokhovski, Schmid, Tamim,

& Abrami, 2014; Means, Toyama, Murphy, Bakia, & Jones, 2009; Moskal, Dziuban, & Hartman, 2013) However, the term blended learning seems to be gaining prominence in the literature. While there are many different definitions of blended learning, it is often viewed as a distinct subdivision of technology integration because it involves a systematic integration of online teaching practices into a face-to-face class environment (Bliuc, Goodyear, & Ellis, 2007).

Some definitions refer to the degree of technology integration: “In the simplest form blended learning is a mixture of physical classroom activities and learning activities supported through online technologies” (Carbonell, Dailey-Hebert, & Gijsselaers, 2013, p. 29). Vaughan and Garrison (2005) say this about blended learning,

Blended learning designs reach beyond the benefits of convenience, access and efficiency. The true benefit of blended learning is in integrating face-to-face verbal and online text-based exchanges and matching each to appropriate learning tasks (p. 4).

While others delineate very particular characteristics, the definition of blended learning is a formal education program in which a student learns: (a) at least in part through online learning, with some element of student control over time, place, path, and/or pace; (b) at least in part in a supervised brick-and-mortar location away from home; (c) and the modalities along each student’s learning path within a course or subject are connected to provide an integrated learning experience (Christensen, Horn, & Staker, 2013).

(Keengwe & Kang, 2013) describe key elements of blended learning environments including learning communities developed through online discussion tools, teacher-created and technology enhanced educational products as well as

commercially generated products. Examples of online teaching practices that may be appropriate for blended learning environments include the use of an LMS, software-based skill development programs, (e.g., accounting and language development), and simulations (e.g., medical courses).

There are many different definitions of blended learning according to (Driscoll, 2002), “The point is blended learning means different things to different people. This may appear to be an academic point but in reality these definitions illustrate the untapped potential of blended learning.” The point being made is that blended learning has not quite found a singular and compelling meaning but is leveraging some existing technology. Driscoll (2002) goes on to say,

It is not surprising that blended learning solutions are a great way to initiate an organization into e-learning. Using blended learning benefits the learner, the training staff, and the organization's bottom line. Blended learning allows organizations to gradually move learners from traditional classrooms to e-learning in small steps making change easier to accept.

Internet Search

The general population has transformed the idea of searching online into a verb—“Google” it. Wikipedia states the following,

The transitive verb to google (also spelled Google) means using the Google search engine to obtain information on the World Wide Web. However, in many dictionaries the verb refers to using any web search engine, such as Yahoo! or Bing.

Internet Search showed up as a technology source for this study as a top preference. The semistructured interviews also indicated that Internet Search was used persistently in on-the-job learning. Google has been a public company for a dozen years at the time of this writing. In that period of time, people have become more dependent on search

engines to answers to everyday and work related queries. Worldwide, 95% of mobile users prefer Google's search engine and 70% of desktop computer users prefer Google, according to Netmarketshare.com. Bing and Yahoo come in second and third place respectively.

The literature supports the adoption of search tools as a primary method to accomplish finding information and troubleshooting problems. Internet self-efficacy and computer use is perhaps intuitively obvious (Eastin & LaRose, 2000). Psychologist Albert Bandura has defined self-efficacy as one's belief in one's ability to succeed in specific situations or accomplish a task (Bandura & Cervone, 1986). Over the years, the search engine has proven itself to be an element of success in quickly finding answers to queries. (Liaw & Huang, 2003) find that the more individuals enjoy using search engines, the more they will believe that search engines are useful tools for searching information.

(Corritore, Kracher, & Wiedenbeck, 2003) identify three perceptual factors that impact on-line trust: perception of credibility, ease of use and risk. It is almost assumed to often that when you find something on the Internet it is true. Over time, the trust factor and credibility has been reinforced (Corritore, Marble, Wiedenbeck, Kracher, & Chandran, 2005). Advancements are taking place to include goals as part of the search process (Rose & Levinson, 2004). Knowing why you are searching for your particular information can make the search process results more meaningful. Navigation that allows for easy reformulation of follow-on searches is another key area of improvement.

(Zhang, Jansen, & Spink, 2006) indicate that studies, which reveal search tactics and the searcher's online behavior, could benefit search engine developers.

The Socrates Minerva Program project SEEKS: Adult Learners' Information Seeking Strategies in the Information Society ((Barajas, Higuera, Jones, & Miller, n.d.) gathered comprehensive data on the information seeking behaviors of adult learners. Key factors in using a Web site included reliability, speed, trust, and confidence. The workplace research on Web search behavior (Hsieh-Yee, 2001) indicated that Internet users ranked searching as the most important activity giving it a 9.1 on a scale of 10. In line with the exponential growth of technology, Internet Search will continue to advance and maintain a crucial role in workplace learning (Rastogi, 2016).

Learning Hub

The *learning hub* is a formation of managed content that can offer customized learning pathways and support a continuous learning culture. The learning hub supports the protean or boundaryless career path ideology. It includes on-demand learning, which is online and self-directed. The learning hub concept also includes curated content: LMS, podcasts, live events, MOOCs, video, online courses, audio books, and a variety of other new media. You can choose from a wide variety of curated content.

The learning hub is designed to support the use of mobile devices. This is important because mobile devices and applications have become culturally accepted within the workplace as part of ordinary work life of the professional (Fuller & Joynes, 2015). Workers today want to choose what is relevant to their job and their industry.

The old methods may not be the best methods since technology infusion and social changes caused by globalization calls into question the effectiveness of traditional methods of knowledge transfer to meet the demands of just in time learning requirements (McLaughlin-Graham & Berge, 2005).

The Internet is delivering high-quality learning via YouTube, TED Talks, MOOC, and corporate content. According to (Mihai, Vlad, & Radu, 2015), e-learning technologies that are widely used in MOOCs include: (a) high-quality indexed video; (b) data capture and analytics; and (c) delivery platforms that combine the qualities of social networking sites like Facebook with the content delivery, discussion, and grading functions of the traditional LMS. The options for learning have increased and now provide literally millions of ways to learn, from a diversity of sources over an extended lifetime. The learning hub is a concept that provides a dynamic range of methods, content, timing, and convenience.

Summary

The literature review had three major topics and started with a focus on the workplace environment, which included technology, gender diversity, and multigeneration workforce. It then shifted to the individual to review motivation, the longevity bonus and career pathways. The first two topics laid the foundation to address the importance of learning preferences and technology preferences. All of these topics reinforce the importance of individuals taking charge of their learning and being actively involved in many choices that affect their lifelong learning goals.

The next chapter reviews the strategy for inquiry, provide information about the participants, and provide details on the methods for data collection and analysis for all three sets of data, learning and technology preferences, DLOQ cultural data, and semistructured interviews.

CHAPTER 3

RESEARCH METHODS

This study is nonpositivist and descriptive. It is based on a triangulation design method. Triangulation is broadly defined by Denzin (1978) as, “The combination of methodologies in the study of the same phenomenon” (p. 291). Triangulation is part of a strategy to improve validity since various data sources should converge and provide a better understanding (Jick, 1979). Mathison’s (1988) notion of triangulation is, “Typically, through triangulating we expect various data sources and methods to lead to a singular proposition about the phenomenon being studied.” Miles and Huberman (1984) put it this way, “Triangulation is supposed to support a finding by showing independent measures of it agree with it or at least don’t contradict it” (p. 235). The value of using this method goes beyond finding common insights; it also provides a way to better understand when differences occur and why they occur.

Denzin (1978) outlines four kinds of triangulation: (a) data triangulation, (b) investigator triangulation, (c) theory triangulation, and (d) methodological triangulations. This study used the data triangulation method, which simply means using multiple data sources. This research approach draws from and unites the analysis from three different data sources: (a) preference survey, (b) DLOQ instrument, and (c) semistructured interviews.

The research methods used in this study are categorized as mixed methods and include both quantitative and qualitative methods. There is much debate about mixed methods research terminology suggesting that quantitative and qualitative will present

the best of both worlds. In contrast, (Giddings, 2006) argues the use of these terms reinforces their binary positioning and marginalizes the diversity of each and tries to diminish the positivist approach and establishing mixed methods to become the preferred method.

This study does not engage in this epistemological argument, but instead supports the non-positivist approach and recognizes the value of each element of the triangulation method. In order to clarify the methodology, additional insights are provided in a cursory fashion below and with much more detail in Chapter 4 (Data Analysis) of this study.

Preference Survey

The preference survey approach uses a pairwise comparison to create a unidimensional scale representing values for each object. A detailed history, evolution technical application of this method is provided in Chapter 4 (Data Analysis). A proprietary qualitative tool, RANKO, is used in conjunction with a circular triad (CT) tool, TRICER. CT analysis is useful to determine “object scalability and overall judge consistency” (Dunn-Rankin, Knezek, Wallace, & Zhang, 2014). This analysis can indicate the quality of the judges and allow for further refinement of the data by removing either the judges or possibly the objects if they are causing confusion. Determining the preferences for the technology sources and the learning sources was very important information on its own, but using the triangulation method, the preference data was also used to better understand the culture of the learning organization that came from the DLOQ instrument.

DLOQ Instrument

Contributing to the mixed method approach is the quantitative instrument, Dimensions of the Learning Organization Questionnaire. The DLOQ provides Likert type data that can be quantitatively analyzed using both parametric and non-parametric tools, depending on the category of demographic data. In this study, the demographic data was primarily categorical and not continuous, which supported non-parametric and descriptive analysis. In a reciprocal approach, the DLOQ data has great value standing on its own, but also provides valuable insights to the preference data. The triangulation approach provided insights to preferences based on the learning culture exposed in the DLOQ. These insights are detailed in Chapter 4 (Data Analysis).

Semistructured Interviews

The third component of the triangulation approach is the qualitative information that was provided by the semistructured interviews. The ability to ask more detailed questions about preferences and the seven dimensions of the learning organization was most important. The semistructured interviews provided confirmation and clarification, when needed, of the other two instruments. This process helped to minimize assumptions. The mixed methods approach may become more quantitative in next phase of this research, but for the initial strategy of inquiry, it provided a holistic view of the research questions.

Strategy for Inquiry

There are two phases of data gathering. The sequence of the data gathering is important. The first phase used a compound survey, which included preference questions for both learning sources and technology sources along with the DLOQ. This survey also included questions to gather some very specific demographic information. The DLOQ portion of this survey gathered answers to 21 questions from the short form DOLQ instrument. The DOLQ instrument used a six-category Likert-based format to generate a score for seven different dimensions of the learning organization's culture. The DLOQ is a qualitative tool. Categorical demographic data for age, gender, years of work experience and level of education was used to provide high-level descriptive results in conjunction with this instrument.

Data from the preference questions were processed with a pairwise comparison instrument to establish preferences for both technology sources and learning sources that are used in the workplace. The output of the pairwise comparison instrument provided a linear plot of scale scores derived from the number of votes recorded in the survey. CTs indicated the transitivity of preferences (Bauer, 1978; Davis, 1958). The details of the analysis of the pairwise comparison instruments are covered in Chapter 4 (Data Analysis) of this study.

The second phase of data gathering used semistructured interviews. A purposive sample was established for the interviews based on the data acquired in the first phase. More details of the purposive sample are covered in Chapter 4 of this study. The combination of data from the interviews and the instruments was used to formulate a

more thorough reporting of the results, and a greater understanding of the learning culture and convergent view of the preferences. All stages of data gathering were managed in accordance with the Institutional Review Board guidelines established by the University of North Texas (See Appendices A and B for the relevant documents).

Participants

The participants in this study all work for a large financial institution and are considered to be knowledge workers. This company has in excess of 200,000 employees and is headquartered in the United States. The primary reason for selecting this company is the diversity of their demographics. The organization also has well-defined workplace learning and performance measurement systems in place for their employees. The company invests and makes strong commitments to workplace learning and was interested in better understanding the learning preferences of their employees. For the purpose of supporting this study, the company provided access to senior learning and development managers who were willing to provide experienced subject matter experts familiar with similar research projects.

All of the employees have access to the Internet and have email addresses that can be used for communication and to easily schedule meetings. The population was distributed throughout the United States. The demographics covered appropriate representation of gender, ages, education level, and years of service.

An email invitation, which described the research project and the pertinent details of the informed consent, was sent to 50 employees within a diverse segment of the population. The recipients were asked to participate and were also asked to extend

the email invitation to five other colleagues in different parts of the organization. The Survey Monkey link provided access to the survey. The survey included a link to the informed consent form (see Appendix B) so the participant could agree and continue or decide not to participate. Survey Monkey is rich with features to keep track of when responses come in. In a period of two weeks, there were 108 responses. Eight of those who responded left the survey after completing the preference component but before completing the DLOQ portion of the survey. Those eight respondents were eliminated from the final data, which resulted in a total of 100 participants. Organizational policy prohibits the use of incentives to participate in research. This population is asked to voluntarily participate in surveys on a regular and consistent basis so not providing an incentive was not a problem.

Methods for Data Gathering and Analysis

At a high level of understanding, the research project encompassed three phases: preparation, data collection, and data analysis. Each of these methods is further explained. The data collection and data analysis are presented together for each of the three data sources used in the triangulation.

Preparation

The preparation was the most important element of this research. The goal was to identify a research problem that could be defined in terms of an initial assessment. This study is considered to be the first phase of a larger and more meaningful study. In order to properly define this study and fine tune the research questions, subject matter experts within the learning organization were identified and interviewed. Eight different

interviews took place with the subject matter experts to collectively define the goals of the study and to identify the instruments and demographics.

The next step in preparation identified the methodology. Instead of choosing a random sample from the population and gathering continuous data for a quantitative analysis, the decision was made to perform a high-level descriptive qualitative study. A triangulation method was used to create different views of the data. This method provided results that were used in defining future quantitative and mixed method studies.

Data Collection Overview

Web survey methodology was used for the combined DLOQ and the preferences survey. Web surveys are becoming increasingly popular (Dillman, 2011; Porter & Whitcomb, 2003). It was practical to use a Web survey since it saved cost and time for data collecting. The Web survey was environmentally friendly and eliminated the use of paper and postage. Participation in the Web survey was convenient for the participants and significantly reduced the response time to receive the results. The research participants of this population had their own computer and mobile device, which made the survey easily accessible. Survey Monkey (<http://www.surveymonkey.com>) provided a secure and effective online survey. It was easy to learn how to build the survey using Survey Monkey since they provide support and guidance for constructing questionnaires.

The data collection followed the Dillman Tailored Method, which is well known for maximizing survey responses (Dillman, 2011). Several principles established by

Dillman (2007) were employed in this research study: a) introduce the Web questionnaire with a welcome screen, b) present each question in a conventional format similar to that normally used on paper self-administered questionnaires, c) restrain the use of color so that figure/ground consistency and readability are maintained, d) avoid differences in visual appearance of questions resulting from different screen configurations, and e) use graphical symbols or words to convey a sense of where the respondent is in the completion process (pp. 377-398). Survey Monkey incorporated these design features.

Methods for Data Collection and Data Analysis

DLOQ

The first stage of data collection was for the DLOQ. This instrument provided seven scores for the dimensions of the learning organization: Continuous Learning, Dialogue and Inquiry, Team Learning, Empowerment, Embedded System, System Connection, and Provide Leadership. Watkins and Marsick (1993, 1996) developed this questionnaire, which has been validated by numerous studies with various settings and participants (Marsick & Watkins, 2003; Yang et al., 2004).

In this study, the short version of the DLOQ with 21 items (Marsick & Watkins, 2003) was used for investigating the research questions. Each item used a six-point Likert scale, ranging from *almost never* to *almost always*. The question items were organized according to the following sequence of each dimension: (a) Continuous Learning, (b) Dialogue and Inquiry, (c) Team Learning, (d) Embedded System, (e) Empowerment, and (f) System Connection, and (g) Provide Leadership. Survey Monkey

provided a feature to easily export the scores from the survey into a spreadsheet format. This method made it easy to import in SPSS and Excel for descriptive statistical analysis.

Data analysis for the DLOQ is predicated on it being a valid and reliable instrument. Yang et al. (2004) showed strong evidence of construct validity for the scale measuring dimensions of the learning organization using the DLOQ. The study tests a factor structure of the dimensions of the learning organization and confirms that the learning organization is a multidimensional construct. Yang et al. (2004) argued that the seven-factor structure proposed by Watkins and Marsick (1993, 1996) fit the data reasonably well. Also, they discuss that the structure of DLOQ provides a useful framework and tool for other researchers to study learning dimensions and their relations with other organizational performance variables.

The original DLOQ consisted of 43 items related to the seven dimensions of a learning organization based on the Watkins and Marsick's model. Yang (2003) argues that the short version of the DLOQ (21 items) is recommended for scholars who want to use the DLOQ as a research instrument to determine theoretical relationships of the learning culture and other variables. The short version includes three adequate measurement items for each of the seven dimensions. Yang (2003) found that the short version of the DLOQ has better psychometric properties in terms of the formation of an adequate measurement model (Yang, 2003).

Many studies have used the DLOQ to investigate the organizational learning climate with various settings (Park, 2008). Through the previous studies, the reliabilities

of each dimension of the DLOQ can be identified. In Table 1, the reliabilities of each learning organization dimension of the DLOQ reports an acceptable level. As illustrated in the table, there is little difference between the long version of the DLOQ (43 items) and the short DLOQ (21 items). The short version had the added advantage of minimizing survey fatigue since there were also demographic questions and preference questions in the survey. This reliability table reinforced the validity of the short form DLOQ as a viable instrument to measure the seven dimensions.

Table 1

Reliability of Each Dimension of the DLOQ from Previous Studies

	Version	DL1	DL2	DL3	DL4	DL5	DL6	DL7
Yang et al. (2004)	Long	.81	.87	.86	.80	.81	.84	.87
Ellinger, Ellinger, Yang, & Howton (2002)	Long	.81	.86	.85	.84	.85	.87	.89
Davis (2005)	Long	.83	.88	.86	.87	.82	.89	.90
Lien, Yang, & Li (2002)	Long	.72	.89	.86	.75	.71	.89	.91
Hernandez (2000)	Long	.80	.81	.79	.81	.81	.80	.84
Zhang, D., Zhang, Z., & Yang, B. (2004)	Long	.80	.78	.78	.82	.82	.84	.85
Egan (2002)	Short	.71	.83	.83	.74	.86	.83	.90
Ellinger et al. (2002)	Short	.60	.78	.77	.72	.75	.80	.87
Yang et al. (2004)	Short	.71	.78	.79	.68	.75	.75	.83

(table continues)

Table 1 (continued).

	Version	DL1	DL2	DL3	DL4	DL5	DL6	DL7
Egan, Yang, & Bartlett (2004)	Short	.71	.83	.83	.83	.74	.86	.90
Wang, Yang, & McLean (2007)	Short	.75	.75	.75	.80	.76	.82	.84

Note. Park (2008). The long version of the Dimensions of the Learning Organization Questionnaire (DLOQ) is composed of 43 question items and the short version is composed of 21 items. DL1 = Continuous Learning; DL2 = Dialogue And Inquiry; DL3 = Team Learning; DL4 = Empowerment; DL5= Embedded System; DL6 = System Connection; DL7= Provide Leadership.

Refer to Table 2 for the data variables. The output of DLOQ is a numerical continuous scale. The preference data is also ordinal. It is important to define the type of data to ensure any statistical analysis is performed with the right matching of data types. In a quantitative study, demographic data that is continuous could be evaluated with continuous DLOQ data. Categorical demographic data would be analyzed differently with continuous DLOQ data.

Table 2

Data Variables for the Study

Variables	Collected By	Data Type	Measure Description
Continuous Learning	DLOQ	Ordinal	3 items: 6-point Likert
Dialogue and Inquiry	DLOQ	Ordinal	3 items: 6-point Likert
Team Learning	DLOQ	Ordinal	3 items: 6-point Likert
Establish System	DLOQ	Ordinal	3 items: 6-point Likert
Empower People	DLOQ	Ordinal	3 items: 6-point Likert
Support Community	DLOQ	Ordinal	3 items: 6-point Likert
Provide Leadership	DLOQ	Ordinal	3 items: 6-point Likert
Learning Source Ranking	Survey	Ordinal	4 items: rank order
Technology Source Ranking	Survey	Ordinal	4 items: rank order

Note. DLOQ = Dimensions of the Learning Organization Questionnaire.

Preference Survey

The preference surveys are a two-part survey, which used a nonparametric scaling instrument to determine the participant’s preference of learning sources and technology sources. Rank sum scaling is a common method of assessing participants preferences when these votes are arranged in all possible pairs (Dunn-Rankin et al., 2014). Data from rank sum scaling consists of numbers, which have no significance beyond establishing a ranking over a set of data points and cannot be used for generalization to the overall population.

Subject matter experts from the research organization established the preference categories. Each survey presented six questions, which represent six pairwise comparisons for voting. Chapter 4 provides details on each of the four learning sources and the four technology sources.

The method for analyzing the data is based on the use of two proprietary software tools, RANKO and TRICER. The use of these tools required careful preparation of data formatting. In addition to the software, manual calculations were performed to gain insights to statistical significance. Chapter 4 provides details on all of the calculations.

Semistructured Interviews

The original survey included one question, which asked if the participant would like to be a volunteer and participate in a special follow-up interview that would last 15 minutes. If they wanted to participate, they were asked to check a box and follow up by sending an email directly to the researcher for scheduling purposes. Due to privacy concerns, the survey did not ask them to provide their email address within the online survey. Ethical policy also restricted the use of providing any kind of incentive to participate in the interviews. Thirty of the participants checked the box at the time of the survey indicating they would participate. However, there were only 18 follow-up emails to the researcher for scheduling the interviews. From the 18 responses, 12 interviews were scheduled.

The survey was closed on Survey Monkey on 4/27/16. The confirming email was sent out to the interviewees on 5/4/16 and the appointments were established on

5/10/16, with the actual interviews all being conducted between 5/16/26 and 5/18/16. These interviews were scheduled two weeks out from initial contact with the respondents. Formal dates and times were established in advance with meeting notices in order to make sure a comfortable agenda could be provided in advance and the convenience of rescheduling would be an option.

The meeting notice included eight questions in order to allow the participants advance preparation. Since the preference data was pretty clear about learning sources and technology sources, the interview questions (see Appendix C) were designed to provide deeper insights on the learning culture as it related to the seven dimensions used in the DLOQ. Planning ahead with a schedule and agenda helped to establish a nondistractive and conducive environment for the interview.

These interviews took place as a recorded phone conversation using a mobile app, eVoice on the iPhone. To some degree, there was a quota based on generational status employed in the selection process. The participant goal for the semistructured interviews was to have a balanced representation of participants based on the four different generations. Two Millennials, six Gen Xers, and four Boomers represented the semistructured interview group.

It was really important to establish trust and confidence with the interviewee. The interview process was communicated in the formal invitation and reiterated before the actual recorded interview. First, the confidentiality of the interview outcome was clearly stated. There would not be any mention of their name in any of the publications

and there would be no use of the recorded conversation except for transcription purposes.

In addition, the transcripts would only be used for the purpose of descriptive coding to establish and identify potentially revealing themes. Each call started with a social introduction, explaining the purpose of the interview and how important the insights could be and that an honest and sincere approach to answering the questions would be very important. After the social aspect of the call, the interviewee was asked permission to have the call recorded in order to proceed. The interviewee was also offered to receive a copy of the recorded conversation and a copy of the transcript via email if desired.

The recording app, eVoice, sent the recording in electronic format via email immediately after the call. The digital recording was reviewed for quality and clarity and then sent to an online transcription service provider, Rev.com. The transcribed document was reviewed for quality before descriptive coding.

The preparation for coding was simplified by using the digital recording and the online transcription service. Both of these tools provided very fast, high quality output. The coding process involved a lot of time and effort on behalf of an independent coder and this researcher. Having two passes at the coding by independent coders helped to reveal the themes and key words that stood out as being relevant and common.

The second coder was provided a sample of descriptive coding from the book, *The Coding Manual for Qualitative Researchers* (Saldaña, 2015). A basic guide was presented to the independent coder in order to make it easy to understand the process

of identifying specific comments that had multiple instances of occurrence. There are over thirty different coding methods presented in the book and the descriptive coding process was the most appropriate. Descriptive coding summarizes in a word or short phrase—most often a noun—the basic topic of a passage of qualitative data. To clarify, Tesch (1990) differentiates that “It is important that these [codes] are identifications of the topic, not abbreviations of the content. The topic is what is talked or written about. The content is the substance of the message” (p. 119). (Saldaña, 2015, p. 102).

The semistructured interviews are a key component of the triangulation process. Part of the survey requested volunteers to participate in a short phone interview. The interview provided an excellent way to go deeper into understanding the culture of the learning organization. The questions were primarily aligned with getting more in depth understanding of the DLOQ but also touched base on the preferences for learning sources and learning technology.

A great deal of planning was required to make it easy for the participants and the interviewer. The participant needed to have an idea of what would be asked in the interview so they could be prepared. They also needed to feel comfortable that their participation would cause them no harm, so privacy messaging needed to take place. The scheduling of the interview was well defined and at the same time flexible. A confirming meeting notice with an agenda was provided to each participant. A special phone number that was used with a recording app on the iPhone was given to them in advance, since the caller ID for the call would not be familiar and could be mistaken for an unsolicited call center number.

Once the call was placed, permission was requested to record the nonsocial portion of the interview. Upon termination of the call, a digital recording was emailed to the interviewer and subsequently sent electronically to a transcription service. The details of the analysis are provided in Chapter 4.

Security and privacy were key elements to having a trusted and authentic discussion. These points were emphasized three different times: initially in the survey when volunteer request, again in the email invitation, and a third time at the beginning of the phone conversation. The value of participation was treated in the same fashion, in the survey and in the invite and especially at the end of the interview. Participants were offered to receive the digital recording and the transcripts too.

The method for performing the semistructured analysis is referred to as qualitative coding. Referring to Gläser & Laudel (2013, para. 43) the core idea of coding is that the texts containing the raw data are indexed. Codes—keywords, phrases, mnemonics, or numbers—that signal the occurrence of specific information are assigned to segments of the text. In the list of codes, each code is linked to all text segments to which the code has been assigned. See, for example, the description by Miles and Huberman (1994),

Codes are tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study. Codes usually are attached to “chunks” of varying size—words, phrases, sentences, or complete paragraphs, connected or unconnected to a specific setting. They can take the form of a straightforward category label (p. 56).

Coding became popular as a basic technique of the grounded theory methodology (Glaser & Strauss, 2009) and is today probably the most popular technique of data analysis. This study does not use the grounded theory methodology, which takes years to develop. Upon reviewing the many types of coding presented by (Saldaña, 2015), descriptive coding was chosen. Saldaña recommends that for first-time or small-scale studies, code on hard-copy printouts first, not via a computer monitor. There is something about manipulating qualitative data on paper and writing codes in pencil that gives you more control over and ownership of the work (Saldaña, 2015, p. 29).

In this research study, descriptive coding allowed responses related to the DLOQ and the preference questions used in the survey to be further connected and better understood. The researcher and an independent coder participated in the coding process. The codes were compared from each coder and compiled using a nominal group technique. The compiled list of codes was reviewed in the context of the DLOQ and preference data, providing the third element of triangulation.

Summary

This chapter provided details on the preparation and data collection stages of the research. Two instruments, DLOQ and the Pairwise Comparison Survey were presented and examined for suitability. The semistructured interview process, transcription, and coding details were reviewed and included in the triangulation design method. The next chapter explores the data analysis and reporting. The methods used for data collection and analysis for each of the data sources are presented in great detail. The preferences of the learning sources and the technology sources are reviewed

and presented and the values of paired comparisons are detailed. The DLOQ instrument usage and subsequent descriptive analysis are examined. The last part of the data analysis reviews the method for obtaining qualitative data using semistructured interviews.

CHAPTER 4

DATA ANALYSIS

This chapter provides detailed analysis of the data collected from the survey instruments and the semistructured interviews. The following data items are presented:

- Demographics,
- Data analysis of preference results for both learning sources and for technology sources,
- Data analysis for the DLOQ, and
- Data analysis of the semistructured interviews.

Demographics

Important demographic data was requested in the online survey. The kind of demographic data was determined by using subject matter experts from the sample population organization. The demographic elements collected at the beginning of the survey were the following: gender, academic level, generation, and years of work experience.

The online survey was sent via email to a large and diverse group of knowledge workers within this large financial organization. There were no requirements to participate in the survey other than being currently employed by the organization. The DLOQ instrument measures the learning organization culture and requires participation within the learning organization, which excludes outside participation. Only employees of the organization were allowed to participate in the survey. The sample process was a nonprobability sample method, which means there is not a known probability of being

selected. The response to the survey was voluntary and the selection process as such can be categorized by human choice and not supported by statistical theory. There was opportunity for many sources of bias. However, this sampling process does not mean that the samples are not representative of the population. It just means that rational probability theory does not apply and the results will not be generalized for the entire population. The survey consisted of 39 questions. Five questions were related to demographics, six questions for technology preference, and six questions for learning preference, 21 questions for the DLOQ and one question to solicit participation in the pool of semistructured interview candidates. The result of the email invitation was that 100 complete responses to the survey were received.

There were 36 males (36%) and 64 females (64%). The academic level was tracked by five categories: high school degree or equivalent, some college but no degree, associate degree, bachelor degree, and graduate degree. The percentage breakdown for academic level was five with high school (5%), ten with some college but no degree (10%), three with an associate's degree (3%), 51 with a Bachelor's degree (51%), and 31 with a graduate degree (31%).

Generational identity was collected according to four categories:

- Millennial/Gen Y—born from 1981 through 2000,
- Gen Xer—born from 1965 through 1980,
- Baby Boomer—born from 1946 through 1964, and
- Traditional/Silent—born before 1946.

There were 8 Millennials (8%), 60 Gen Xers (60%), 32 Boomers (32%), and 0 Traditional (0%).

The years of work experience was collected according to six categories:

- 1-2 years,
- 3-5 years,
- 6-10 years,
- 11-15 years,
- 16-20 years, and
- greater than 20 years.

The results of the data collected were: (a) 1 in the 1-2 years category (1%), (b) 2 in the 3-5 years category (2%), (c) 2 in the 6-10 years category (2%), (d) 11 in the 11-15 years category (11%), (e) 6 in the 16-20 years category (16%), and (f) 68 in the greater than 20 years category (68%).

The analysis of the demographics indicated scarcity for both Millennial and Traditional generational categories. There was no Traditional generation and only 8% Millennial, which is not consistent with the overall population of the organization. Another observation is the heavy weighting assigned to academic level with 82% having college degrees. Being that the organization is a financial institution, the bias towards higher education was not unexpected. Based on intimate knowledge of the organization, it is safe to assume that all of the participants have been exposed to a number of different educational formats that brings personal familiarity with a variety of technology sources and learning sources. The types of questions that were presented

in the survey instrument were well understood within the context of workplace learning. All of those who participated are familiar with learning technology and learning sources since they are made available to this population on a regular and consistent basis in the workplace environment.

Preference Results for Both Learning Sources and for Technology Sources

Survey Administration

Three forms of descriptive analysis using two instruments in conjunction with semistructured interviews were used to identify the emergent patterns. Both instruments were applied within the same survey in order to establish a concise, easy to navigate and efficient experience for the participant. The survey tool, Survey Monkey, maintained the integrity of the data by not allowing partial answers and partial completion. All 100 participants completed the entire survey that included both instruments.

The survey presented a paired comparison instrument for technology sources and for learning sources. There were four learning sources presented using six questions in the survey. In similar fashion there were four technology sources presented. The preference results for both learning sources and technology sources were analyzed using identical procedures. Both sets of data were processed using variance rank sums analysis and CT analysis. The results from these analyses are presented after a brief overview of how these analysis programs contribute to understanding data consistency and statistical significance. Before reviewing the specific details, it is important to first establish the context and history for using variance rank sum analysis and CT analysis.

Starting with paired comparisons, it is appropriate to define a paired comparison and a paired comparison experiment. According to Knezek (1978),

A paired comparison is the process of observing two objects and choosing one that is preferred. Whenever pairwise comparisons of two or more objects are made by one judge, a paired comparison experiment is carried out. If all possible comparisons of objects are performed by every judge, a complete paired comparison experiment takes place. (p. 1)

For technology sources, this involved using 100 judges to provide a pairwise comparison of four objects: Learning Hub, Internet Search, Social Media, and MOOC. In similar fashion for learning sources, the same 100 judges were used to provide pairwise comparison of four objects: On Demand, On The Job, Live, and Blended. Since every object was used by every judge, this analysis is considered a complete paired comparison experiment.

The history of paired comparison is first noted in a publication by (Fechner, 1948), but subsequently there are many references that cite the use of paired comparisons (David, 1963; Starks & David, 1961; Thurstone, 1927). According to (Gulliksen & Tucker, 1961)), “The method of paired comparison is a very valuable one since it provides information on transitivity of preferences, on scale values (SVs) and on the applicability of a theory, the law of comparative judgments” (p. 173). Transitivity in a paired comparison indicates an expected logical choice occurs. If object A is preferred over B and B is preferred over C, then transitivity would expect A to be preferred over C. Transitivity is required for linearity and linearity is the foundation for determining a scale. Since the purpose of the analysis was to create a reliable one-dimensional linear scale to measure preferences, it is useful to have a method to measure the departure

from transitivity. The departure from transitivity is a CT. The name *circular triad* is derived by examining a triangle that visually represents a vector mapping of three objects A, B, and C. The arrows will all point in the same direction and form a CT whenever there is a departure from transitivity (Kendall & Smith, 1940).

The paired comparison method works best when the quantity of pairs to evaluate is reasonably small and does not become laborious. The number of pairs is calculated with this formula: number of pairs equals $(N/2)(N-1)$, where N is the number of objects to be compared. For this analysis, N is 4, so the number of pairs by the formula is 6. This results in having six questions in the survey for technology sources and six questions in the survey for learning sources. The objects for both technology sources and learning sources were evaluated by subject matter experts to determine the appropriate kind and quantity. It was determined that 8 items were to be evaluated for each category, then there would be 28 questions for technology and 28 questions for learning sources.

CT analysis is useful to determine “object scalability and overall judge consistency” (Dunn-Rankin et al., 2014). This analysis can indicate the quality of the judges and allow for further refinement of the data by removing either the judges or possibly the objects if they are causing confusion. The concept of judge consistency refers to the participant in the survey, who is the judge. The participant that has the fewer number of CTs would be more consistent than a judge with a higher number. The maximum number of CTs is a function of the number of objects (n): $MAX = (n^3 - 4n)/24$ if

n is even and $(n^3 - n)/24$ if n is odd (Kendall & Smith, 1940). The CT analysis in this study has four objects with $n = 4$; the MAX number of CT per judge is 2.

Variance rank sum analysis takes advantage of the prior CT analysis. It provides details and insights regarding the rank total, scale scores, and statistical significance.

Dunn-Rankin et al. (2014) give this explanation,

The variance stable rank method of scaling (Dunn-Rankin, 1965, Dunn-Rankin & King, 1969) is an adaptation of a two-way analysis of variance by ranks. In other words, it is a nonparametric (distribution free) subject by treatment analysis in which the treatments are the psychological objects that are scaled. The basic assumption of the method is that the scale values are proportional to the sum of the ranks assigned by the judges to each of the objects. In this method, the maximum and minimum possible rank totals, for a given number of judges and objects, act as a convenient and interpretive frame of reference within which the objects are scaled. A linear transformation of these two extreme rank totals into 100 and zero, respectively, defines the limits of the scale. (p. 58)

The expectations and informative output from this analysis is a unidimensional scale from 0 to 100 that places ranking of each object accordingly. Additional information from this analysis indicated whether there was any statistical significance between the objects or if there was indication that the results happened instead by chance. The next section provides the CT results and the variance rank sum analysis for both the learning sources and the technology sources.

Learning Sources

CT Analysis

Data collected from the survey questions assigned to learning sources provided the following output when analyzed. The average number of CTs from the 100 participants (judges) was 0.14, which indicates there was a total of 14 CTs. The maximum number of possible CTs per participant is two. There were four (4%)

participants that had the maximum number of CTs. There were six (6%) participants with one CT. There were eighty-four (84%) with zero CTs. The overall judge consistency was 0.93, which is very good consistency. Reports on the individual judges could have been used to identify the individuals who had the maximum number of CTs, but the nature of the demographic data captured in the survey did not capture the participants contact info, which could have been used to schedule a semistructured interview. Eliminating these four participants from data analysis and repeating the analysis did not make any measurable difference in the overall output, so the entire data set was kept in place. The same participants participated in the DLOQ instrument and the elimination could have an impact on that data, so the entire data of 100 participants was maintained. Kendall's coefficient (W) is a calculation that indicates a measure of agreement among the participants of the survey. A 1 represents total agreement and a 0 represents total disagreement. W is .1624 for the learning sources data. Refer to Figure 1 to review some of the pertinent data that was calculated using a proprietary CT analysis tool.

Object	# CT's In	ABS Z	ABS Prob	Grp Z	# Votes	Scaled
1	11	-0.85	0.1967	0.50	92.	30.67
2	11	-0.85	0.1967	0.50	125.	41.67
3	9	-0.88	0.1894	-1.50	196.	65.33
4	11	-0.85	0.1967	0.50	187.	62.33

Figure 1. CT results for learning sources.

The column labeled *Object* references the four learning sources. Object 1 is On Demand, Object 2 is On The Job, Object 3 is Live, and Object 4 is Blended. The column

labeled *# CTs* indicates the total number of CTs assigned to each object. The column *# Votes* tallies the distribution of the votes per object. The total number of votes adds up to 600, since there were six questions presented to 100 participants. The column *Scaled* represents the unidimensional values for each object on a scale from 0 to 100. There were no negative indicators from the CT analysis. The data checking process using the CT method indicated safe passage to the next phase of analysis, reported in the next section using variance rank sum analysis.

Variance Rank Sums Analysis

According to (S. S. Stevens, 1959), "Measurement is the assignment of numerals to events or objects according to rule." Determining a scale using a pairwise comparison process should furnish evidence that the objects have a real objective ranking. The score is presented in a unidimensional straight line ranking which is easy to understand.

Unidimensional, as the name implies, is just one dimension.

It is important to distinguish between the different types of unidimensional scales. According to Trochim & Donnelly (2001), there are three major unidimensional scale types: (a) Thurstone or equal-appearing interval scaling, (b) Likert or summative scaling, and (c) Guttman or cumulative scaling. The Thurstone scale type is used with the pairwise comparison process. The Likert scale type is further discussed, as it was used in the DLOQ.

This simply means that we can measure the rank order of the preferences on a straight-line scale from 0 to 100. There are not two or three dimensions needed in order to measure the preference; it can be done with a single ruler. Besides the visual

representation showing the rank order, additional tests for significance can provide information that indicates the number of significant pairs and how the probability of chance can be a factor. It is important to understand that building a scale is different than getting a scale response. The survey was used to get a scale response. The scale was determined by using a proprietary analysis program, RANKO. The details of how this processing takes place is provided. Since the nominal data gathered does not rely on assumptions that it is acquired from a given probability distribution, the process of analysis is considered to be nonparametric.

The scale for this study was developed to provide insights to four different learning sources that are available to this sample population. Interviewing the learning and development subject matter experts within the learning organization identified these four different learning sources. The four learning sources are On Demand, Live, Blended, and On The Job. It was important to make sure the operational definition was presented in the survey. Each of these categories could possibly be misinterpreted without the added clarification.

These four learning sources resulted in six paired comparisons that were presented in the survey for the participant to choose one over the other. A proprietary program, RANKO, was used to create the linear scale showing the least preferred to the most preferred SVs. The most preferred SV was Blended (65), closely followed by On The Job (62), distanced by Live (42) and On Demand (31). An examination of the SVs on the unidimensional scale in Figure 2 indicates some of the SVs are closer to each other and some are a further distance apart. Examining On The Job with an SV of 62 and

Blended with an SV of 65 the distance is only three units apart. (Dunn-Rankin et al., 2014) explain, “The small difference of three or less has an extremely high probability of occurrence by chance so that the observed difference is likely just a chance difference” (p. 62). The relationship of these two SVs require triangulation with the other forms of descriptive analysis since the terms in the survey for these categories are not obviously confusing and they might actually not be by chance.

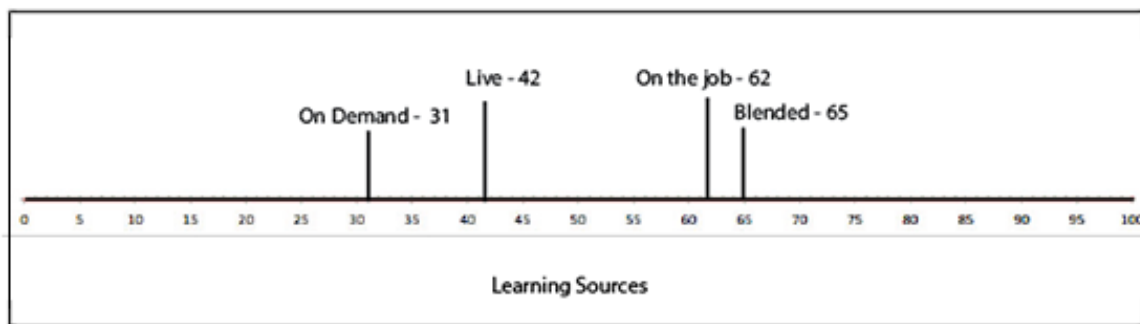


Figure 2. Unidimensional scale values for learning sources.

There are additional calculations: critical range, tests for significance and the relative scalability index that provide more details to better understand the reliability and validity of the preferences. Each of these calculations are further reviewed and presented. The critical range is used to determine statistical significance. The critical range is a number and if the SV is equal or greater than the critical range number indicates statistical significance. Dunn-Rankin et al. (2014) state,

The rank method has units that are equal in a variance stable sense. They are variance stable because a specific difference between rank sums has the same probability of occurrence wherever the rank totals (and the scaled scores) may be located. (p. 60)

Calculating the critical range is accomplished by multiplying two factors. The first factor is the Expected Standard Deviation and is denoted as E(S). The second factor is called the range distribution (Qa), is the percentage points of the Studentized range for infinite degrees of freedom (Dunn-Rankin et al., 2014, p. 232). Qa is selected from a table (3.633) that features K, the number of objects, and desired significance level (.05). $E(S) = \sqrt{N(K)(K+1)/12}$, where K is the number of objects (4) being rank scaled. N is the number of participants (100). $E(S) = 12.91$. Critical range is $E(S) * (Qa) = 46.9$.

The critical range is known and is applied by looking at the table of rank differences (Figure 3) to see how many items are greater than the critical range number. In Figure 3, there are four items that are greater than or equal to the critical range. A pair is deemed significant if it is greater than the critical range. Pairs 2 and 3, Pairs 1 and 3, Pairs 1 and 4, and Pairs 2 and 4 are significant at a 5% level, and therefore did not occur by chance.

Table of Rank Differences				
	Items			
	3	4	2	1
3	0			
4	9	0		
2	71	62	0	
1	104	95	33	0

Figure 3. Rank differences of the learning sources.

A simple calculation, the Scalability Index (SI), is the ratio of the number of significant pairs to the maximum number of pairs. $SI = 4/6$, in this case $SI = .666$

Technology Sources

CT Analysis

The same analysis that was detailed and explained for the learning sources was applied using the data for the technology sources. Data collected from the survey questions assigned to technology sources provided the following output when analyzed. The average number of CTs from the 100 participants (judges) was 0.03, which indicates there were a total of three CTs. The maximum number of possible CTs per participant is two. There were zero participants (0%) that had the maximum number of CTs. There were three participants (3%) with one CT. There were ninety-seven (97%) with zero CTs. The overall judge consistency was 0.985, which is considered very good consistency.

Reports on the individual judges could have been used to identify the individuals who had the maximum number of CTs, but the nature of the demographic data captured in the survey did not capture the participants contact info, which could have been used to schedule a semistructured interview. Eliminating these four participants from data analysis and repeating the analysis did not make any measurable difference in the overall output, so the entire data set was kept in place. The same participants participated in the DLOQ instrument and the elimination could have an impact on that data, so the entire data of 100 participants was maintained.

Kendall's coefficient (W) is a calculation that indicates a measure of agreement among the participants of the survey. A 1 represents total agreement and a 0 represents total disagreement. W is .2340 for the learning sources data. Refer to Figure 4 to review some of the pertinent data that was calculated using a proprietary CT analysis tool.

Object	# CT's In	ABS Z	ABS Prob	Grp Z	# Votes	Scaled
1	3	-0.96	0.1685	0.78	68.	22.67
2	3	-0.96	0.1685	0.78	202.	67.33
3	2	-0.97	0.1652	-0.26	136.	45.33
4	1	-0.99	0.1619	-1.31	194.	64.67

Figure 4. CT results for technology sources.

The Object column references the four learning sources. Object 1 is Social Media, Object 2 is Learning Hub, Object 3 is MOOC, and Object 4 is Internet Search. The column titled # CTs indicates the total number of CTs assigned to each object. The column # Votes tallies the distribution of the votes per object. The total number of votes adds up to 600 since there were 6 questions presented to 100 participants. The column titled Scaled represents the unidimensional values for each object on a scale from 0 to 100. There were no negative indicators from the CT analysis. The data checking process using the CT method indicated safe passage to the next phase of analysis, reported in the next section using variance rank sum analysis.

Variance Rank Sums Analysis

The scale for this study was developed to provide insights to four different technology sources that are available to this sample population. These four different technology sources were identified by interviewing the learning and development subject matter experts within the learning organization. The four technology sources are Social Media, Learning Hub, MOOC, and Internet Search. It was important to make sure

the operational definition was presented in the survey. Each of these categories could possibly be misinterpreted without the added clarification.

These four technology sources resulted in six paired comparisons that were presented in the survey for the participant to choose one over the other. A proprietary program, RANKO, was used to create the linear scale showing the least preferred to the most preferred SVs. The most preferred SV was Learning Hub (67), closely followed by Internet Search (65), distanced by MOOC (45), and Social Media (23). An examination of the SVs on the unidimensional scale in Figure 5 indicates some of the SVs are closer to each other and some are a further distance apart. Examining Internet Search with an SV of 65 and Learning Hub with an SV of 67, the distance is only two units apart. (Dunn-Rankin et al., 2014) explain, “The small difference of three or less has an extremely high probability of occurrence by chance so that the observed difference is likely just a chance difference” (p. 62).

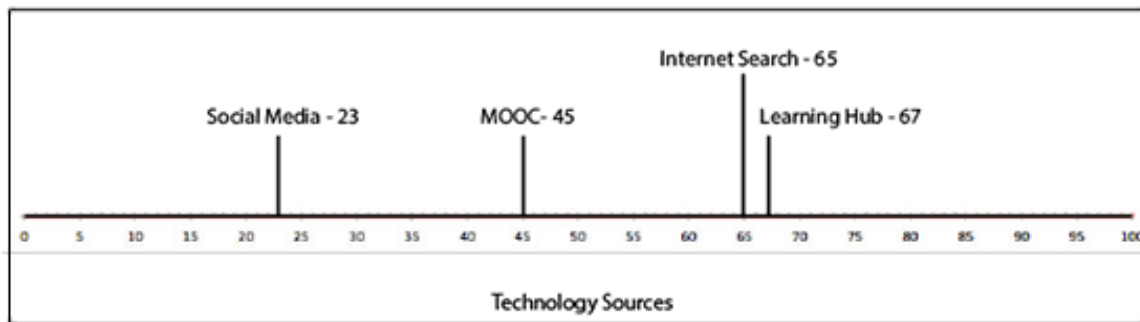


Figure 5. Unidimensional scale values for technology sources.

The relationship of these two SVs require triangulation with the other forms of descriptive analysis since the terms in the survey for these categories are not obviously confusing and they might not actually be by chance.

Calculating the critical range is accomplished by multiplying two factors. The first factor is the Expected Standard Deviation and is denoted as E(S). The second factor is called the range distribution (Qa), is the percentage points of the Studentized range for infinite degrees of freedom (Dunn-Rankin et al., 2014, p. 232). Qa is selected from a table (3.633) that features *K*, the number of objects, and desired significance level (.05). ($E(S) = \sqrt{N(K)(K+1)/12}$) where *K* is the number of objects (4) being rank-scaled. *N* is the number of participants (100). $E(S) = 12.91$

Critical range is $E(S) * (Qa) = 46.9$. The critical range is known and is applied by looking at the table of rank differences to see how many items are greater than the critical range number. In Figure 6, there are five items that are greater than or equal to the critical range number. A pair is deemed significant if it is greater than the critical range. Pairs 2 and 3, Pairs 1 and 2, Pairs 1 and 3, and Pairs 1 and 4 and Pairs 3 and 4 are significant at a 5% level, and therefore did not occur by chance.

Table of Rank Differences				
	Items			
	2	4	3	1
2	0			
4	8	0		
3	66	58	0	
1	134	126	68	0

Figure 6. Rank differences of the technology sources.

A simple calculation, the Scalability Index, is the ratio of the number of significant pairs to the maximum number of pairs. $SI = 5/6$, in this case $SI = .833$

Analyzing the preference data for both the learning sources and the technology sources revealed some interesting occurrences. First, the validity of the data is not in question. For both cases, the number of CTs was very small and the SVs most likely represent preferences for the sample population. In terms of clustering, both scales had similar visual presentations. At the high end of the scale, there were two SVs that were closely coupled for technology and for learning sources. In both cases, they were only a few SVs apart.

A closer look at the other data from the DLOQ instrument and the semistructured interviews provide further detailed insights. The highest SV for learning sources is Blended, with an SV of 65. The highest SV for technology sources is Learning Hub. Reviewing the operational definitions used in the preference survey, you will see common meanings. The key words in the Learning Hub definition (learning opportunities from a wide variety of curated content delivered by an LMS) are “wide variety” and the delivery method is a “learning management system.” Examining the operational definition for Blended (This is a mixture of on demand and live, not just one or the other), highlights the key words as a “mixture” and the delivery method is that which can be found in an LMS. Those who are familiar with these definitions could relate to them in an equal sense and judge them with the same priority resulting in high SVs for each.

In a similar fashion, the other SVs can be evaluated relative to their paired relationship on their respective unidimensional scales. On The Job with an SV of 62 and Internet Search with an SV of 65 were very close in SVs and both were a few SVs away

from first place. Examining the operational definition of On The Job (refers to informal learning channels, not a structured course but instead job experiences and mentoring), identifies the key words “not structured” and “job experience.” Examining the operational definition of Basic Internet Search (Google, Bing, and other Internet search platforms provide just-in-time info and job aids.) identifies the key words “search” and “job aids.” Those who are familiar with these definitions could relate to them in an equal sense and judge them with the same priority resulting in high SVs for each.

Another alignment for comparison is the third highest SV for each category, Live with an SV of 42 and MOOC with an SV of 45. Both of these are relatively close in SV and also in distance from second place above and fourth place below. A review of the operational definitions provides the following. Examining the operational definition of MOOC (Learning from massive, open, online courses offered from universities and private entities), identifies the key words as “open” and “online.” Examining the operational definition of Live (Instructor led, in person or virtual [WebEx], you have collaboration and social engagement with others), identifies key words as “instructor led” and “virtual.” Once again, those who are familiar with these definitions could relate to them in an equal sense and judge them with the same priority resulting in high SVs for each.

An evaluation of the lowest SV components for each preference scale represents an SV of 23 for Social Media and an SV of 31 for On Demand, clearly indicating a great distance from the top two preferences. Examining the operational definitions for Social Media (Learning from YouTube, LinkedIn, Facebook, and so forth), identifies the key

words “YouTube” and “LinkedIn.” Examining the operational definition provided for On Demand (On-demand learning is online, self-directed, and self-study. The learner chooses from a wide variety of curated content [e.g., degreed.com) identifies key words as “online” and “self-directed.” The connection here may not be as strong, even though YouTube and LinkedIn are online and self-directed, the extended view of additional curated content might be a factor worth further analysis.

What can be concluded from the preference study is both the independent measure of preference for each category, technology sources, and learning sources but also the possible correlation when visually examining the combined scales as shown in Figure 7.

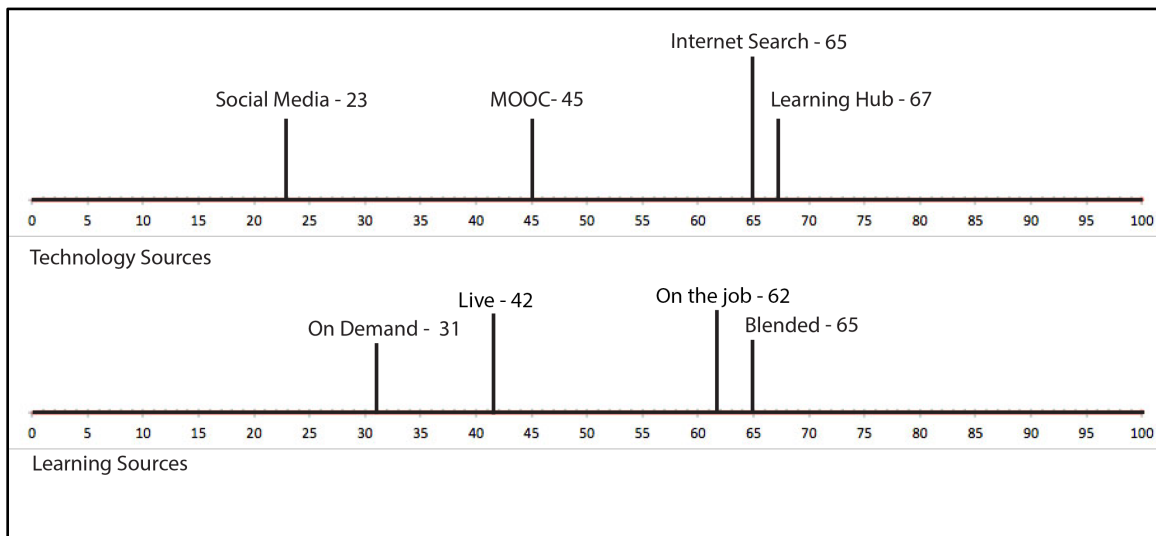


Figure 7. Comparative view of both scales: Technology and Learning Sources.

Data Analysis for DLOQ

The DLOQ is a reliable and valid instrument that has been used around the world in many cultures to provide insights about the learning organization’s culture (Park, 2008). It is based on seven different dimensions of the learning organization. It is

important to provide a definition of the learning organization. Watkins and Marsick (1993), the authors and creators of the instrument, define the learning organization in this way,

The learning organization is one that learns continuously and transforms itself. Learning takes place in individuals, teams, the organization, and even the communities with which the organization interacts. Learning is a continuous, strategically used process, integrated with and, and running parallel to, work. (p. 8)

Watkins and Marsick (1993) also note that learning occurs at four interdependent levels: (a) individual, (b) team, (c) organization, and (d) society. Within the individual level, there are two dimensions: (a) Continuous Learning and (b) Dialogue and Inquiry. The team level has one dimension: Team Learning and collaboration. The organizational level has two dimensions: (a) Embedded System and (b) Empowerment [of people]. The fourth level, the global level, has two dimensions: (a) System Connection and (b) Strategic Leadership.

The data used in this study comes from a 21-question survey that rates the responses for each of the seven dimensions on a six-point Likert scale. There are three questions for each of the seven dimensions. These seven dimensions are discussed in detail as the results are examined. The profile of the learning organization is descriptively analyzed in a qualitative fashion. Quite often, when a random sample of the population is used with the DLOQ and the demographic data is continuous instead of categorical, a variety of quantitative analysis can be performed. For this study, that is not the case, by design. It is not the goal to generalize these findings and to draw conclusions about an additional population outside of the 100 participants of this study.

Since the data was not from a random sample, this study does not use any inferential statistical analysis but instead provides a descriptive analysis of the data. The sampling method used for the DLOQ instrument was a combination of convenience and snowball. An initial group of 50 was informed of the survey from within different parts of the organization and were asked to refer the survey to five others at their discretion within the organization as well. The result provided 108 responses. Only 100 completed both parts of the survey that included the DLOQ and the preference instruments.

Using SPSS version 24, the descriptive statistics were calculated on the overall test scores. Examining the histogram of the average test scores (see Figure 8) indicates the scores closely resemble a normal distribution curve.

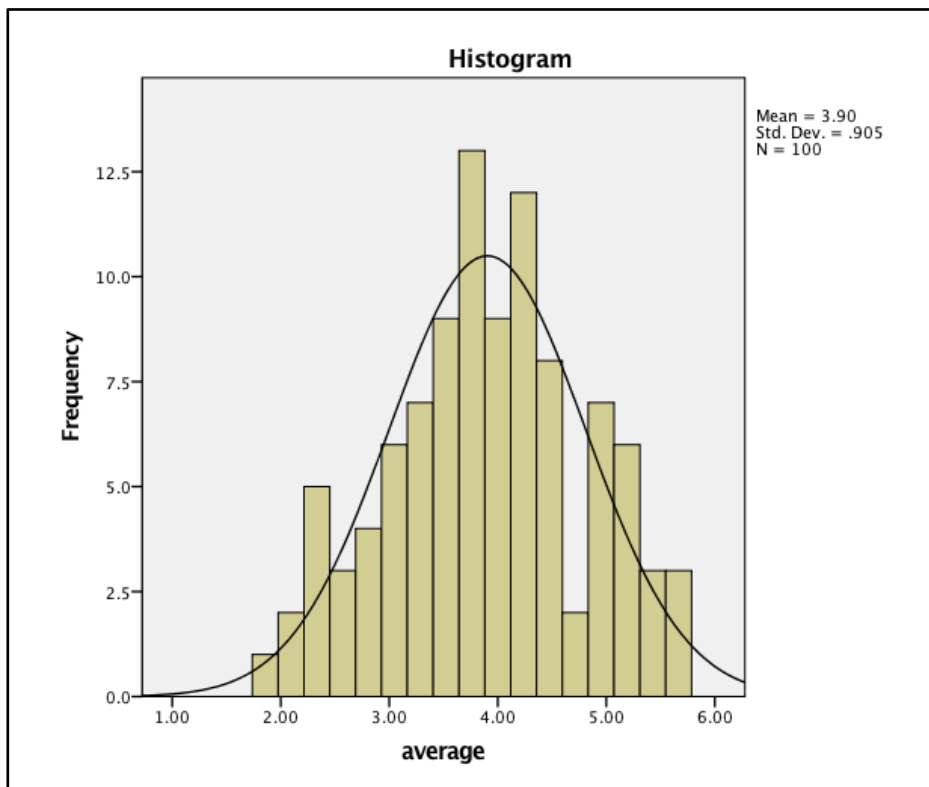


Figure 8. Histogram of DLOQ average scores.

The demographic data, gender, years of work experience, generation, level of education is categorical and not continuous. Because of the nonrandom sampling process and the use of categorical demographic data there were no inferential statistics used in this study. However, using a different approach in future studies, there are methods that can use inferential statistical testing like a two-sample *t*-test, ANOVA, and multiple linear analyses.

The scores of the DLOQ provide insights to the culture of the learning organization. There are many ways to evaluate the scores. The frequency of the average score calculates a mean value of 3.90 with a standard deviation of .905. Using SPSS Version 24, a quick reliability assessment was run which showed a case-processing summary of 100% valid entities with no exclusions, which calculated a Cronbach's alpha of .960 for 21 items. This is a very high reliability indicator and is consistent with other reliability tests (Park, 2008).

Figure 9 indicates the average scores for each of the 21 questions as they apply to the seven dimensions. There were three questions for each dimension and the graph represents the scores as they are grouped together. The first three questions apply to Continuous Learning (CL); the next three are for Dialogue and Inquiry (DI), followed by Team Learning (TL), Establish System (ES), Empowerment (EP), Support Community (SC), and Strategic Leadership (SL). The lowest overall score was related for a Team Learning question, "In my organization, teams/groups are confident that the organization will act on their recommendations." The highest score was related to Continuous Learning, "In my organization, people help each other learn."

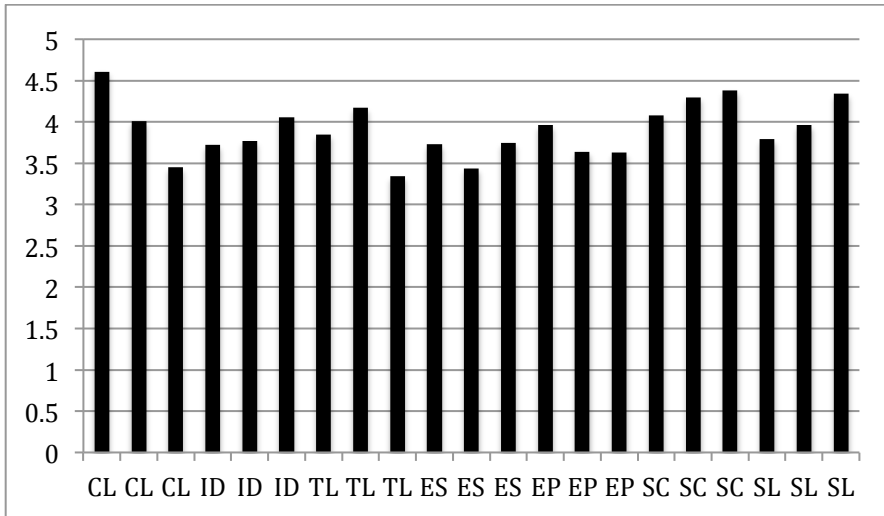


Figure 9. Average scores for individual questions in the DLOQ. CL = Continuous Learning; ID = Dialogue and Inquiry; TL = Team Learning; ES = Embedded System; EP = Empowerment; SC = System Connection; SL = Strategic Leadership.

Figure 10 shows the combined group scores, with three scores for each of the seven dimensions. The lowest group score was Embedded System, which means to create measurement systems, make its lessons learned available, and measure the results of training. The highest score was for Support Community, which encourages global perspectives, work with outside communities, and encourages diverse perspectives.

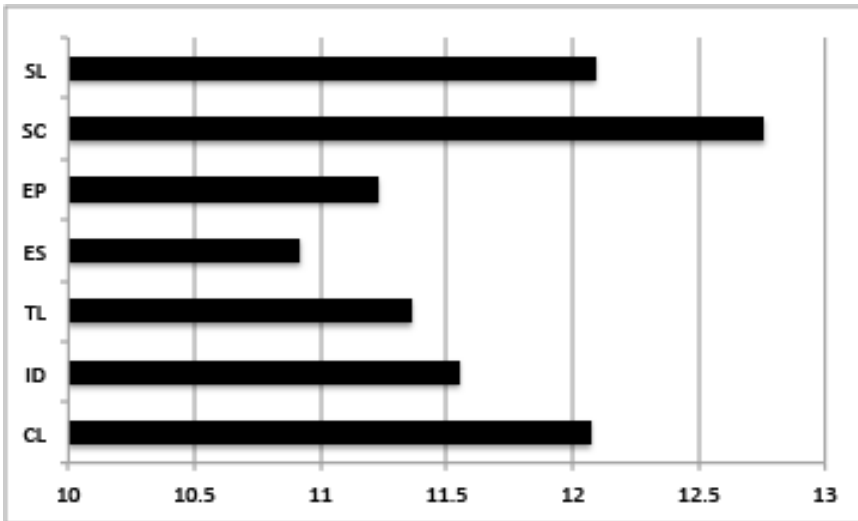


Figure 10. Combined group scores for each dimension in the DLOQ.

The next phase of the DLOQ data analysis requires a visual evaluation of the scores as they relate to some of the categorical demographic data. The line plots in Figures 11-16 were created using a spreadsheet. In each graph, the DLOQ score is represented on the y-axis and the x-axis represents each of the seven dimensions. The legend for each dimension is at the bottom of the x-axis.

Gender Analysis

The first point of interest was to see if the DLOQ score varies according to gender. The majority of the participants were female, which is actually consistent with overall population of the learning organization. Refer to Figure 11 for the details. For the most part, with one exception, the data appears to be quite consistent regardless of gender. The exception is the fourth dimension: Establish System. There might be a perception of difference or gender bias.

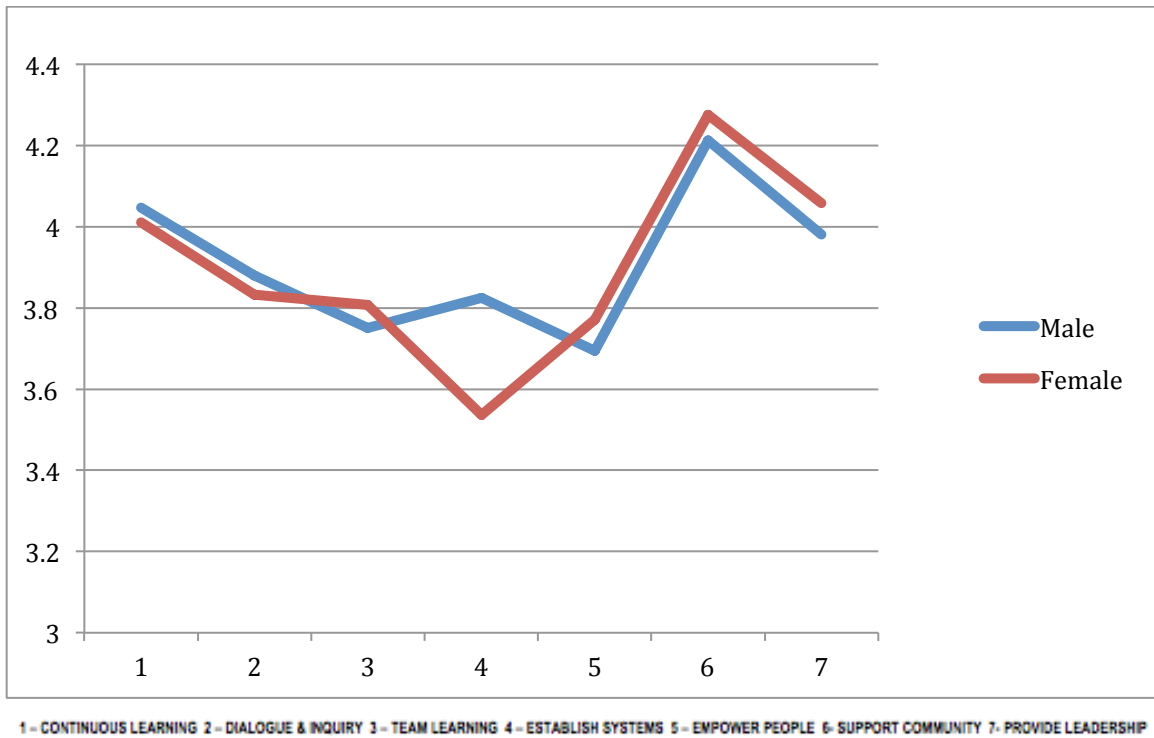


Figure 11. DLOQ gender analysis.

Years of Work Experience

The years of work experience have six categories. The lowest work experience category is 1-2 years, which is most likely the younger generation. The scores for this category are consistently higher. This was a small group representing less than 10% of the sample population, so size might be a factor. Being unfamiliar or even overly concerned about showing dissatisfaction by giving lower scores might be a factor too. See Figure 12. If the study used a random sample and if the actual ages were used as continuous data instead of categorical data, some inferential statistics could be used for analysis that is more detailed.

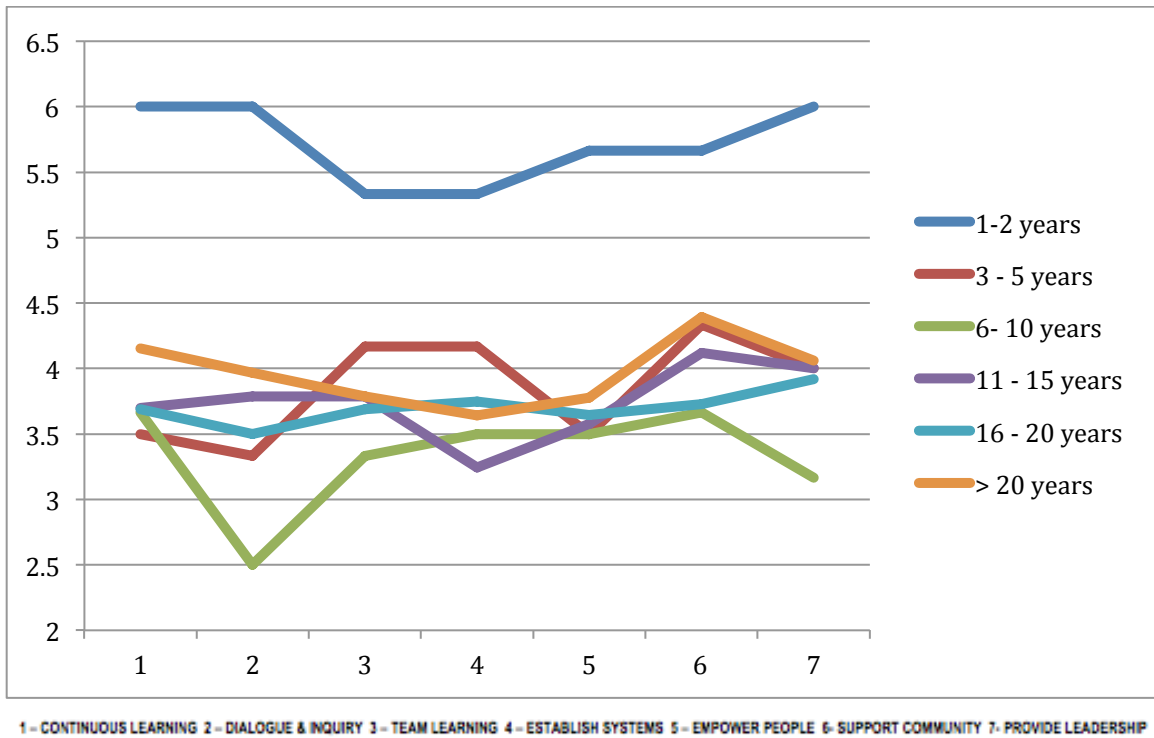


Figure 12. DLOQ Years of Work Experience analysis.

Education Level

The level of education has five categories. The lowest educational level is high school degree. This education level represents a variety of generational groups from Millennial to Boomer. This was a small group representing 5% of the sample population, so size might be a factor. The other outlier is for the associate’s degree, which was a very small sample representing 3% of the sample population (see Figure 13).

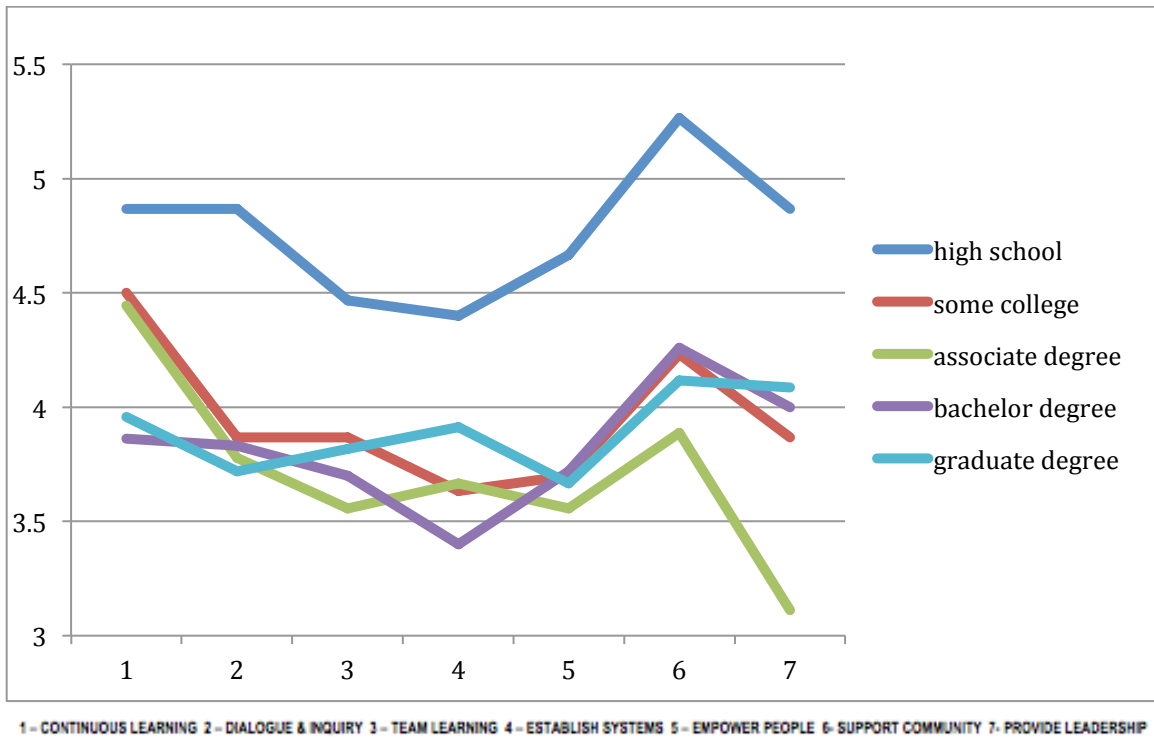
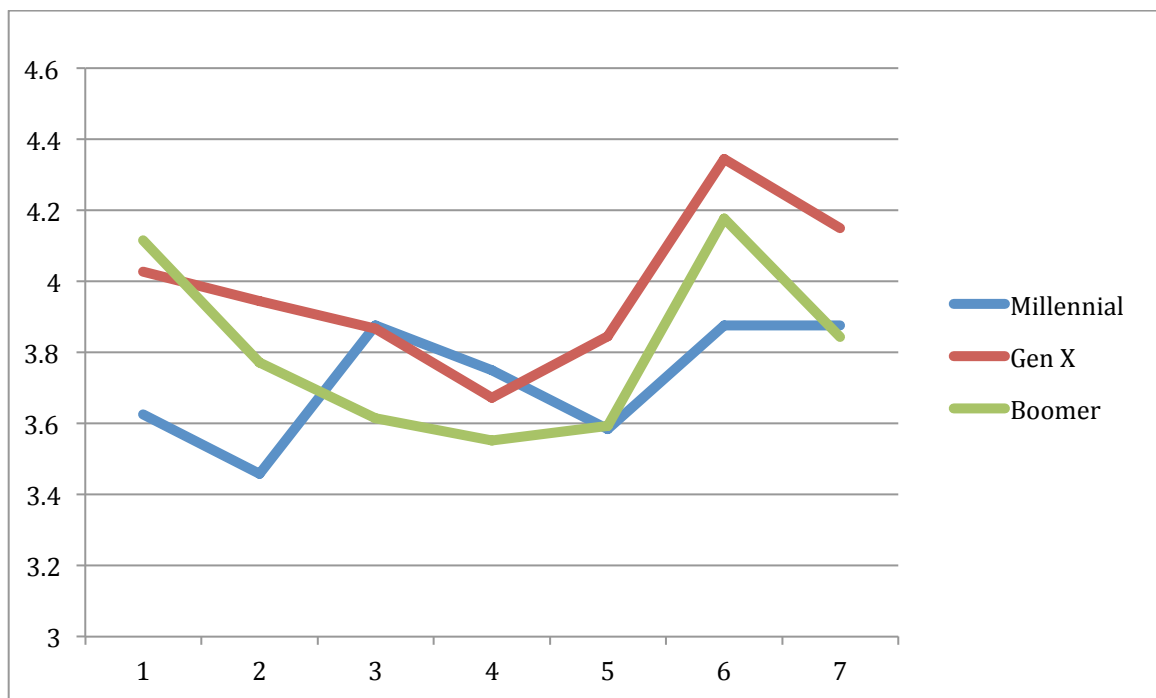


Figure 13. DLOQ Education Level analysis.

Generational Level

The sample population did not have any participants from the Traditional/Silent category but did have participants from the Millennial, Gen Xer, and Boomer categories. It is an interesting observation that the data from Boomers and Gen Xers provided a relatively higher score for Support Community than for Millennials. Support Community deals with encouraging global perspectives, working with outside communities, and encouraging diverse perspectives. Gen Xers reported the highest score in this category, which fits some of the profiles assigned to the group as being the “generation revolutionized by television and the media that provided this generation with more exposure to world events and pop culture than previous generations” (Hansen & Leuty, 2012, p. 36; Lancaster & Stillman, 2002). The visual presentation of these charts

establishes a preliminary perspective for further evaluation (Figure 14). There are seven different dimensions to the DLOQ scores as they are compared to the various categorical demographic data. There is no means to derive any statistical significance from this high-level descriptive information. Each dimension of the learning organization can be further analyzed based on the overall profile of the specific generation. For example, the Millennial generation could be further researched in terms of Continuous Learning, Dialogue and Inquiry, and so forth.



1 - CONTINUOUS LEARNING 2 - DIALOGUE & INQUIRY 3 - TEAM LEARNING 4 - ESTABLISH SYSTEMS 5 - EMPOWER PEOPLE 6 - SUPPORT COMMUNITY 7 - PROVIDE LEADERSHIP

Figure 14. DLOQ Generational category analysis.

Technology Source Analysis

The next phase of data analysis using the DLOQ scores is to see if there is any relationship between each of the technology sources. Each of the four different technology sources was selected as preferences by the 100 participants. Social Media

was selected 68 times, Learning Hub was selected 202 times, MOOC was selected 136 times, and Internet Search was selected 194 times. For each member of the Social Media group, three scores, one from each group of dimension questions were averaged to determine the dimension score. This resulted in having seven dimension scores for each member. Next, the seven dimension scores for all 68 members were averaged and graphed.

The same calculations were made for the group of 202 that favored Learning Hub, the group of 136 that favored MOOC and the group of 194 that favored Internet Search. It does not appear from the graph that the four different technology sources adversely influenced the relative DLOQ scores (refer to Figure 15). The alignment and general directions of the graphs indicate consistent treatment regardless of preference for any of the four technology sources. One interesting observation that is consistent with all of the graphs is the amplitude for Item 6, which is the Support Community dimension. Support Community deals with encouraging global perspectives, working with outside communities, and encouraging diverse perspectives.

Learning Source Analysis

A similar data analysis used the DLOQ scores to see if there is any relationship between each of the Learning Sources. On Demand was selected 92 times, Blended was selected 196 times, On The Job was selected 187 times, and Live was selected 125 times. Three scores, one from each group of dimension questions were averaged to determine the dimension score. This resulted in having seven dimension scores for each member. The member scores for each group were average and graphed. Refer to Figure

16. It does not appear from the graph that the four different Learning Sources adversely influenced the relative DLOQ scores. The alignment and general directions of the graphs indicate consistent treatment regardless of preference for any of the four Learning Sources.

Comparison of Data Analysis for the Rank Scale and DLOQ

The triangulation methodology provides a variety of views into the qualitative data. Clearly, the rank scale analysis identified strong preferences for Learning Sources, with Blended and On The Job as the top two sources. Another perspective using the DLOQ data indicates the highest scores for Learning Sources (see Figure 15) were the same as the top two preferences for Learning Sources, which are On The Job and Blended.

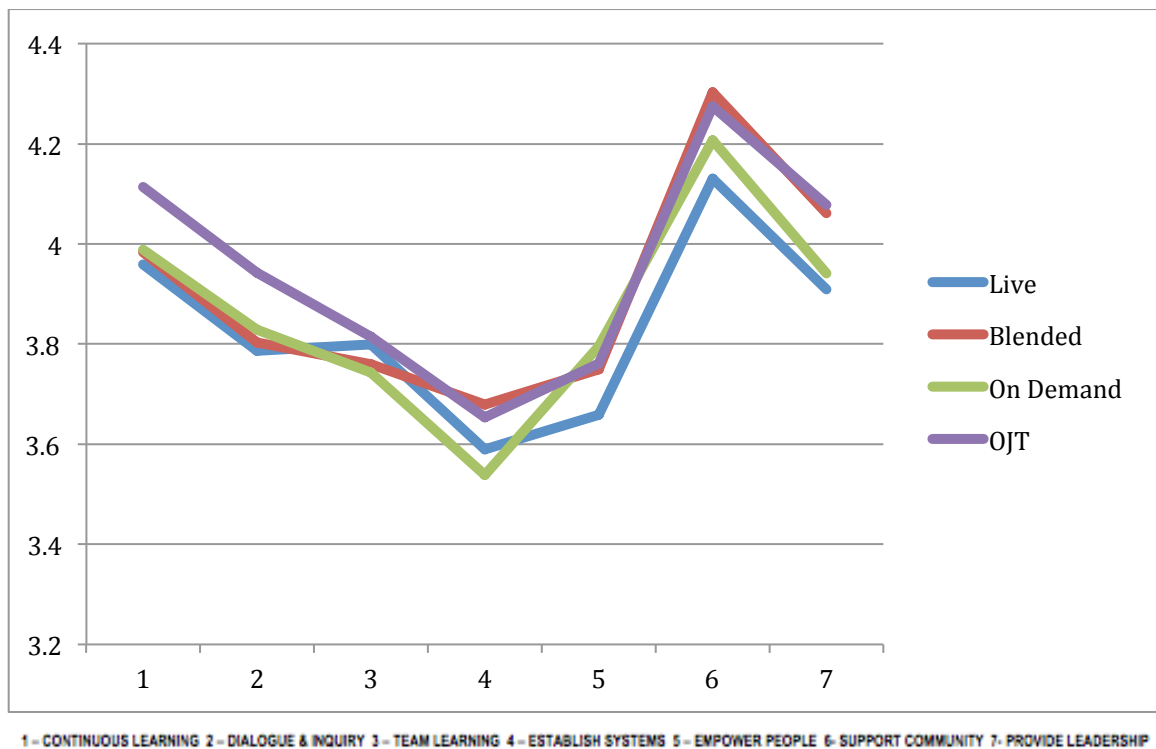


Figure 15. DLOQ Learning Source analysis.

Learning Hub and Internet Search were the top rankings for technology sources.

Another interesting perspective using the DLOQ data indicates the highest scores for technology sources were the same as the top two preferences for technology sources, which are Learning Hub and Internet Search (see Figure 16).

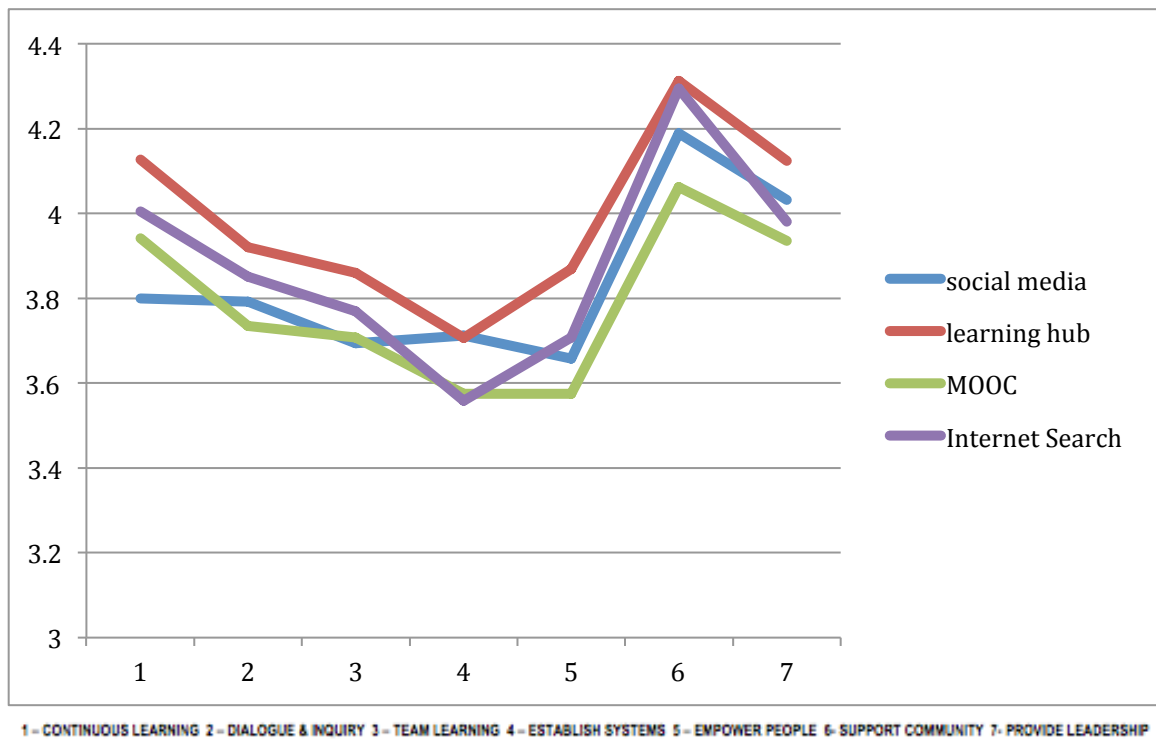


Figure 16. DLOQ Technology Source analysis.

This might be a coincidence and would require further testing from another study to confirm statistical significance.

Additional perspectives and views are covered in the next section, which discusses semistructured interviews. These interviews provide additional context that help to answer the research questions. Extracting meaningful data from the coding first required a second reading of the transcript with the coding comments, which were provided as “bubbled” new comments using Microsoft Word. These comments were

entered into a table for each transcript and compared with the bubbled comments from the second coder. A detailed comparative review of this dual entry table provided the top-ten themes that were consistently presented and captured in the coding of the transcripts. Refer to Table 3 for a list of those dominant codes that were derived from the coding process. The frequency of usage for both the primary and secondary coder is provided. In addition to these 10, there were many common codes that were consolidated using a nominal group technique to establish the dominant codes.

Table 3

Frequency Table of Most Dominant Descriptive Coding Codes

Dominant Codes	Primary Coder	Secondary Coder	Combined Coding
Lifelong Learning	36	47	83
Work Independent	27	35	62
Self-Directed	23	19	42
Pride In Knowing	41	37	78
Client Driven	44	47	91
Time Constrained	26	33	59
Incentive	24	33	57
Flexibility	15	26	41
Searching	52	60	112
New Interests	36	44	80

The process of triangulation can provide perspective and views that may not be equally prevalent in all data sources. The information provided in the semistructured interviews is intended to provide additional insights into the culture of the learning organization, as measured by the seven dimensions evaluated in the DLOQ (refer to Figure 17).

Watkins and Marsick's Model (1997) of the Seven Dimensions of the Learning Organization	
<i>Dimension</i>	<i>Description</i>
Continuous learning	Opportunities for ongoing education and growth are provided; learning is designed into work so that people can learn on the job.
Inquiry and dialogue	The organizational culture supports questioning, feedback, and experimentation; people gain productive reasoning skills to express their views and the capacity to listen and inquire into the views of others.
Team learning	Work is designed to use teams to access different modes of thinking; collaboration is valued by the culture and rewarded; teams are expected to learn by working together.
Embedded system	Necessary systems to share learning are created, maintained, and integrated with work; employees have access to these high- and low-technology systems.
Empowerment	People are involved in setting and implementing a shared vision; responsibility is distributed so that people are motivated to learn what they are held accountable to do.
System connection	The organization is linked to its communities; people understand the overall environment and use information to adjust work practices; people are helped to see the effect of their work on the entire organization.
Strategic leadership	Leadership uses learning strategically for business results; leaders model, champion, and support learning.

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Figure 17. Descriptions of Seven Dimensions of the DLOQ.

An attempt is made in this analysis to map some of the dominant codes to each of the seven dimensions, based on the descriptions. The overall scores from the DLOQ are generally higher than lower on the absolute scale from 1 to 6. Some of the categories have scores that are consistently higher or lower on a relative scale. This section of the analysis examines each of the seven dimensions of the DLOQ to find more views that hopefully better define, support, or challenge the overall scores for this learning organization. Starting with the first dimension and ending with the seventh dimension, each was analyzed. Each of the descriptions refers to Figure 17.

Continuous Learning

Continuous Learning, as described in Figure 17, provides ongoing opportunities for education and growth at work on the job. A consistent comment about learning on the job was related to the amount of constant change that takes place in the industry. Change is a driver for learning. Another driver for learning on the job is the pride in knowing. The financial industry is primarily based on customer service. Making sure that you are up-to-date on the latest information is a significant motivator for learning. The following is a direct quote from "Alice," a Millennial, "I think the incentive for me is when I learn, I can speak to my clients more knowledgeably and hopefully I sound educated. The incentive is self-worth and constant improvement is an internal drive for me." Alice wants to make sure that she is recognized for contributing to the organization and establishes herself a valuable part of the team. Being a team player is very important to her and knowing that her customers really count on her to be the expert drives her to stay current on industry and product updates.

Another direct quote from “Sam,” a male Boomer, who has been with the organization for over twenty years, “As we keep trying to redefine how we're going to approach the marketplace and help individuals and so forth, you couldn't possibly, I think, really advance your career without constantly re-educating yourself on what these things that are important.” Sam understands how quickly things can change. Over the years, he has seen different events in the financial markets force changes in reporting and compliance requirements.

“Sally,” a Gen Xer states the following, “I definitely consider myself a lifelong learner, because I think I always have the interest and the curiosity to learn more. I think time has changed my attitude towards learning, knowing that you always have to learn to get to the next step, to get to your next role.” Sally had recently changed careers and knew that she had to step up the learning process to get current quickly on the new job. She also felt that life balance was important too, but still made learning a priority because she did not want to disappoint her boss and co-workers.

Inquiry and Dialogue

According to the description in Figure 17, the basis of this dimension is questioning, feedback, and exploration. The element of change that is predominant in this workplace drives all three of these components. This dimension really invokes the question of how do people learn in the workplace. This dimension is foundational to the research questions related to learning sources and technology sources. The notion of searching for information and leveraging the resources both externally and internally

were explored within the interviews. On the topic of inquiry, Sam, a Boomer, reported the following,

I feel that in our environment, it's kind of interesting because our company reinvents itself so frequently, as we keep trying to redefine how we're going to approach the marketplace and help individuals and so forth, you couldn't possibly advance your career without constantly reeducating yourself on what these things that are important.

Sam has been with the company for over twenty years. He has self-directed most of his continuing education and was primarily driven by personal interests as opposed to job requirements.

Searching was another dominant code. Information is available in a variety of sources, but establishing a mind-set to actively search for the information that you need appeared to be a strong theme. "Rob," a Gen Xer, states the following,

Research that you do on your own is the fastest way to gain some credibility. When you're working with folks, you have to have some background in what you're speaking to, or to what their perspective may be. For me, when the Internet got here, it was like being in a candy store. Now I have access to everything.

Rob felt that he could find anything at any time just by using Internet search. He likes to show others how to do the same. Voicing the same idea about searching, "Steve," a Millennial, who has been at the company for fifteen years (since college) said, "If you want to change your life and have a different lifestyle than what you had in the past, then it's very important to learn how to do so, and that it can be learned more often than not pursuing your education."

Team Learning

The central concept of this dimension is the value and reward of collaboration by the culture of the learning organization. The majority consensus of those interviewed shared a strong perspective and balanced view regarding collaboration. The opportunity to be independent and self-directed was emphasized along with the opportunity to take advantage of the resources and team learning that is being offered. There was a unified view that rewarding by the company was not obvious, but instead collaboration was expected.

The Team Learning score in the DLOQ was significantly higher for both Millennials and Gen Xers than for Boomers. The score was higher for the Learning Hub over the other learning sources. The technology sources did not vary to any great degree, possibly indicating that the kind of technology is being used does not affect how you collaborated. This is an area that would be interesting to evaluate further.

Here are a few abstract comments on the topic of collaboration: “Maryanne,” who is happy to be a Gen Xer, but thinks like a Boomer says the following about working as a team, “I really enjoy working with others and learning in that sense and doing group type projects and so on.” “Mindy,” another Gen Xer, who is actively involved in her community, said,

I do prefer to learn in a group. The reason being that I think you get different people's impressions and thoughts on a concept, so you learn from their own thoughts going through it at the same time with you.

Sam, a Boomer says he likes to solve problems and comments on team collaboration, “If I’m researching a question, or if I’m working with a team, understanding the motivations of the team is crucial in providing an answer that they can take action on.”

Regarding the view of rewarding. Sam continues with,

The bank encourages learning, but that’s where it stops. They have an expectation that as a subject matter expert in whatever field you’re in that you maintain currency on the topic. There’s typically not really an incentive from a pay-for-performance view on learning that you’ve done on your own.

Sam has been with the firm for over twenty years and feels there is so much more that can be done to enable and reward the employees when it comes to learning.

Embedded System (Established Systems)

According to the description for Embedded System, a learning organization should have the necessary systems to integrate learning into the workplace. Working with the learning and development leadership within this organization provided insights into one of the learning sources, which is known as the Learning Hub. This is a new system that has been deployed to provide both low and high tech methods of deploying curated content. The Learning Hub is accessed from the company intranet and can also be accessed outside via the Internet. The lowest scores on the DLOQ are associated with this dimension. The Learning Hub is a recently new system that has been deployed for less than a year. It would be interesting to study the acceptance and usage of this system with a follow-up assessment using the DLOQ survey.

Some comments that support that lower scores indicated by the DLOQ as it relates to access to systems. “Mike,” a Boomer, says this regarding the resources that are available at work, “I do feel that they at least provide the kinds of tools and

resources, at least to encourage people, give them an opportunity to do that.” Mike is in the technology area and uses different systems on a regular basis. “Fred,” a Gen Xer, shares his thoughts on some restrictions that are in place,

From an industry profession perspective, there are professional organizations, Websites that have research and data and analytics that would benefit me in my learning and development within my career, but yet they're blocked within our computer systems from being viewed.

Another factor that may contribute to the lower score from the DLOQ is that people are aware of the systems and not actively engaging in their use. “Wendy,” a Gen Xer, states, “There are resources that are available, I just need to make the time to use it.” This appears to be a general problem with Gen Xers as they strive to find the right work/life balance.

Empowerment

Empowerment is described in Figure 17 as people being involved in setting and implementing a shared vision and distributed responsibility. Those interviewed shared a common understanding that it was primarily up to each individual to be in charge of their learning and to connect with both internal and external resources to accomplish what is needed. The motivation was not extrinsic and did not come from the company but was intrinsic and driven by the desire to gain and maintain expertise.

Wendy is very much a self-driven, self-directed Gen Xer. She states the following about being empowered,

I feel that there's definitely just more of an influence that I drive that's not being driven by management or by peers but definitely based on some of the things that I've encountered and the change in the marketplace and change in the industry that I work in. I have felt the need to continue to learn and stay abreast of things and different developments, different products.

Sally, another Gen Xer, regarding a shared responsibility, states,

I think I own part of it. Some of it's mandated by where I work and my role and my function. I also think there's a little part of it that I take on and try to understand differently and understand the new stuff, which I probably don't have to do, so I would say it's a combination of my personal interest and work related interest.

Rob, a manager and longtime Gen Xer employee, indicates the following,

“They're willing to invest the energy and the focus in executing the best because they know they're going to get the return for it.” Going deeper in questioning the same individual about interacting with others in the workplace,

I find myself being the “stability factor” to continually educate those that are rotating through the space. My learning turns to teaching, which I feel like you learn as much, if not more, through teaching than you do by being in the “learner's chair.”

Alice, a highly motivated Millennial, shares her view on the company providing her with the opportunity to go outside for additional education,

I know with several of my colleagues with executive MBAs, being able to take off certain Fridays to go to classes. I think they do really promote that and make it something that you can access while also having your full-time responsibilities.

The general dominant codes associated with this dimension are that of being self-directed and work-independent.

System Connection (Support Community)

System Connection as describe in Figure 17 is also referred to as Support Community and is noted as the sixth of the seven dimensions. The work environment is connected into the community and work practice is flexible. The overall DLOQ score is consistently the highest for this dimension. The semistructured interviews provided insights regarding time constraints, flexibility, and mandated learning. Many of the

interviewees voiced strong opposition to the mandated learning, which is required by the government regulators. The following comments were consistent: Jane, a Boomer, was very frustrated with the mandatory training and shared this heartfelt view. "I don't know if you would call this learning but we have training that we're forced to take." On a more positive note with respect to community support, people are encourage to get involved in the industry and make time to accomplish these community interests. Once again, on advancing her education, Alice indicates the following view,

I think, at least speaking to my experience they encourage you to seek further education. I think, generally, in the form of something like a designation that I got. I know that was pretty important to the management here. They feel strongly that to advance you need that. I know that I have a number of colleagues who seek industry designations and then also some that go to executive MBA programs. I do think they are encouraged to seek those types of designations where still working, rather than to go full-time into an MBA. I think that is something that is more achievable.

The general dominant codes associated with this dimension are that of flexibility, time dependent, and incentive.

Strategic Leadership (Provide Leadership)

Two perspectives on this dimension evolved during this research. Before the survey was created for the study, subject matter experts from the executive leadership and development organization were interviewed to help establish the learning sources and technology sources that would be appropriate for the research. The leadership perspective on using learning strategically for business results is valid, based on the level of financial and human capital investments that the organization has made in the past and continues to make. The other perspective, which is the common employee perspective from the sample population, was not in total alignment with the leadership

perspective. However, the overall scores for this dimension from the DLOQ had the greatest dynamic range, from 3 to 5, depending on the level of education and generation. It appears that there is a lot of variability on the perception of how well the leadership is viewed. Phyllis, a young Boomer, who says she thinks like a Millennial share this view on the leadership, "Learning can take on a different placement in the organization in its strategic use or leverage depending on the line of business that you're affiliated or associated with." She goes on to say, "I would say that my interest in learning is at its highest with direct alignment to a business that enables and relies on learning as a key strategic business enabler or lever for success." Rob comments as a Gen Xer, "They're willing to invest the energy and the focus in executing the best because they know they're going to get the return for it."

Summary

This chapter provided detailed insights for each of the three data sources. There were 100 participants that fully answered the survey questions and 12 individuals participated in the semistructured interviews. The triangulation process started with understanding the constructs of the categorical demographic data and the sampling process used to acquire data from the participants. Both instruments provided additional qualitative insights and a clear understanding of preferences and a high-level view of the learning organization for this particular group through the lens of the seven dimensions. The analysis of the data from the semistructured interviews culminated by deriving themes using a descriptive coding process. The interviews made the research more visceral, palatable, and tangible, and helped to verify the validity of the DLOQ

measurements. The next chapter builds upon the data analysis and provides further discussion and a conclusion summary to address the three research questions of this study.

CHAPTER 5

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter has three sections: Discussion of the findings, conclusions, and recommendations for future research. In the discussion of the findings section, the results of the triangulation method using data from the preference scale measurements, the Dimensions of the Learning Organization Questionnaire, and the semistructured interviews is reviewed. The conclusions section shares the view of how this study has provided some very important and unique insights to evaluating the culture of the learning organization. The recommendations for future research section presents an expanded usage of this method of research for the learning organization and specific details for the next phase of this study.

Discussion of Findings

The purpose of this study was to provide a preliminary exploration and analysis in determining individual preferences for learning sources and technology sources. In addition to better understanding these preferences, the goal was to better understand the cultural dimensions of the learning organization. This is a very important research project for the organization simply because learning is a key performance indicator for the organization and is essential to the overall success of the organization. Since this research is a preliminary study, the intention was to focus on a specific sub-sample of the organization. At this time, there was no intention to provide any sort of generalization for the larger population of this organization. Triangulation of data from

the preference SVs, the DLOQ scores, and semistructured interviews provided a better definition of what was needed to equip the organization with optimal learning resources.

Addressing Research Question 1

Research Question 1 states, “What is the preference for learning sources and technology sources by adults in the workplace for this limited population?” This is covered in three parts in the following sections. The first part reviews the findings for the learning sources. The second part reviews the findings for the technology sources. The third part compares the finding and relationship between the two different sources.

The top preference for Learning Sources was Blended with an SV of 65. The second-level preference for Learning Sources was On The Job with an SV of 62. Both of these values were significantly higher than the third place Live, with an SV of 42, and On Demand, which was fourth place with an SV of 31. Going into this study, there was no preconceived notion or expectation. The literature review on both of the top preferences indicates a high frequency of interest and review for both learning sources. The semistructured interviews supported additional validation for both of the top preferences.

Both of the highest SVs for the learning sources were very close and were only three units apart. Since they were widely separated from the next two preferences, it is hard to tell if one is really more desired than the other, but it is clear that both of them were highly preferred. Another interesting finding is the relationship of Blended and On Demand and Live. Blended is the combination of the other two. Given a choice of one

over the other between On Demand and Live , the results indicated an almost split decision with On Demand receiving 46 votes and Live receiving 54 votes. Having a chance to select both by choosing Blended, indicates that both Live and On Demand are actually highly accepted.

The top preference for technology sources was Learning Hub with an SV of 67. The second-level preference for technology sources was Internet Search with an SV of 65. Both of these values were significantly higher than the third place MOOC with an SV of 45 and Social Media, which was fourth place with an SV of 23.

The Learning Hub is a source of curated content that contains a wide variety of technology and content. The content includes voluminous amount of MOOC and Social Media. The same concern, which was explained above regarding the fact that Blended, was a superset of On Demand and Live might apply to the Learning Hub being a superset of MOOC and Social Media. A deeper evaluation of preference, which did not include superset categories, might be in order to find out the true preferences of individual categories.

Comparing the independent results of the learning preferences versus the technology preferences provides some additional insights. A point of interest arises when taking a closer look at the most preferred items in each category (learning and technology) to identify common traits. For example, the most preferred learning source is Blended and the most preferred technology source is Learning Hub. The Learning Hub is curated content, which includes a high proportion of Blended learning. In a similar evaluation of On The Job and Internet Search there is a strong association of using the

Internet as a job aide. Similar associations take place with Live and MOOC, and Social Media and On Demand. These kinds of observations are exactly the kind of high-level insights that the researcher was hoping to discover. These insights can be part of the discussion when establishing the criteria for future research questions and next level research.

Further triangulation using the DLOQ scores indicates some possible relationship with the preference outcomes. Figures 15 and 16 illustrate the relationship of the learning sources and the technology source on the DLOQ scale. An interesting observation is that for the sixth dimension of the DLOQ, which is Support Community, the two highest scores on the DLOQ come from the two highest preferences, which are On The Job and Blended for learning sources; and Internet Search and Learning Hub for technology sources. This observation is a direct result of triangulation and might be by chance and not statistically significant. A future study might address this as a point of research.

Addressing Research Question 2

Research Question 2 states, “How does age, gender, educational level and years of experience influence the overall score measured by the DLOQ for this limited population?” This is covered in four parts in the next sections.

The outcome of the DLOQ implies interesting insights with respect to gender. When comparing the overall average scores of male and female they are almost identical for all of the dimensions except for one (Refer to Figure 11.). The exception is the fourth dimension of the DLOQ, which is Establish System. This dimension is visibly

different. Since the dimension of Establish System includes the use of technology, this may be related to the perception of the way technology is viewed differently between genders. Again, this is the type of insights gained by triangulation.

Looking at DLOQ scores with respect to years of work experience indicates exceptionally high scores for the fewest years of work experience (refer to Figure 12). A deeper evaluation related to the years of experience is needed. It would be good to know if workers that have not been in the work place for an extended period of time are less likely to be forthright in their answers out of fear, since they are not yet comfortable with work environment. In a similar fashion, those who have been working for many years have higher overall scores than those who have fewer years. The semistructured interviews provide additional insights related to Empowerment and leadership.

Figure 13 shows the relationship of the DLOQ scores with years of education. There are five categories of education. The only outlier appears to be the lowest level of education, which is high school. The scores from this category is visibly higher than the other categories. This might be the result of a small number of participants for this category. The other categories do not indicate much visible difference in the scores.

Figure 14 shows the relationship of the DLOQ scores based on generations instead of age. Categorical analysis was used instead of age in order to avoid the temptation to do quantitative correlation. The results of DLOQ scores for Millennials, Gen Xers and Boomers do not indicate any particular trend. The expectations for this

analysis were open without any preset notions. It will require further research to see if there is any correlation.

Addressing Research Question 3

Research Question 3 states, “By using semistructured interviews are there conceptual similarities that relate the DLOQ scores and the preferences for technology sources and learning sources for this limited population?” The information from the interviews gave congruence to the rest of the research. Many of the quotes from the mix of interviewees supported the DLOQ and the preference outcomes. The descriptive coding process was very time consuming and required a lot of work to define the themes. It was qualitatively subjective, but overall themes emerged from two independent coders. The interviews helped to reinforce the concept of reliability in the research process. It was refreshing to better understand the participants and to hear how what they thought of the survey process and the type of inquiry that was presented. All of those who were interviewed expressed an interest in the subject matter and the importance of learning both on the job and in life outside of work.

Future Research

Using this study as a concept for future research can have broader impact than just learning about learning and technology preferences. The theme of this study used the idea of correlating preferences with the overall culture score. It so happened that this organization was interested to see the connection of learning sources and technology sources with the overall learning culture.

The approach of using personal preferences and connecting them with the learning culture can be expanded to a variety of other preference categories. There are a number of preferences associated with each of the seven dimensions of the learning organization. For example, the dimension of *teamwork and collaboration* could have preferences associated with it that could be determined by using the pairwise comparison method and this approach of analyzing the preference scales with the DLOQ scores could be used to better understand that particular dimension of the learning culture.

Another example examined the preferences associated with Embedded System. The choices associated with how learning is shared in the organization could be identified in a similar way the learning and technology sources were identified. These choices could be scaled using the same pairwise comparison process and then further analyzed with a DLOQ evaluation in conjunction with semistructured interviews.

This study was designed to be the first phase of a larger research project. The analysis included both qualitative and quantitative analysis and is considered a mixed method study (Creswell, 2014). The quantitative analysis involved Likert data from the DLOQ instrument. More specifically, the next phase of this study should use a different paradigm, which will have more emphasis on quantitative analysis and include additional continuous demographic data. With a larger random sample, parametric testing can be used for means testing.

The next phase of this research should include additional professional expertise that has deep subject matter knowledge on using the DLOQ. Using DLOQ experts to help

formulate the next phase of this study would build on their previous experience and perhaps share some best practices and identify some of the tools that would be required for in depth statistical analysis. The output of DLOQ is a numerical continuous scale, which could be used in a two-sample *t*-test with gender, which is categorical scaled data. Further ANOVA analysis can be performed against years of experience and age, which would be continuous data. This new kind of demographic data can be correlated with the DLOQ score using Pearson's correlation. This process can show how the overall score is influenced by a number of demographic parameters.

With respect to the DLOQ analysis, the data from other studies outside of this learning organization could provide the basis for a comparative study with other financial institutions. Ultimately, the goal of this kind of research is to provide a better understanding of the learning organization culture and to provide guidance for adopting change. This research can help to identify and justify further investments in the appropriate resources that will be needed in the future. There is no gold standard in place that provides the ultimate understanding of a learning organization; however, having a repertoire of tools and supporting research can provide a level of oversight and guidance for the organization.

Research is a never-ending continuous process and requires the interests of others to continue the work. The next section compiles and brings closure to the first phase of this research and summarizes the outcome and culmination of the findings.

Conclusions

The approach used with this research study was most revealing. Instead of trying to gather some basic information that was limited to one specific component of this learning organization, like just the preferences for learning sources and the preferences for technology sources, a broader method of triangulation was used. Because of triangulation, more information was revealed and overall confidence in the data was established. There is no doubt that the preferences appear to be valid for this group of 100 participants. The tools used for determining SVs proved to have statistical significance and were not by chance.

The semistructured interviews confirmed the clarity of choices that were made in the preferences survey. Metaphorically, the preference survey put the nail into the wood, but the semistructured interviews drove the nail deeper. In addition to confirming the preferences, the semistructured interviews provided deeper insights and confirmation to the scores provided by the DLOQ. The DLOQ probes into each of the seven dimensions that represent the culture of the organization. There were three questions on the survey for each of the seven dimensions. Having a chance to go deeper via interviews with twelve of the participants once again confirmed the authenticity of the DLOQ scores.

The foundation of this study is the research questions. The primary element of these questions was centered on preferences for technology sources and learning sources. Understanding these preferences is important simply because they are not constants and are subject to change that is induced by exponential growth in technology. Evaluating these preferences in a narrow scope outside of the learning

organization culture will not reveal the root cause and driving forces for the changes. It can be concluded that knowing more about the learning culture and correlating that information along with current preferences for technology sources and learning sources can improve the overall learning environment.

This study is unique by evaluating both preferences and learning culture scores. It can serve as a method of constant improvement to assess the changing learning environment. It is worthy of further research, and could be refined and used as an ongoing method to trend the adoption of learning technology. Using preferences analysis in conjunction culture analysis should be a best practice going forward. Paying closer attention to the individual needs can be a big factor in the success of building a true learning organization. Research removes some of the speculation associated with making key decisions related to equipping the learning organization with the appropriate resources.

This study emphasizes the importance of individual preferences and how they are related to the overall learning culture of the organization. Individual preferences go beyond the individual and contribute to the fabric of the team and the organization. Learning organizations need to continuously transform, change and adapt to new circumstances. Technology is one of the key drivers of change in today's workplace.

There are many ways to measure the culture of a learning organization, however this study formulated an approach that combined a valid and reliable instrument, DLOQ with preference tools and personalize interviews to reveal the contribution of personal preferences to continuous learning, inquiry and dialogue and team learning. The

triangulation design method of this study is uniquely applied to understand and assess not only the current learning environment but can be equally used to help determine the trends and direction of the changing learning environment. This study supports the emphasis on role that personal preferences have in the learning organization. It is hopeful from this researcher's perspective that new knowledge has been gained and can be used by others to extend the knowledge base of workplace learning.

APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL



Research and Economic Development
THE OFFICE OF RESEARCH INTEGRITY AND COMPLIANCE

March 11, 2016

██████████
Student Investigator: ██████████
Department of Learning Technologies
University of North Texas

Re: Human Subjects Application No. 16-056

Dear ██████████:

As permitted by federal law and regulations governing the use of human subjects in research projects (45 CFR 46), the UNT Institutional Review Board has reviewed your proposed project titled "Adult Learning: Evaluation of Preferences for Technology and Learning Sources for Workplace Learning." The risks inherent in this research are minimal, and the potential benefits to the subject outweigh those risks. The submitted protocol is hereby approved for the use of human subjects in this study. **Federal Policy 45 CFR 46.109(e) stipulates that IRB approval is for one year only, March 11, 2016 to March 10, 2017.**

Enclosed are the consent documents with stamped IRB approval. Since you are conducting an online study, **please copy the approved language and paste onto the first page of your online survey. You may also use the enclosed stamped document as the first page of your online survey.**

It is your responsibility according to U.S. Department of Health and Human Services regulations to submit annual and terminal progress reports to the IRB for this project. The IRB must also review this project prior to any modifications. **If continuing review is not granted before March 10, 2017, IRB approval of this research expires on that date.**

Please contact The Office of Research Integrity and Compliance at 940-565-4643, if you wish to make changes or need additional information.

Sincerely,

Chad Trulson, Ph.D.
Professor
Chair, Institutional Review Board

CT: JP

UNIVERSITY OF NORTH TEXAS

1155 Union Circle #310979 Denton, Texas 76203-5017
940.369.4643 940.369.7486 fax www.research.unt.edu

FOR MORE INFORMATION CONTACT THE OFFICE OF RESEARCH INTEGRITY AND COMPLIANCE

APPENDIX B
INFORMED CONSENT DOCUMENT

Informed Consent

University of North Texas Institutional Review Board Informed Consent

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study:

Adult Learning: Evaluation of preferences for technology and learning sources for workplace learning

Student Investigators:

██████████, University of North Texas (UNT) Department of Learning Technologies.

Supervising Investigator:

██████████, University of North Texas (UNT) Department of Learning Technologies.

Purpose of this study:

To better understand preferences for technology sources and learning sources for adults in the workplace. The workplace has multiple generations working together. How they prefer to learn, what they prefer to learn and where they prefer to learn is potentially valuable information for the learning organization within the workplace. This study will use two surveys along with semi-structured interviews in order to identify emergent patterns.

Study Procedures:

If you are a participant in this study, you will be asked to complete two short survey instruments and optionally a semi-structured interview regarding your experience. The first instrument is the short form (21 questions) Dimensions of Learning Organization Questionnaire and the second is a pairwise comparison survey used to prioritize 4 learning sources and 4 technology sources. The two survey instruments should take less than thirty minutes to complete and the optional semi-structured interview will not exceed 30 minutes.

Foreseeable Risks: No foreseeable risks are involved in this study.

Benefits to the Subjects or Others:

This study could potentially provide valuable information for the learning organization within the workplace and help create improved approaches and resources for a multi-generational workforce.

<http://www.bobalu.org/InformedConsent.html>

APPROVED BY THE UNT IRB

DATE: 3/11/16 - 3/11/17
JFK

Page 1 of 2

Compensation for Participants:

None.

Procedures for Maintaining Confidentiality of Research Records:

The confidentiality of your individual information will be maintained in any publications or presentations regarding this study. Questions about the Study: If you have any questions about the study, you may contact ██████████, University of North Texas (UNT) Department of Learning Technologies or ██████████, University of North Texas (UNT) Department of Learning Technologies.

Review for the Protection of Participants:

This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

APPENDIX C
SEMISTRUCTURED INTERVIEW QUESTIONS

- 1) Has your interest in learning changed depending on where you work?
- 2) Do you consider yourself a lifelong learner?
 - a. Has your interest in learning changed over time?
- 3) Do you feel that workplace encourages you to learn?
 - a. By that, I mean to say, is there a compelling incentive for you to advance your level of knowledge and expertise at work?
 - b. Do you feel like you need to learn more?
- 4) Do you personally have ideal learning environments? If so, what do you like about them?
- 5) Do you prefer to learn alone or with others?
- 6) How big a factor does your workplace influence your learning?
 - a. Does it make a significant difference?
- 7) Do you feel like you are in charge of your learning?
 - a. What you learn, when you learn, where you learn?

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