

AN ABSTRACT OF THE DISSERTATION OF Charles M. Bagley for the degree of Doctor of Education in Learning, Leadership, and Community presented on November 14, 2018.

Title: An Evaluation of the 70:20:10 Framework for Workplace Learning.

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This evaluation studied the evidence of research-based learning theories and practices in the 70:20:10 framework literature. Carefully noting that the 70:20:10 framework is a workplace performance model (that is, a model that underscores doing work tasks versus only knowing about them), this investigation finds the majority of the framework literature was well grounded in the basic elements of human learning outlined in the literature review. There was sound evidence of research-based learning theories and practices woven throughout the framework literature. Additionally, the 70:20:10 framework literature aligns with how workplace learning is developing in the twenty-first century.

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An Evaluation of the 70:20:10 Framework for Workplace Learning.

By

Charles M. Bagley

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Chapter 1: Introduction

Currently, the effectiveness of formal workplace learning in the U.S. remains low despite significant commitment of time and resources (Caffarella & Daffron, 2013; Merriam & Leahy 2005; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012) or as Silverman (2012) astutely observes, “So much training, so little to show for it” (para 1). This is a considerable challenge to U.S. businesses and organizations as they look for a competitive edge to enhance their bottom line and overall effectiveness (Noe, 2017).

Caffarella and Daffron (2013) report a significant reason for the low effectiveness of typical workplace learning is the use of instructional practices that do not address the complexity of the learning process. One predominant weakness is the failure to address the challenge of using the learning effectively once the learning episode is completed, referred to as the transfer of learning process. Research conducted by Hutchins, Burke and Berthelsen (2010) suggests workplace learning professional’s “use of less scrutinized, proximate methods” that are not well grounded in research-based learning theories and practices also contributes to the low transfer of learning problem (p. 613). Their research further suggests, “training practitioners seldom consult either the research or practitioner literature and find it of little value in supporting their workplace learning role” (p. 613). Exacerbating to the problem, is that many learning and development (L&D) professionals are routinely barraged with a sundry array of workplace training strategies, concepts, products and merchandises promising quick and effective results. Thomson, Pate, Schnidman, Lu, Andreatta and Deweet (2017) report, “the L&D industry is complicated, with varying structures,

shifting priorities, disruptive technologies and multiple audiences to appease. It's a lot to keep tabs on, and it's becoming increasingly more complex as new skills and new ways of learning emerge" (p. 4). Without a firm understanding of research-based learning theories and practices, Kirkpatrick & Kirkpatrick (2011) suggest, "Training activity can be mistaken for value, and effort for impact," (para. 2). Accordingly, contemporary workplace learning effectiveness is wanting despite substantial commitment of time and resources. This is attributed to L&D professionals failing to embrace the complexities of the learning process and effective use of research-based literature to inform their practice.

However, there is a workplace learning strategy that attempts to counter these recognized weaknesses. The 70:20:10 framework provides a model that repositions how learning and development can be conducted with better results by mixing formal learning (around 10 percent) with social learning such as coaching or peer learning (approximately twenty percent) and experiential, informal learning (roughly seventy percent). It is critically important to note that these percentages are rough guidelines that vary significantly and are not fixed or permanent prescriptions. This approach is not new; Jennings (2016a) suggests, the roots of the 70:20:10 framework can be traced back to Socrates who perceived adult learning "to be a process of mental inquiry, not passive reception of transmitted content" (Knowles, Holton & Swanson, 2011, p. 34) while Scott and Ferguson (2016) argue references to the framework can be traced back to Tough (1971). Moon (2015) finds evidence suggesting this model "has been around since the mid 1980's" (p. 6). However, it was first formalized in 1996 as a result of a longitudinal study conducted by the Center for Creative Leadership. Key

aspects of the framework are the recognition and facilitation of social (learning with and from others) along with informal and experiential learning within the workflow in the service of enhancing work performance. “The business world is abuzz with 70:20:10” assert Arets, Jennings & Heijen (2016, p. 6) but how much of this approach is founded on research-based learning theories and practices that can address the complexity of effective contemporary workplace learning? Or is this approach simply a scheme that is overhyped and well marketed but lacking in theoretical substance and practicality?

Purpose of the Study

The purpose of this study is to assess the 70:20:10 framework’s grounding in research-based learning theories. Further, the study addresses the complexity of effective contemporary workplace learning to determine how these findings may support practitioners in learning and development.

The literature review process did not reveal any other academically sponsored, scholarly research on the 70:20:10 framework suggesting this work may be the first. Though limited only to the connection of the 70:20:10 framework to research-based theory and practice, this work offers no longitudinal or comparative insights. However, evaluating the connection of the 70:20:10 framework to research-based theory and practices may provide valid insights regarding the previously mentioned findings by Hutchins, Burke and Berthelsen (2010).

Research Questions

1. What is the evidence of research-based learning theories and practices in the 70:20:10 framework?

2. How might understanding these findings inform learning and development practitioners?

Research Approach

The research methodology used for this investigation is the Context, Input, Process, and Product or CIPP program evaluation model. It is a well-established, comprehensive framework for conducting formative, summative and developmental evaluations of programs, projects and organizations (Stufflebeam & Shrinkfield, 2007). First developed to facilitate improvement and accountability in public schools, the model has an extensive record of successful applications in a number of areas within the United States and internationally. The structure of the CIPP model lends integrity to the evaluation process and combats poorly designed evaluations that allow for biased and corrupted findings (Stufflebeam & Zhang, 2017). Because of its quality, the CIPP model resides in the company of legitimate evaluations models that “convey valid descriptions and judgments of a program or other entity” (Stufflebeam & Zhang, 2017, p. 2).

Specific to this work, there are no shortage of examples regarding the successful use of the CIPP model in evaluating workplace learning and development programs. Examples range from employee training satisfaction in Korea (Jeon & Lee, 2014) to the quality and merit of nursing education programs in the United States (Lippe & Carter, 2017) to call center performance in Turkey (Kavgaoglu & Alci, 2016) to training evaluation in public organizations of Pakistan (Khalid, Rehman & Ashraf, 2012). Moreover, the use of the CIPP model is commonplace as a dissertation format; so much so, that several doctoral programs offer a standard CIPP template for

using the model in developing dissertations. Additionally, after this work is completed, it provides a reliable and robust structure to discern the value of workplace learning in the quickly changing, complex and complicated learning and development landscape previously noted by Thomson, Pate, Schnidman, Lu, Andreatta and Deweet (2017).

To further ensure the integrity of the evaluation process, a meta-evaluation is conducted using the 2011 edition of *The American Evaluation Association Standards* for program evaluation to document how the quality evaluation indicators were addressed throughout the evaluation process. Employing the American Evaluation Association (AEA) standards adds an additional layer of evaluation support to ensure the quality, value and worth of the evaluation process. Beginning in the 1960's, these standards have slowly emerged into the current form in response to the question, "...what is required for a high-quality reflective evaluation practice in current North American, multicultural, globalized settings?" (Yarborough, Shulha, Hopson, & Caruthers, 2011, p. xxxviii).

From this evaluative analysis, conclusions are formulated regarding the degree to which the 70:20:10 framework is grounded in research-based learning theories and practices with insights that inform learning and development practitioners.

List of Terms

70:20:10: is a framework that provides a structure repositioning how learning and development can produce better results by mixing formal learning (approximately 10 percent) with social (approximately twenty percent) and experiential, informal learning (approximately seventy percent).

Formal learning: the third partner of the informal, non-formal, and formal learning triad, formal learning is learning taking place in a planned, deliberate manner.

Informal learning: learning taking place in a manner that is not intentionally prearranged.

Learning: the process where the learner can perform the intended learning repeatedly, skillfully and exponentially after the instructional episode is completed.

Learning and development: commonly referred to as L&D, learning and development is the area of expertise that facilitates individual, group, team or organizational learning and performance development within an organization, corporation, or institution.

Research-based learning theories and practices: learning concepts and principles that are firmly grounded in accepted and reputable learning theories and practices.

Workplace learning: learning that takes place in any institution, business, corporation or organization.

Chapter 2: Review of Literature

The purpose of this study is to assess the 70:20:10 framework's grounding in research-based learning theories. This literature review did not reveal any other academically sponsored, scholarly research on the 70:20:10 framework suggesting this work may be the first. By evaluating the connection of the 70:20:10 framework to research-based theory and practices, valid insights may be revealed pursuant to the low effectiveness of workplace learning.

Learning is a natural part of the human endeavor and continues to be a critical factor in a human being's ability to survive and thrive. Learning comes so naturally to humans that infants begin learning on their own within hours of being born (Medina, 2014). Yet when learning is formalized in a workplace setting (that is learning that is planned and delivered deliberately) it can be less than fully effective. This review looks at five areas:

1. The development of formal workplace learning.
2. Theories and theorists that are critical to evaluating the 70:20:10 framework for evidence of research-based learning theory and practice.
3. Elements of effective learning that are also critical to evaluating the 70:20:10 framework for evidence of research-based learning theory and practice.
4. The emergence and components of the 70:20:10 framework.
5. The role of cognitive biases in thinking and decision-making.

First however, the review begins with an important foundational exploration of what learning is and how it takes place. Exploring these two topics helps to frame the investigation and provides a deeper understanding of the learning dynamic.

What is learning?

Simply put, learning is constructing experience (Sheckley & Bell, 2006).

Experience is derived from potentiation; meaning neurons (brain cells) firing over and over, and the result of repeated experience is “the process of building neural networks” in the brain’s long-term memory (Wolfe, 2001, p. 135). As it does this, the brain “constantly shapes and re-shapes itself as a result of experience” (Sousa, 2012, p. 1). This process creates the reservoir where learning resides that is well described by Kahneman (2011) who emphasizes the importance of practice and feedback in the learning process,

Memory holds the vast repertory of skills we have acquired in a lifetime of practice, which automatically produce adequate solutions to challenges as they arise, from walking around a large stone on the path to averting the incipient outburst of a customer. The acquisition of skills requires a regular environment, an adequate opportunity to practice, and rapid and unequivocal feedback about the correctness of thoughts and actions. When these conditions are fulfilled, skill eventually develops, and the intuitive judgments and choices that quickly come to mind will mostly be accurate (p. 416).

Accordingly, Knowles, Holton and Swanson (2011) assert learning is basically a change as a result of an experience, a view that is shared by Merriam, Caffarella and

Baumgartner (2007) who observe that though learning is a complex process it is “a change in behavior” (p. 276). This view is similar to neuroscientists Corkin and Wilson (2007) who state that learning is an adaptable transformation in brain structure based on experience which is in concert with Seung’s (2013) view, “you are the activity of your neurons” (p. xviii).

These distinguished scholars paint a clear picture; successful learning is an experiential process where a learner can perform the intended learning repeatedly, skillfully and exponentially after the instructional episode is completed...and that is often far from what happens in formal workplace learning. Workbooks, lectures, and videos, “remain the strategies of choice in the industry. And this is a problem, [sic] we know from the body of research that learning occurs through the practice and feedback components” (Salas, Tannenbaum, Kraiger, Smith-Jentsch, 2012, p. 86). Why this ongoing reliance despite poor results? Kolb (2005) suggests, “as educators, we have created a system that makes it almost impossible to learn” while Ericsson and Pool (2016) describes why this systematic learning failure occurs so often,

The bottom line is what you are able to do, not what you know, although it is understood that you need to know certain things to be able to do your job. When people are trained in the professional and business worlds, you find a tendency to focus on knowledge at the expense of skills. *The main reasons are tradition and convenience: it is much easier to present knowledge to a large group of people than it is to set up conditions under which individuals can develop skills through practice* [emphasis added] (p. 131).

The results of the common yet ineffective approaches to formal workplace learning are described by Merriam and Leahy (2005), “millions of dollars are spent every year on continuing education and training, yet some estimate that less than 10% of this expenditure pays off in improved performance at work” (p. 1). While Ford, Baldwin, and Prasad (2018) report though organizations spend significant amounts of money on workplace learning with some positive results, business and organizations “could be getting a better return on their investment” (p. 20). This situation begs the question, how did we end up with such a system?

The development of formal workplace learning

The aspect of this review is by no means an attempt at an exhaustive review of the historical and archeological literature on the development of formal workplace learning. To do so, is well beyond the scope of this study. However, a reasonable, scholarly review of applicable historical and archeological literature reveals a recognizable pattern indicating the emergence and evolution of formal learning has not always been fully compatible with how humans learn best. Moreover, this pattern suggests evidence of motivations other than developing the learner as a fully functional, critical thinking human-being may, at times throughout history, be responsible for the development and implementation of formal learning. Accordingly, this portion of the investigation submits pragmatically selected examples of the literature that illustrates this observed pattern and informs the focus of this research.

Roots of human learning. An understanding of learning’s roots informs and provides context for a deeper understanding of some of the oldest and most developed approaches to learning. Though workplace learning is relatively new in the expansive

history of human existence, it is a significant aspect of human development (Watkins, 1995). Beginning with our human learning roots, Estep (2008) surmises, “the history of training and learning begins with the very beginning of humankind with elders teaching the young how to find and recognize edible plants, hunt and process game, care for children, and make weapons and tools from local materials” (p. 10). Watkins (1995) argues that “some suggest training can be traced back to early cave paintings that depicted hunting lessons” (p. 4). Gray (2008) concurs with his observation and adds that for millions of years as hunter-gatherers, humans did not distinguish between work (hunting and gathering), learning and play. It wasn’t until the comparatively recent advent of agriculture, followed by industrialization, that formal learning emerged and these three endeavors (work, learning and play) were separated (Gray, 2008). Religious influence on the development of formal learning played a notable role beginning with the temple economy in the Fertile Crescent around 4500-3500 BCE. Knowledge (initially that of the seasons) became a commodity to be bartered for in return for sustenance while fear was used to maintain control (Wallech, Daryae, Hendricks, Negus, Wan, & Bakkan, 2013). Gray (2008) argues that as formal learning began to mature, it became a means of training for long, laborious hours tending the fields and cattle or later for long hours of tedious, boring work as industry began to develop. Knowledge, skill and ability development was secondary to changing behavior; “the goal,” he writes, “was indoctrination, not inquisitiveness” (p. 57).

In medieval times, the majority of people didn’t go to school but “learnt through work” (Orme, 2001, p. 307) which began as child workers, given that

industrialists through the nineteenth century “wanted to keep poor children at work in factories” (Gray, 2008, p. 62). Religious influence continued in western civilization through the beginning of the 20th century facilitating obedience in what “was little less than slavery” (Cubberley, 1920, p. 457). Both school and workplace learning seemed to have influenced each other at different times throughout history (sometimes being interchangeable such as medical school training for new medical doctors) and there is reasonable evidence that suggests both are rooted in fear and control as foundational learning motivation strategies (Gray, 2008); nearly the opposite of what the learning motivational theorists recommend (such as personal control of the learning, psychological safety, meaning, rest and encouragement; Wolkowski, 2008). As Ericsson and Pool (2016) alluded, traditions often linger and the roots of these are still commonly found in present-day learning venues.

Apprenticeships. As specialized roles began to emerge, and agrarian and industrialized tools and equipment became more complex, the need for specialized skill development was required (Sleight, 1993). Apprenticeships formerly emerged in the Middle Ages and often came under the authority of guilds that assumed responsibility for the quality, standards and authorization of membership adhering to these three levels of proficiency: “the master, who owned the materials and directed the work; the journeyman, who worked for the master in return for pay; and finally the apprentice.” (Estep, 2008, p. 12). Watkins (1995) reports apprenticeships in the 1700’s were the most common workplace learning strategy in the United States but were often provided under arduous circumstances. It wasn’t until the 1800’s that formal classes began to emerge modeled after the elementary and secondary school

classrooms of the times that emphasized “linearity, conformity and standardization” (Robinson, 2011, p. 8). Shaw and Craig (1994) observe,

For half a decade, the ideology of mass production ruled the way people worked, the way they thought about work, and the way they learned for work. Apprenticeships gave way to group training--away from the shop floor or the supervisor's desk. And gradually, learning about work moved away from work itself (p. 5).

Mass training. The Industrial Revolution technology increased “the ability of the factory to produce concrete goods quickly and cheaply, so more workers were needed to run the machines” (Sleight, 1993, para. 14). Sleight continues,

The factory owners wanted the workers trained quickly because there was a large demand for the produced goods. Since the machines were much more complicated than the tools of the agrarian society of the past, and training needed to be accomplished quickly, the training methods of the past were inadequate. Unlike on-the-job training and apprenticeship, classroom training could train many workers at the same time and under a single trainer, so fewer trainers were needed. Learning away from the job kept distractions from the production floor at a minimum and did not take equipment out of production for use in training (para. 14).

However, the classroom approach had drawbacks despite its economic and production feasibility and efficiency; mainly poor transfer of learning, lack of contextualization and relevance of the learning, and inability to adjust the pace of the learning to individual learning needs (Sleight, 1993; Watkins, 1995; Estep, 2008). World War I

and II facilitated enhanced training delivery in order to meet the demands of war time production where systematic instructional methods were established. Vestibule or “near-the-job” training emerged to meet the shortcomings of classroom training while attempting to embrace the benefits of apprenticeships. Near-the-job training facilitates training that is close to the work that the workers will be doing with qualified instructors that were usually well experienced machine operators or managers. The idea was to minimize the transfer of learning barriers and make the transition from learning to work as seamless as possible. Charles R. Allen exemplifies this approach with the introduction of the remarkably effective yet simplistic, “show, tell, do, check” method of near-the-job/on-the-job training to train fifty thousand shipyard workers in 1917; “Supervisors had pocket cards reminding them to tell the workers what to do, show them how to do it, have them do it, and then check to see that they understood. This method is still used in on-the-job training programs” (Watkins, 1995, p. 5). Post World War II saw workplace learning develop in sophistication as it was influenced by “the growth of the behavioral sciences, the American civil-rights movement, the advent of information technology, and recently, the crisis of global economic competitiveness” (Shaw & Craig, 1994, p. 5).

Contemporary and future learning. The Association for Talent Development’s *2016 State of the Industry* reports, “spending on learning programs continued to be a priority for organizations in 2015” (p. 9) as businesses and organizations look towards learning to enhance their bottom line and overall organizational effectiveness. Arie De Geus of Royal Dutch Shell aptly points out, “The ability to learn faster than your competitors may be the only sustainable

competitive advantage” (as cited in Senge, 2006, p. 4). In response to these needs, Noe (2016) projects the following future trends in workplace learning

- Wearables (smartwatches, bands, smart eyewear);
- Gamification;
- Wireless Tablet-Based Technology;
- Mobile Learning;
- Augmented Reality Virtual; and
- Artificial Intelligence (p. 495).

Note the re-emergence of play (in the form of gamification) and the use of technology to embed learning seamlessly into work to create a practical learning experience. It appears workplace learning may be coming around full circle back to how hunter-gatherers originally learned (albeit minus the technology). As effective learning strategies are explored, the pedigree of their success can often be found embedded in human learning characteristics of the hunter-gatherer era that relied on the development of experience. Corrigan (2013) recognizes this in the context of active learning,

It seems that the failure of active learning practices to gain wider purchase in contemporary education, despite the current active learning movements, can be attributed in part to the common misunderstanding that lecturing is *the* traditional approach, not active learning. But, when we take an epochal perspective, it turns out that active learning has an ancient history, while lecturing is the fad, a blip in the history of learning (para. 14).

Furthermore, re-integrating enjoyment into learning seems to be a natural return to the true human self and the future, whether work, play or learning, will be wherever people are having the most fun (Johnson, 2016).

Unfortunately, contemporary formal workplace learning continues to rely heavily on generally ineffective delivery strategies selected by decision makers not skilled in assessing appropriate training effectiveness (Brinkerhoff and Montesino, 1995; Kirkpatrick and Kirkpatrick, 2011). Moreover, decision makers are confronted with a variety of means for assessing learning effectiveness ranging from single to multiple item scales, content validation and situation specific measures (Holton, Bates, & Ruona, 2000, p. 336). The use of these tools “raises several concerns” due to poor reliability, “misinterpretation of findings and measurement error” (Holton et al., 2000, p. 336) and “until recently, no diagnostic tool has emerged” that is valid and reliable (Holton, Bates, Bookter & Yamkovenko, 2007, p. 386). Presently, one of the strongest systems for determining learning effectiveness is the Learning Transfer System Inventory (LTSI), which is rigorously validated due to its comprehensive, methodical measures (Noorizan, Nur Fareeha Afan, Norfazlina, & Akma, 2016, p. 159), yet upon inspection none of the measures built into the LTSI include evidence of neurocognitive or experiential learning practices as described previously.

The classic theorists

A review of learning cannot be complete without a review of at least a sampling of some of the most influential learning theorists and a brief discussion of their impact on the development of formal learning. Note, however, that this review is

intentionally quite cursory to avoid being drawn into the deep chasm of voluminous theorists and theories.

Piaget. Jean Piaget (1896 – 1980) used his early interests in zoology and his academic preparation in biology to ground his research in what is referred to as “‘the master plan’ to address the question of ‘how does knowledge develop?’” (Snowman and McCown, 2013, p. 23). A key underpinning of Piaget’s theories is the concept that humans are born with a natural affinity for organization and an innate ability to adapt (Snowman and McCown, 2013). These themes facilitated Piaget’s view that the learner is often in a state of constantly creating and recreating a model of their own reality (Encyclopedia Britannica, 2013). Through these constant changes emerged Piaget’s view that the learner goes through a number of stages. The first is the sensorimotor stage occurring from birth to age 2 followed by the preoperational between ages 2 and 7. The third stage is the concrete operational stage occurring from ages 7 to eleven with the final stage being the formal operational stage that emerges in adolescence and continues into adulthood (Wood, Smith and Grossniklaus, 2001). Wood et al. (2001) report Piaget’s belief in lifelong learning is key to intellectual development and does not stop or discontinue at any given time however he theorized that once formal operational thought was achieved, “no new structures were needed” (para. 8). Though Piaget felt no new structures were needed he asserted this is an important consideration for this investigation, “Intellectual development in adults involves developing more complex schema through the addition of knowledge” (Wood et al., 2001, para. 8).

Vygotsky. A contemporary of Piaget, Lev Vygotsky (1896 – 1934) is considered to be one of the most influential educational psychologists (Yasnitsky, 2012). He was the first to offer an alternative to Piaget’s explanations of cognitive development by positing the concept that cognitive development is strongly influenced by those who are more intellectually advanced (Snowman & McCown, 2013). He also developed the concepts of psychological tools to aid and change the thought process, the zone of proximal development, and scaffolding (Snowman & McCown, 2013). His untimely death prevented the full development of his theories and hypotheses, and impeded the widespread implementation of his ideas. Despite this, his work provides an important foundation for contemporary educational psychology and is the cornerstone for modern social constructivism theory.

Dewey. John Dewey (1858 – 1952) offered a radically different approach to teaching practices and his work is considered a “turning point” for an enhanced, wholistic view of learning. Dewey’s views are well summarized using science curriculum as an example,

All that we can be sure of educationally is that science should be taught so as to be an end in itself in the lives of students – something worthwhile on account of its own unique contribution to the experience of life (Dewey, 1916, p.282).

This experiential approach that connects new learning to existing experiences, otherwise now known as cognitive activation, is a hallmark of Dewey’s work. Dewey felt the teacher’s business is to facilitate a cooperative learning enterprise, not dictation (Dewey, 1939). He writes, “the development occurs through reciprocal give

and take, the teacher taking but not afraid to give. The essential point is that the purpose grow [sic] and take shape through the process of social intelligence” (Dewey, 1939, p. 47). Dewey (1939) went on to suggest that a type of learning regardless of the topic must be facilitated within the “scope of ordinary life experiences” (p. 48). Dewey’s conclusions were the result of an authentic pursuit of truth using the scientific method (make a hypothesis and empirically testing it under controlled conditions) which began to move formal learning from command and obedience to curiosity, spontaneity and freedom (Cahn, 2018). Cahn (2008) writes, “Dewey stressed that ideas are to be judged not by their origins but by their consequences” (p. x).

Erikson. Erik Erikson (1902 – 1994) is noted for his eight stages of intellectual and personality development. Stages 1 – 5 occur in childhood (infancy, early childhood, play, school, and adolescent) while the final three stages occurring in various stages of adulthood: young adulthood, adulthood and old age (Cavanaugh & Blanchard-Fields, 2011). Erickson believed all of the eight stages occur at their own unique time during one’s lifespan and involves the resolution of a crisis or dilemma resulting in the emergence of a strength associated with each stage of development (Knowles, Holton & Swanson, 2011). A synthesis of Erickson’s views suggest human development (and specific this investigation adulthood) are a number of definable, ongoing sequences that the individual must navigate in order to fully develop as a functional person. Knowles, Holton & Swanson (2011) argue, “Each transition to a new stage creates motivation to learn ... [and] by understanding the developmental life span, practitioners can be more attuned to adults’ motivation to learn” (pp. 223 – 224).

Knowles. Malcolm Knowles (1913 – 1997) was one of the most prominent adult learning scholar-practitioners in the world. Knowles is most recognized for his work in advancing andragogy defined as the art and science of how adults learn. This perspective in contrast to the widely misused term in adult learning of pedagogy which is derived from the Greek words ‘lead the child’ and defined as the art and science of teaching children to learn (Merriam, Caffarella and Baumgartner, 2007; Knowles, Holton & Swanson, 2011). A pedagogical approach requires the instructor to assume full responsibility for the entire instructional episode dictating what, how, and when the learning will take place and then determining if indeed the learning had taken place (Knowles, Holton & Swanson, 2011). Conversely, Knowles advanced an andragogic perspective first developed in Europe in the 19th and early 20th centuries by outlining the now celebrated six assumption of adult learning as defined by Knowles, Holton & Swanson, 2011 (pp. 63 – 67):

1. The need to know. Adults need to know why they need to learn something before undertaking it.
2. The learners’ self-concept. Adults have a self-concept of being responsible for their own decisions, for their own lives. Once they have arrived at that self-concept, they develop a deep psychological need to be seen by others and treated by others as being capable of self-direction.
3. The role of the learners’ experiences. Adults come into an educational activity with both a greater volume and a different quality of experience from that of youths. It also means that for many kinds of learning the richest resources for learning reside in the adult learners themselves. But

the fact of greater experience also has some potentially negative effects. As we accumulate experience, we tend to develop mental habits, biases, and presuppositions that tend to cause us to close our minds to new ideas, fresh perceptions, and alternative ways of thinking.

There is another, more subtle reason for emphasizing the experience of learners,

it has to do with each learner's self-identity. To children, experience is something that happens to them; *to adults, experience is who they are* [emphasis added]. The implication of this fact for adult education is that in any situation in which the participants' experiences are ignored or devalued, adults will perceive this as a rejecting not only their experience, but rejecting themselves as persons.

4. Readiness to learn. Adults become ready to learn those things they need to know and be able to do in order to cope effectively with real-life situations. An especially rich source of readiness to learn is the developmental tasks associated with moving from one developmental stage to the next. The critical implication of this assumption is the importance of timing learning experiences to coincide with those developmental tasks. For example, a sophomore girl in high school is not ready to learn about infant nutrition or marital relations, but let her get engaged after graduation and she will be very ready.

Bench workers are not ready for a course in supervisory training until they have mastered doing the work they will have to supervise and have decided they are ready for more responsibility.

5. Orientation to learning. In contrast to children's and youths' subject-centered orientation to learning (at least in school), adults are life-centered (or task-centered or problem-centered) in their orientation to learning. Adults are motivated to learn to the extent that they perceive that learning will help them perform tasks or deal with problems that they confront in their life situations. Furthermore, they learn new knowledge, understandings, skills, values, and attitudes most effectively when they are presented in the context of application to real-life situations.
6. Motivation. Adults are responsive to some external motivations (better jobs, promotions, higher salaries, and the like), but the most important motivators are internal pressures (the desire for increased job satisfaction, self-esteem, quality of life, and the like).

Summary of key insights. In the review about learning, the argument was presented that learning resides as a function of experience. In as much that humans learn from experience, they can become captives to it as well. Consequently, the theorists discussed in this section, arrive at their conclusions, at least in part, as a derivative of their own experiences. Piaget was influenced by his early interests and later by his formal education in zoology in constructing his views on learning particularly the human ability to adapt to new and different situations. While Piaget believed students learn best when interacting with each other, Vygotsky's view that

learners developed quicker from “the instructional interactions they have with those that are more intellectually advanced” (Snowman & McCown, 2013, p. 36) may have well been influenced by “all the cross-winds of social movements that blew through the Soviet society” in a time of revolutionary social construction during his adult life (Van der Veer et al, 1991, p. 296). Early communist doctrine required educational work as a central aspect of Marxism and this education and reeducation directed by the Communist party during the Bolshevik era (Brians, 2011) and early Soviet Republic that may have provided a significant and persuasive backdrop influencing Vygotsky’s view of learning from someone more intellectually sophisticated. Authenticity in developing intellectual experience is at the heart of Dewey’s view on learning and development. Jane M. Dewey (1939) observes in the “Biography of John Dewey”,

That his boyhood surroundings played a large part in forming John Dewey's educational theories is clear. As a boy and young man he saw almost all his associates assuming a share in household activities and responsibilities. Young people were brought into intimate contact with a whole round of simple industrial and agricultural occupations. On the other hand school was a bore, not only to his companions, but to Davis and himself, who were interested in reading almost anything except their school books, and its tiresomeness was mitigated only by the occasional teacher who encouraged conversation on outside topics. The realization that the most important parts of his own education until he entered college were obtained outside the school-room played a large role in his

educational work, in which such importance is attached, both in theory and in practice, to occupational activities as the most effective approaches to genuine learning and to personal intellectual discipline. His comments on the stupidity of the ordinary school recitation are undoubtedly due in no small measure to the memory of the occasional pleasant class hours spent with the teachers who wandered a little from the prescribed curriculum (p. 9).

One can almost see these influences in nearly every aspect of Dewey's writings on education and society.

Erikson underwent similar experiences. Boeree (2006) reports Erickson did not favor formal schooling, choosing instead to wander around Europe, visiting museums and sleeping under bridges living the life of a happy-go-lucky nonconformist. However, despite this casual start, Erickson eventually found himself at Harvard where he worked and interacted with leading psychologists (Henry Murry and Kurt Lewin) and anthropologists (Margaret Mead, Ruth Benedict, and Gregory Bateson) as part of his work sought to enhance formal learning through his research and design of human developmental stages (Thomas, 2002).

Conversely, Knowles excelled at school being recognized as a "very able student" as early as the fourth grade and was successful in nearly every possible way: Eagle Scout, scholarship recipient to study in Switzerland his junior year in high school, and acceptance to Harvard (Cooke, 1994). However, his early life experiences with his father, a veterinarian in Missoula, Montana, taught him "how to think critically and how to learn from other people by asking [sic] good questions" along with

acquiring the qualities of generosity, integrity, fairness and authenticity (Knowles as cited by Cooke, 1994, p. 48). It was this ability to think critically and ask illuminating questions that facilitated his ongoing development of the lifelong process of learning (Cooke, 1994, p. 64).

Keeping in mind the argument that humans learn from experience, one can observe experiential influences on these noted theorists. Despite the normalness of the theorist's response to their experiences due to the innate influence of experience on the human perspective, several reoccurring themes emerge from this review of the classic theorists that inform this investigation:

- Experience, in a variety of forms and interpretations, is one of, if not the, essential component for effective learning.
- For learning to be fully effective, learning needs to be contextually relevant in order to attract and motivate the learner.
- Humans have a propensity for trying to make sense out of the chaotic overture of data acquired through their brain's sensory register (seeing, hearing, feeling, tasting, and smelling). This propensity for order takes on the form of attempting to organize and catalog data into themes, stages and categories.
- Learning does not take place in isolation but is enhanced by interaction with others whether it be with a peer or a colleague as suggested by Piaget or, as Vygotsky phrased it, a "more knowledgeable other."

Traditional learning theories

Despite the human penchant for categories, classifying learning into categories and themes remains remarkably elusive. Merriam, Caffarella and Baumgartner (2007) argue, “Learning defies easy definition and simple theorizing” (p. 275) primarily due to the remarkable complexity of the brain and its learning system. Stein (2010) believes the complexity of the human brain cannot be measured or quantified while Medina (2014) asserts, “Every brain is wired differently.” Though humans all enjoy (for the most part) the same neuroanatomy, the individual neural patterns are universally dissimilar. Accordingly, Merriam et al. (2007) underscore there is little consensus on how many learning theories there are or how they should be organized. This review recognizes these considerations in briefly appraising the following theories in service to the overall investigation of this study.

Behaviorism. The behaviorism learning theory is essentially, as the name suggests, simply facilitating a change in behavior. Merriam et al. (2007) believe “behaviorism is the philosophy that underlies most adult career and technical education and human resource development” (p. 281). Moreover, they suggest accountability for the learning results through reliable evidence that the educational program or instructional practice is successful.

Humanism. Humanism seeks to develop the whole person and facilitate advancement of the learner towards self-actualization. While many formal learning episodes are based on need (i.e. one needs to learn something for the next promotion or better paying job), humanism is squarely centered on intrinsic want. Drawing from humanism philosophy, this perspective was influenced by Maslow’s view of self-

actualization and Rogers contention humanism is the pathway for becoming a fully-functional person (Merriam and Bierema, 2014).

Cognitivism. Cognitivism or mental activity describes the theories for “acquisition, storage, transformation and use of knowledge” (Matlin, 2005, p. 2). Often referred to as information processing akin to computer processing, cognitivism focuses on cognitive neurocognition or in other words, how the brain learns. However, despite advances in neurocognition research practices that steadily yield new and previously uncharted insights, “neurological explanations for complex higher mental processes are often elusive” (Matlin, 2005, p. 14).

Social cognitive theory. Social cognitive theory combines elements of both behaviorists and cognitivist orientations by positing “that people learn from each other” often in a social setting (Merriam et al., 2007). Modeling and on-the-job training are common applications of this theory in workplace learning.

Constructivism. Constructivism is more akin to a collection of similar theories that focus on how the learner creates meaning from experience in an attempt to make sense of the experience and Piaget, Vygotsky and Dewey are all, at least in part, constructivists (Merriam & Bierema, 2014). Merriam and Bierema (2014) go on to suggest “self-directed learning, transformational learning, reflective practice, situation cognition, and communities of practice” are all aspects of constructivism (p. 37).

Elements of Andragogy. The roots of andragogy, or the art and science of how adults learn, run deep to when humans emerged on the planet. Human’s reliance on learning has been the primary survival strategy however, it is not until relatively

recent times that an effort has been made to formalize the nature of how humans learn into structured theories. Knowles six assumptions for adult learning provide helpful insights and avenues into effective adult learning and development. Complementing these Knowles' tenets are the following additional considerations important in formulating a complete picture of how adults learn as topically outlined by Merriam and Bierema (2014).

Self-directed learning. Self-directed learning (SDL) occurs when one intentionally seeks out learning, plans the learning, takes responsibility for the learning, controls the learning and evaluates the outcome (Merriam and Bierema, 2014). Extensive amounts of literature cited by Merriam and Bierema (2014) suggest SDL has “practiced for over 50 years” (p. 65). However, SDL is one of the oldest forms of learning and it is fair to propose that its lifespan is substantially longer than 50 years. Moreover, Merriam and Bierema (2014) assert that in “our fast-paced changing environment, it is no longer possible to learn everything we need to know in formal preparatory education” (p. 78).

Transformational Learning. Transformational learning (also referred to as transformative learning or simply TL) has outpaced andragogy in being “the most studied and written about adult learning theory” (Merriam and Bierema, 2014, p. 82). Clark (1993) defines TL as a learning process, “that shapes people; they are different afterwards, in ways both they and others can recognize” (p. 47). Merriam, Caffarella and Baumgartner (2007) believe there are three essential components of TL to occur: experience, critical reflection, and individual development. Intertwined with experience and critical reflection, this perspective overlaps with a number of other

theories and concepts echoing the vital importance of context, experience and reflection in the learning process.

Experience and learning. Experience (creating, re-creating or connecting to existing experience) lies at the heart of learning that is realistic and authentic. Dewey (1938) recognized “all genuine education comes about through experience” (p. 13). There are a significant number of models, theories and definitions for the application of experiential learning that exist, however, Keeton and Tate (as cited by Beard & Wilson p. 4) define experimental learning as,

learning in which the learner is directly in touch with the realities being studied. It is contrasted with learning in which the learner only reads about, hears about, talks about, or writes about these realities but never comes into contact with them as part of the learning process (viii).

Similarly, Boud, Cohen, and Walker (1993) observe,

We found it to be meaningless to talk about learning from experience. Experience cannot be bypassed; it is the central consideration of all learning. Learning builds on and flows from experience: no matter what external prompts to learning there might be – teachers, materials, interesting opportunities – learning can only occur if the experience of the learner is engaged, at some level. These external influences can act only by transforming the experience of the learner (p. 8).

These insights provide a deeper understanding of the relationship between experience and learning and help to clarify the viability of the various models and theories reviewed.

Motivation and learning. Motivation in learning is essential; without motivation, learning is a distant concept that is virtually unachievable. Wlodkowski (2008) asserts, “Being motivated means being purposeful” in pursuing endeavors that are important to the learner (p. 3). Ambrose, Bridges, Lovett, DiPietro and Norman (2010) argue motivation in learning “influences the direction, intensity, persistence, and quality of the learning behaviors” in which a learner engages (p. 69). Ryan and Deci (2000) argue that motivation is simply “to be moved to do something” (p. 54). Motivation is a key to our survival yet what makes motivation happen remains mysterious and enigmatic as “we cannot see it or touch it or precisely measure it” (Wlodkowski, 2008, p. 2).

Two essential considerations for learning motivation are comprehension and meaning. (Macquire, Firth & Morris, 1999). Sousa (2012) asserts, “Of the two criteria, meaning has greater impact on the probability that the new information will be stored” (p. 49). Ryan and Deci (2008) go on to suggest self-determined learning requires one to feel connected, effective (successful, useful) and agentic (the capacity of individuals to act independently and make their own choices) while Linnenbrink and Pintrich (2003) report that self-efficacy is key to promoting learner engagement and authentic learning. Ambrose et al. (2010) emphasize the importance of learning goals over performance. Performance oriented goals have the learner concentrating on a normative standard by proving one’s competency or avoiding incompetency. Conversely, “when guided by *learning goals*, in contrast to performance goals, students try to gain competence and truly learn what an activity or task can teach them” (p. 72). Watkins (2010) furthers this perspective with his suggestion of a

learner's orientation towards the learning. A performance orientation maintains the learner's concern with *proving* their competence while a learning orientation is focused on *improving* one's competence. Watkins (2010) goes on to share Goodhart's Law as an influence in learning as it impacts genuine motivation,

In the field of economics, Goodhart's Law suggests that when a measure which was seen as a performance indicator is turned into a target, the system will distort. Similar laws exist in social sciences and assessment. In such a context the twin challenges for schools are: 1. to recognize that passing tests is not the goal of education, but a by-product of effective learning. 2. to recognize that even when we want pupils to do their best in tests, pressure and performance orientation will not achieve it (p. 12).

Partnership education offers a unique alternative to the bureaucracy of standardized goals by engaging the learner as an active partner in their learning. Championed by Riane Eisler, partnership education asserts the instructor becomes a facilitator in an authentic learning process not a dispenser of information and ensures various and unique ways of learning are respected. Learning is a cooperative venture with a combined responsibility, and learners learn through experiential learning encouraging them to think critically about their observations and experiences (Eisler, 2017).

Though motivation is elusive, it is achievable by avoiding mandates and engaging the learner in meaningful exploration of their needs, wants and desires.

Summary of key insights. Learning is change and historically was central to our survival and will continue to be well into the future as Gerjuoy (as cited by

Toffler, 1970) asserts, “The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn” (p. 414). Though all the theories discussed recognize learning is a complex process with a remarkable number of variables and considerations, genuine learning allows the learner to be become different, to recondition their thinking so they can do something they could not do before. This requires effort; however, the effort can become natural when the learning is realistic, meaningful and understandable. Therefore, learning that is truly effective requires engagement of the learner in subjects and tasks that are of genuine interest to them and the learning tasks closely mimic how the learning will be employed once the learning episode is completed. A simple way to accomplish this is to involve them in identifying, planning, delivering and assessing their learning, taking care to make use of and further develop their critical thinking and reflection skills. Learning occurs in solitude but is more often effective when learning occurs in the company of others especially with a guide or facilitator. Regardless of the theoretical underpinnings of learning, learning is as natural to humans as breathing or walking and humans have been naturally engaged in some form of learning since they emerged on the planet.

Elements of pragmatic, effective learning

Up to now, this review has investigated the nature of human learning, briefly reviewed its evolution along with various aspects of learning theory and perspectives from the classic learning theorists. This portion of the analysis investigates elements required for applied, pragmatic, effective learning.

Goals, objectives and outcomes. Caffarella and Daffron (2013) report goals and objectives are often used interchangeably however goals provide a wider scope of the learning episode while objectives are more focused on specific learning outcomes. Moreover, as previously stated, Ambrose et al. (2010) emphasize the importance of learning goals over performance goals. Learning goals are clearly articulated, authentic, achievable, intentional outcomes that provide unmistakable direction for the learning to follow. In investigating goal's supporting partner, objectives, Caffarella and Daffron, 2013 believe "program objectives provide clear statements of specific results" (p. 165) to be attained as a result of the learning episode. The objectives should be stated in such a manner so there is no confusion about what the learners will acquire. This can ensure students develop their knowledge skills and abilities and "truly learn what an activity or task can teach them" (Ambrose et al., 2010, p. 72). Once established, Stein (2010) suggests the learning should be pursued with "relentless intentionality" to improve the learner's competence (Watkins, 2010).

Argris (1991) introduces the concept of single loop and double loop learning which is an important, if not critical, consideration in developing and facilitating learning outcomes. He provides an example of these two concepts this way,

...single loop learning is the thermostat that automatically turns on the heat whenever the temperature in the room drops below 68. Double loop learning is when a thermostat could go beyond its programmed function and ask itself 'why am I set at 68?' (p. 100).

This deeper probing into the profound possibilities of achieving a clear understanding of what the learning can and needs to accomplish as well as clearly understanding why

the learning needs to take place may fend off effects of Goodhart's Law (when a measure becomes a target, it is no longer an accurate measure). This avoids performance goals that are achieved merely for the sake of achieving them.

Caffarella & Daffron (2013, p. 161) cite the following sources that assist in developing and determining effective goals:

- “Why are we doing this?” (Milano & Ullius, 1998);
- “What do we hope will change in the future?” (Gboku & Lekoko, 2007);
- “Why is the program worth doing?” (Rothwell & Cookson, 1997).

Using intentional design processes such as a lean engineering process, an instructional design system (ISD) approach, design thinking or a logic model accompanied by learning processes such as the before and after-action reviews, can provide valuable tools in developing effective goals and outcomes that serve the learner and the learning.

Lean. Lean is a manufacturing process designed to eliminate waste and, in doing so, provide added customer value (Lean Enterprise Institute, 2017). A lean process is a facilitated methodology involving key or essential players who outline a manufacturing process and once laid out look for inefficiencies and enhancements to the process in service to the overall desired outcome. A lean process can be used to develop and design learning using the same basic process to outline the learning episode in the planning stage, look for ineffectiveness and ensure the learning, including the goals and desired outcomes, are meeting expectations. An important aspect of Lean is using the five whys questioning method. “This is practice of asking why repeatedly whenever a problem is encountered in order to get beyond the obvious

symptoms to discover the root cause” (Shook & Verble, 2013, Para. 2). In doing so in a designing learning application, one can derive a core understanding of situation in order to design and deliver a meaningful learning experience.

Instructional System Design. Instructional design systems (ISD) provide a systematic approach for developing and delivering learning programs (Noe, 2013). Though there is no one commonly recognized procedure for identifying goals and programming driven by outcomes, the ADDIE model serves as a basic starting point for developing, deliberate well planned programming by employing the ADDIE acronym: analyzing, designing, developing, implementing and evaluating. Noe (2013), observes,

Regardless of the specific ISD approach used, all share the following assumptions:

- Training design is effective only if it helps employees reach instructional or training goals and objectives.
- Measurable learning objectives should be identified before the training program begins.
- Evaluation plays an important part in planning and choosing a training method, monitoring the training program, and suggesting changes to the training process (p. 11).

Design thinking. Design thinking is a human-centered, collaborative, optimistic, experimental design process that provides an opportunity for design thinking users to develop a “formalized framework of applying the creative design

process to traditional business problems” (Gibbons, 2016, para. 5). Dam and Siang (2017) define it this way,

Design Thinking is a design methodology that provides a solution-based approach to solving problems. It’s extremely useful in tackling complex problems that are ill-defined or unknown, by understanding the human needs involved, by re-framing the problem in human-centric ways, by creating many ideas in brainstorming sessions, and by adopting a hands-on approach in prototyping and testing. Understanding these five stages of Design Thinking will empower anyone to apply the Design Thinking methods in order to solve complex problems that occur around us — in our companies, our countries, and even our planet (para. 1).

Championed by Stanford’s d.school, the roots of design thinking have “been practiced for ages” (Gibbons, 2016, para. 1) as the process envelopes several related concepts into a facilitated process that looks at a learning situation as a change endeavor that is “both reflective and intentional” (IDEO, p. 8). Design thinking uses this basic but often elastic outline: empathize (emphasizing with and understanding the end users and participants), define (identify the user’s needs), ideate (i.e. dream, conceive, envision, imagine, visualize), prototype (create a small-scale model), and test (and evaluate the test to refine the model). Design thinking offers a more humanistic alternative to the directive, business driven development schemes of the Lean and ISD approaches. In design thinking, comes “the confidence that new, better things are possible and that you can make them happen” (IDEO, p. 11).

Logic models. Logic models are helpful planning tools in developing an outline of a learning episode that begins with clearly written outcomes that unmistakably articulate the logical relationship between learning, required actions, and long-term outcomes (Meyer, Halter, Alleva, Reidy, Turner and Townsend, 2005). The Center for Disease Control and Prevention maintains,

Logic models can assist you in program evaluation by providing a picture of how your program is intended to work. It identifies your programs main components and how they should relate to one another. Logic models include process and outcome components (2014).

Other names for a logic model include: road map, mental model, blueprint for change, and program framework (Milstein & Chapel, 2017). Meyer et. al. (2005) assert a well-developed logic model involves all aspect of the learning dynamic including input from the learners and key stakeholders resulting in a road map that charts the learning's course of action. Using a columned, graphic representation, logic models begin with the desired overall impact then working backwards to determine the required action items, learning outcomes, required participants and activities culminating with the needed inputs – which appear first in the graphic model representation.

Summary. Regardless of the design approach, careful planning of a learning episode is essential in order to meet the learning outcomes. However, care must be taken to ensure the development of goals, objectives and outcomes are not a routine, administrative process but a meaningful, expressive endeavor that creates a learning that meets the needs of the learners and the organization.

Attention, motivation, stress and sensory memory. As previously discussed, if motivation is lacking in a learning situation, learning itself is very challenging to facilitate. However, closely akin to motivation (and overlapping recurrently) is attention, a topic that is “as brittle as it is intricate” (Levine, 2000) and lies in front of motivation in the learning dynamic. Without attention, the entire learning process is in serious jeopardy. Keeping in mind the brain is a survival device and has a strong aversion to boredom (Medina, 2014), acquiring attention is an inherent neuro-function that has not changed much since humans first emerged on the planet (Willis, 2010). The primary neurofunctionality that facilitates attention is the reticular activating system or RAS. How it works is sensory data acquired by the senses (except for smell which is channeled directly to the limbic system) is routed to the RAS and filtered through it to determine if the data is worthy of attention. Willis (2010) describes the process this way,

[the RAS] is a primitive network of cells in the lower brain stem through which all sensory input must pass if it is to be received by the higher brain. Out of millions of bits of information available to pass to the brain every second, only several thousand are selected to pass through the RAS – and that selection is an involuntary, automatic response rather than a conscious decision (p. 49 – 50).

Willis (2010) goes on to indicate that this process, like other mammals, is attuned to the sensory data that has determined to be threatening or as Wolfe (2010) suggests, “the brain is biologically programmed to attend” to the sensory data that has the highest emotional significance which is usually associated with survival (Willis, 2010,

p. 87). Accordingly, Wolfe astutely observes, “our species has not survived by attending to and storing meaningless data” (p. 87). Levine (2002) believes attention consists of: alertness, mental effort, saliency determination (defining the most relevant sensory data), cognitive activation (connecting to previous experiences) and satisfaction level (pp. 85-86).

As previously reviewed, motivation is a critical consideration in the learning process and is the next step in the learning dynamic once attention is acquired. “Motivation binds emotion to action...it is the natural human process for directing energy to accomplish a goal” (Wlodkowski, 2008, p. 2). Moreover, motivation needs to be maintained to ensure the learning dynamic continues to unfold. To assist in facilitating this, Macquire, Firth & Morris (1999) reminds us that meaning and comprehension are essential elements to the attention and motivation quotient in learning. Wlodkowski (2008) argues the following elements are necessary for adequate motivation:

- Creating an atmosphere of respect and interconnectedness through honoring learner perspectives, experience and values (inclusion).
- Facilitating a favorable perspective towards learning experience through personal relevance, preference and choice (attitude).
- Ensuring the learning has value (meaning).
- Engendering applicable of knowledge, skills and abilities that transfer from the learning venue to real world use (competence).

To put these ideas into play, Wlodkowski recommends two important constructs; “if something is learned, it can be learned in a motivational manner ... [and] every instructional plan also needs to be a motivational plan” (pp. 46 - 47).

Stress can be the death of learning by reducing the higher cognition functions in the brain (Reed, 2010) thereby destroying the most powerful foundations of attention and motivation. Stress can be empowering and inspiring but also a gateway to illness and excessive stress can rob one of the joy of life and learning (Girdano, Dusek & Everly, 2005). Eustress is an “action-enhancing stress that gives an athlete a competitive edge or a speaker the enthusiasm to project optimally” while “distress produces overreaction, confusion poor concentration, and performance anxiety with usually poor results” (Girdano, et al, 2005, p. 3). Girdano, et al, (2005) report negative stress occurs when there is overload or expectations beyond one’s control, frustration, and/or boredom or isolation. When these conditions are met and exceed a person’s ability to cope with the stressor, exhaustion or behavioral or physical problems may occur. Humans were built to deal only with short (thirty seconds or so) durations of stress however longer durations...or worse constant stressors... retards cognition, memory and executive functions (Medina, 2008). Moreover, stress impacts one’s ability to perform a task whether it is executing a learning task or engaged in an athletic performance, “you need a certain amount of tension to be able to go on. On the other hand, if you are too far gone, you just go off the deep end, you lose control. So it is just being able to find that narrow comfort zone” (Steve Podborski, 1982 Overall World Cup Downhill Champion as cited by Orlick, 2000, p. 121). That

“narrow comfort zone” varies wildly from person to person as Medina (2008) astutely observes, “Every brain is wired differently” (p. 70).

From a neurocognitive perspective, attention, motivation and stress are essential considerations for the learning to be acquired and processed by the sensory memory. The sensory memory is “a large-capacity storage system that records information from each of the senses with reasonable accuracy ... for less than 2 seconds then most of it is forgotten” (Matlin, 2005, p. 10). Wolfe (2001) describes the role of the sensory memory,

The role of the sensory memory is to take the information coming into the brain through the sensory receptors and hold it for a fraction of a second until decision is made about what to do with it (p. 79).

Data that survives being discounted and forgotten moves into the working memory.

Summary. Attention, motivation and stress require careful planning and must never be left to chance. Using the planning stage to explore and discover the critical learner’s needs, enthusiasms and fears provides essential information in organizing a successful learning episode.

Working memory. Sensory data that successfully negotiates the sensory register and is selected for attention moves into the working memory. Memory is an exceptionally multidimensional, highly intricate process that encompasses stimulating a large number of neurons in many areas of the brain (Wolfe, 2001). There is no structural portion of the human brain (such as the amygdala, hippocampus or cortex) classified as working memory (or sensory register) therefore this aspect of the learning process is a functional, theoretical aspect of human memory and not a feature of neural

anatomy. Matlan (2005) observes, “working memory is the very brief, immediate memory for material that we are currently processing” (p. 109). The working memory holds small amounts of information for about 15 – 20 seconds (some estimates go as high as 30 seconds) after which if the data is not processed in some way, it will be discarded. Processing the data consists of manipulating it by thinking about it, talking about it, and rehearsing it (Wolfe, 2001). The process of practicing and rehearsing the acquisition and recall of the information to be learned also requires adequate and measured spacing and timing. Additionally, incoming data cannot be acquired in large quantities and requires delivery in small amounts for adequate absorption.

Long Term Memory. The Long Term Memory (LTM) is where learning resides and ensuring learning is properly encoded and stored there should be the focal point of any learning episode. The LTM uses billions of neural connections to store vast quantities of information and experience (Matlin, 2005). “When the brain forms memories or learns a new task, it encodes the new information by tuning connections between neurons” (Tafton, 2015). The more often this activity “repeats, the stronger and the denser the resulting neural connectivity” becomes (Goleman, 2006, p. 157).

Many neurobiologists do not believe working memory and long-term memory are distinctly different however many do believe these distinctions and the subdivisions discussed below are viable means of partitioning the complex memory process (Matlan, 2005). These distinctions are used for ease of comprehension rather than conviction as there is no neuroanatomy specific to these terms. A common practice is to divide the long-term memory into declarative, procedural, semantic and episodic memory (Malan, 2005).

The differences in knowing versus doing are stored in the declarative memory for knowing and the procedural memory for doing. Seldom do they translate very well between each other. Stolovich and Keeps (2002) provide this explanation for differentiating between declarative and procedural memory in learning:

1. Declarative knowledge – comes into play if the learning objectives require learners to: name, list, identify, define, differentiate between, match, point to, recall, select, state, explain, or in any way simply talk about something.

2. Procedural knowledge – comes into play if the learning objectives require learners to do something such as: perform an operation, manipulate objects, build, create, perform a procedure, solve a problem, or apply knowledge (p. 47).

Akin to these aspects of memory is the episodic memory that houses the collection of “events that have happened to you” (Matlan, 2005, p. 129) whether the event occurred 10 years ago or 10 minutes ago. Conversely, semantic memory holds a reservoir “about your knowledge about words and other factual information” (Matlan, 2005, p. 129).

The kingpin in facilitating storage and recall in the LTM is encoding. Corkin and Wilson (2007) observe the brain constructs models of the world used to guide behavior as a result of representations established from identified uniformities. These commonalities are things “that tend to be related to one another” (p. 8) and therefore are used to make predictions and estimates about the future. “Learning” Corkin and Wilson (2007) suggest, “involves extracting these regularities from experience.” Factors that influence the encoding of learning as defined by Corkin and Wilson are: repetition, importance, timing, order, and reinforcement and result in an “adaptive

change in behavior resulting from experience” (Corkin and Wilson, 2007, p. 8). Matlin (2005) and Noe (2013) add elaboration to the encoding process which is defined as relating to a learner’s existing learning, experiences or neural patterns.

Summary. Learning resides in the long-term memory and new learning requires significant manipulation to ensure new learning is successfully acquired and retained. Simply telling a learner what they need to learn falls far short of the requirements necessary for effective acquisition and retention of the learning for use after the learning episode is completed.

Higher order thinking/critical thinking. Higher order thinking and critical thinking are discussed in detail later on in the review. However at this juncture, higher order thinking involves critically assessing incoming data to objectively formulate concepts, facilitate creativity, solve problems and reason logically (Levine, 2002) while Merriam and Beirema (2014) offer this definition of critical thinking (p. 222), “the ability to assess your assumptions, beliefs, and actions.” Higher order thinking and in particular, critical thinking is closely aligned with reflection in action and reflection on action which is discussed in detail later on in this review. Facilitating higher order thinking and critical thinking allows the learner to assume some degree of control over their learning and especially provides the skills to continue to develop and refine the learning after the formal learning episode is completed.

Transfer of learning. Transfer of learning (also referred to as learning transfer) is a learner’s ability to “effectively and continually apply what they learned in training to their jobs” (Noe, 2013, p. 152). “It is often referred to as the ‘so what’ or ‘now what’ phase of the learning process” (Caffarella & Daffron, 2013, p. 211) and is

the crux of a learning episode; what is actually functionally used, applied, and acted on. Noe (2013) identified several considerations to learning transfer: closed skills, open skills, near transfer and far transfer. Closed skills are those skills that are intended to be identically reproduced by the learner back at their job while open skills are more wide-ranging and abstract in nature (Noe, 2013). Near transfer is akin to closed skills and refers to a learner's "ability to apply learned capabilities exactly to the work situation" (Noe, 2013, p. 165). Conversely, far transfer of learning is affiliated to open skills where the learning application is moderately to significantly different than the learning venue and conditions (Noe, 2013).

Component skills are another important aspect to the learning transfer dynamic. These are the skills required to complete the learning task and if these skills are weak or nonexistent the learning transfer will suffer significantly (Ambrose, et al. 2010). Similar to component skills in the service of effective learning transfer is the concept of conditionalization. The National Research Council (2000) emphasizes,

Knowledge must be "conditionalized" in order to be retrieved when it is needed; otherwise, it remains inert (Whitehead, 1929). Many designs for curriculum instruction and assessment practices fail to emphasize the importance of conditionalized knowledge. For example, texts often present facts and formulas with little attention to helping students learn the conditions under which they are most useful. Many assessments measure only propositional (factual) knowledge and never ask whether students know when, where, and why to use that knowledge (p. 49).

Attention to these aspects of learning transfer are important if not critical to an effective learning process.

Class size is an integral consideration in facilitating effective transfer of learning. Taking lessons from higher education, Cuseo (2007) argues, “Empirical evidence...suggests that there are eight deleterious outcomes associated with large-sized classes: (1) increased faculty reliance on the lecture method of instruction, (2) less active student involvement in the learning process, (3) reduced frequency of instructor interaction with and feedback to students, (4) reduced depth of student thinking inside the classroom, (5) reduced breadth and depth of course objectives, course assignments, and course-related learning strategies used by students outside the classroom, (6) lower levels of academic achievement (learning) and academic performance (grades), (7) reduced overall course satisfaction with the learning experience, and (8) lower student ratings (evaluations) of course instruction.” Research conducted by Carbone and Greenberg (1998) “found that most students agreed that class size affected their ability to learn, and large classes negatively affected their ability to interact (in and out of class) with faculty.” Keil and Partell (1997) also concluded that “increasing class size had a negative effect on student achievement and retention.”

Summary. This portion of the review outlines critical steps that are required to enable some degree of successful transfer of the learning from the learning episode to application. Without careful consideration to ensuring the

learning is transferred to actual applied use and practice, the learning episode may not archive the desired outcomes.

Feedback. Feedback is “information given to learners about their learning activity performance that guides future behavior (Ambrose, et al, 2010). Moreover, Ambrose, et al. (2010) suggest, “goal directed practice coupled with targeted feedback are critical to learning” (p. 125). However, Wiggins (2012) asserts, “The term feedback is often used to describe all kinds of comments made after the fact, including advice, praise, and evaluation. But none of these are feedback, strictly speaking” (para

1). Wiggins offers these touch points for effective feedback:

1. Goal-Referenced: effective feedback requires that a person has a goal, takes action to achieve the goal, and receives goal-related information about his or her actions.
2. Tangible and transparent: any useful feedback system involves not only a clear goal, but also tangible results related to the goal.
3. Actionable: effective feedback is concrete, specific, and useful; it provides actionable information.
4. User-Friendly: even if feedback is specific and accurate in the eyes of experts or bystanders, it is not of much value if the user cannot understand it or is overwhelmed by it. Expert coaches uniformly avoid overloading performers with too much or too technical information.
5. Timely: in most cases, the sooner one gets feedback, the better.

6. Ongoing: adjusting performance depends on not only receiving feedback but also having opportunities to use it.
7. Consistent: to be useful, feedback must be consistent.
8. Progress toward a goal.

The final touch point brings these elements full circle back to the initial element of effective feedback: goal referenced. Wiggins recognizes a common teaching dilemma that limited time reduces opportunities for meaningful feedback. However, Wiggins (2010) reports, “research shows that less teaching plus more feedback is the key to achieving greater learning. And there are numerous ways—through technology, peers, and other teachers—that students can get the feedback they need” (para 37).

Tolerance of mistakes, errors, blunders and failure. Mistakes and their family members errors, blunders and failures are natural parts of the learning process and should be not only accepted but embraced in the learning environment. Moser, Schroder, Heeter, Moran and Lee (2011) report when a mistake is made neural (brain cell) connections fire regardless of whether or not the learner is aware of the error and corrects it or is unaware of the slip-up. Put another way, mistakes can grow and develop your brain. In addition to enhanced neural activity, Steuer, Rosentritt-Brunn and Dresel (2013) found the climate in learning environments where classrooms were “mistakes friendly” increased motivation to learn. Boaler (2016) argues that mistakes are “learning in action” and creates an atmosphere where mistakes are “expected, inspected, and respected.” Recognizing mistakes and the like as viable learning opportunities also overlaps with reducing stress in the learning environment.

Movement and rest. Few instructional designs give serious attention to the importance of exercise and rest in learning. However, the research documenting the importance of these considerations is as unmistakable as they are abundant. Cotman and Berchtold (2002) found “Extensive research on humans suggests that exercise could have benefits for overall health and cognitive function, particularly in later life” (p. 295) while van Pragg (2009) reports, “Evidence is accumulating that exercise has profound benefits for brain function. Physical activity improves learning and memory in humans and animals” (p. 283). Conversely, while exercise is critical to cognition, rest is equally important yet also often overlooked. Van der Helm and Walker (2009) indicate, “When viewed as a whole, findings at the cellular, systems, cognitive and clinical level all point to a crucial role for sleep in the affective modulation of human brain function” (p. 747). Moreover, breaks and sleep are important in successfully consolidating neural pathways with new dendrites and synaptic connections (Willis, 2006).

Fuel and hydration. Proper fuel and hydration are not just limited to sports and athletics but are also needed for effective learning. While the brain accounts for approximately 2 percent of a human’s total body weight, it “consumes a disproportionate amount of fuel to support its many activities” requiring a remarkable twenty percent of a body’s total glucose supply (Carter, 2014, p. 44). However, the brain cannot store glucose and therefore requires a steady supply acquired through dietary carbohydrates transported through the blood stream most notably via the Circle of Willis (a series of arteries encircling the brain) (Carter, 2014). Extensive literature is available regarding proper brain nutrition however National Institute for Health

(2017) recommends, “Fruits and vegetables, whole grains, lean meats, fish, poultry, low-fat or non, fat dairy products less solid fat, sugar and salt, proper portion sizes, [and] adequate fluid (p. 19).

On the topic of adequate hydration, Popkin, D’Anci, Rosenberg (2010) report even mild dehydration (1-2% of body weight loss) can lead to a notable lessening in several important cognitive functions “such as concentration, alertness and short-term memory” (p. 441). For example, Pawson, Gardner, Doherty, Martin, Soares, and Edmonds (2013) found,

Students who brought water to the exam achieved better grades than students who did not. When coursework marks were covaried, this effect remained statistically significant, suggesting that this finding was not simply due to more able students being more likely to bring in water (57).

As previously discussed, attention is an important gateway to an effective learning dynamic and proper hydration a helpful lubricant to ensure the learner’s attention is available for learning.

Reflection. Reflecting on a learning experience is an important yet often overlooked aspect of a learning dynamic. The value of reflective practice should not be limited to professional development but to all domains of learning and scholarship. Though “there is no universally accepted definition of reflective practice but a multitude of perspectives” (York-Barr, Sommers, Ghere, & Montie p. 8). They go on to review a very comprehensive list of reflective learning theorists culminating in their view that reflective practice for continuous learning requires: pause, openness, inquiry, thinking, learning, and action resulting in enhanced student learning (York-Barr,

Sommers, Ghere, & Montie, 2001). Akin to mindfulness, effective reflection in learning calls for an openness to new and different possibilities in concert with “active and conscious processing of thoughts” that may very well include aspects of analysis, synthesis, and metacognition in pursuit of a “broader understanding” of the learning and its implications (York-Barr, et al. 2001, p. 7). Merriam, Caffarella, and Baumgartner (2007) endorse two basic reflection processes: reflection-on-action and reflection-in-action.

Reflection-on-action. As the title suggests, this aspect of reflection occurs after a circumstance or event has occurred. Generally analytical in nature, reflection-on-action allows for consideration of experiences, modifications to performance and commitment to changes in actions. A prime example of a formal reflection-on-action process is the U.S. Army’s After Action Review (AAR). “After-action reviews identify how to correct deficiencies, sustain strengths, and focus on performance of specific mission essential tasks list (METL) training objectives” (U.S. Army, TC 25-20, p. ii). Adopted for use outside of the military, AAR type formats are often used in a variety of civilian settings yet the following guidance applies to most uses,

Key is the spirit in which AARs are given. The environment and climate surrounding an AAR must be one in which the soldiers and leaders openly and honestly discuss what actually transpired in sufficient detail and clarity that not only will everyone understand what did and did not occur and why, but most importantly will have a strong desire to seek the opportunity to practice the task again (p. ii).

The basic format follows these four probing questions:

1. What were our intended results (what was planned)?
2. What were our actual results (what really happened)?
3. What will we sustain or improve (what can we do better next time)?
4. What caused our results (what is the take-away)?

An additional analysis asks what are some upcoming opportunities to test the take-away lessons learned (Clark, 2004).

Reflection-in-action. Is more akin to thinking on one's feet and being able to make unplanned adjustments quickly. As the old adage claims, "if you keep on doing what you are doing, you will keep on getting what you are getting." If what you are getting is adequate, no adjustment is required however if through reflection-in-action one senses an approach, strategy, or action is not achieving the intended results, then an adjustment is necessary.

Learning partnership relationships. Engaging learners in their learning is vital motivational strategy. However, engaging with them as partners through a nurturing relationship can be particularly powerful. A form of self-directed learning, partnership education is a significant departure from what is considered normal instructional methods where the instructor controls the learning process with structured and sequenced goals and objectives. Engaging learners as partners in their learning and sharing responsibilities can be a powerfully engaging method. This process consists of the following approaches:

- Learners/participants are seen as partners in the learning process;
- Teachers model facilitation rather than control;
- Every learner's unique abilities are supported;

- Learners/participants are treated with empathy and caring;
- Diverse learning abilities are respected;
- Learners/participants voices are heard and their ideas are respected;
- Emotional needs are understood and addressed;
- Cooperative learning and individual responsibility are combined;
- Learning is a reciprocal activity between teacher and learner/participant (i.e. learning colleagues); and
- Learners/participants learn through experiential opportunities (Eisler, 2016).

The reciprocal sharing of the learning responsibilities removes the entire instructional burden from the instructor and shares in the meaningful exploration of the learning in a way that is contextually relevant to the learner.

Teaching with strengths. Liesveld and Miller (2005) provide extensive evidence gathered by the Gallup Organization constituting the elements of effective teaching. “Mountains of research point to this remarkable fact: While their styles and approaches may differ, all great teachers make the most of their natural talents. Here's something else: Great teachers don't strive to be well-rounded. They know that ‘fixing their weaknesses’ doesn't work -- it only produces mediocrity. Worse, it diverts time and attention from what they naturally do well (Gallup, para. 3) Liesveld and Miller (2005) assert successful teachers reject negative stereotypes of students, the latest teaching trend, and

work by instinct more than they even know, having worked out the strategies and approaches that succeed for them in reaching different

students. In an extraordinarily high number of cases, their instincts lead them to the results they want – better educated students (p. 15).

In addition to employing innate skills and abilities, Liesveld and Miller (2005) suggest the value of relationships as a critical component of the learning dynamic, “relationships are what make the learning experience go; an essential truth about teaching...it’s all about relationships” (pp. 23-24).

Deep evaluation. Did the learning work? An evaluation effectively verifies the transfer of the learning back to the point of use or execution and measures the impact on the individual or organization’s bottom line results (Stolovich & Keeps, 2005). Merton and Wilson (2012) add evaluations should “encompass both an empirical aspect (that something is the case) and a normative aspect (judgement about the value of something) (p. 5). Noe (2013) breaks down the aspect of outcomes into these areas:

- Cognitive outcomes: the degree to which learners are familiar with principles, facts, techniques, procedures, and processes emphasized in the training program.
- Skill-based outcomes: the level of technical or motor skills and behaviors acquired as a result of the learning episode.
- Affective outcomes: facilitates increased attention and motivation such as an enhanced tolerance for diversity, safety attitudes, and customer service orientation.
- Results: are used to determine the training program’s payoff to the company such as reduced accidents and equipment downtime.

- Return on Investment: related to results, this evaluation aspect considers the training's monetary value against the cost of the training (pp.241 – 243).

These evaluation outcomes can be evaluated both formatively (conducted during the instruction and allows for valuable feedback and opportunities for correction and refinement) and with a summative evaluation (conducted after a learning episode to determine the extent of change in the learner pursuant to the learning outcomes) (Noe, 2013).

In the 1950's Donald Kirkpatrick build on Raymond Katzell's work in developing a functional workplace learning evaluation model. Though widely recognized as Kirkpatrick four level evaluation model, Thalheimer (2018) correctly recognizes this model as the Kirkpatrick-Katzell four level model which has become the mainstay of workplace learning evaluation for almost 60 years (Thalheimer, 2018). More recently, Kirkpatrick and Kirkpatrick (2016) have built on the Kirkpatrick-Katzell four level model by adding a fifth level of evaluation that serves as a basic outline for the different levels or deepness of evaluation processes:

Level 1: Reaction - The degree to which participants find the training favorable, engaging and relevant to their jobs.

Level 2: Learning - The degree to which participants acquire the intended knowledge, skills, attitude, confidence and commitment based on their participation in the training.

Level 3: Behavior - The degree to which participants apply what they learned during training when they are back on the job.

Level 4 and 5: Results - The degree to which targeted outcomes occur as a result of the training and resulted in an improvement in the business climate and return on investment (p. 10). Noe, 2013 suggests examples of this level are productivity, customer satisfaction or reduction in accidents.

However, there are some important perspectives on the limitations of the Kirkpatrick-Katzell model due to a number of assumptions that may potentially impact the model's validity (Alliger & Janak, 1989). Though there are many who join in the chorus suggesting the need to move past the Kirkpatrick-Katzell model,

there has been little agreement about how this can be undertaken with a series of models being constructed yet no evidence of widespread use of any particular models. This suggests that both researchers and organisations [sic] believe that Kirkpatrick's work remains relevant particularly where the potential limitations are understood and acknowledged within the evaluation design process (Mavin, Lee & Robson, 2010, p. 9)

One alternative to the Kirkpatrick-Katzell model that has garnered some attention is the CIRO model that "focuses on measurements taken before and after the training is carried out" and "focuses on the resources of the organization and their objectives" (Mavin, Lee & Robson, 2010, p. 10). The CIRO model of evaluation provides a different viewpoint on the assessment of a learning episode to the degree that it almost is more of a planning tool. The CIRO consists of these four questions (Mavin, Lee & Robson, 2010, p. 10):

Context – what needs to be addressed?

Input – what is likely to bring about the changes?

Reaction – how did the learners react to the training?

Outcome – what are the immediate, intermediate and ultimate outcomes?

Most recently Thalheimer (2018) offers an exciting alternative to the Kirkpatrick-Katzell model that embraces the complexity of the transfer of learning process while remaining functionally pragmatic. While recognizing the significant contribution of the Kirkpatrick-Katzell model, Thalheimer proposes an eight level evaluation model that enables learning effectiveness in a wide variety of learning conventions. Thalheimer's new model, *The Learning-Transfer Evaluation Model* (or LTEM), "is designed specially to help organizations and learning professional determine whether their evaluation methods are effective in providing feedback" (p. 11). Where learning occurs, the LTEM can evaluate it (Thalheimer, 2018).

Regardless of the evaluation strategy, Stark (2013) observes, "measuring learning is not easy" and given the ease of human thinking and decision-making bias, he adds evaluation data derived from Level 1/Reaction type of data "are typically spotty and the techniques used to summarize evaluations and compare instructors or courses are generally statistically inappropriate" (para. 11). Stein (2010) suggests not all tests are measurements as they cannot measure the complexity of the human mind and there are only a limited number of psychological properties that are actually measurable. He recommends the concept of ecological validity which is simply: does the evaluation look anything like what you will have to do in real life.

Critical thinking and the role of cognitive biases in thinking and decision making

An essential component of this study centers on critical thinking defined simply by Lau & Chan (2017) as “the ability to think clearly and rationally about what you do or believe” (Introduction section, para.1). Baron (2008) digs in a little deeper suggesting this is “the kind of thinking we would all want to do, if we were aware of our own best interests, in order to achieve our goals” (p. 5). While Merriam and Bierema (2014) argue critical thinking is “the ability to assess your assumptions, beliefs, and actions” (p. 222). Though this subject is given much attention and is highly prized in business and education alike, the ability to think critically often remains elusive. In research, lack of critical thinking can be especially detrimental to the intended investigation. Dawkins (2017) warns, “you can be committed to science, but as soon as you’re committed to a hypothesis, you’ve walked off the trail of objective truth” (para. 1). Taleb (2010) widens Dawkin’s perspective with this description of a common mental trap called the narrative fallacy;

We like stories, we like to summarize, and we like to simplify, i.e., to reduce the dimension of matters ... the [narrative] fallacy is associated with our vulnerability to overinterpretation and our predilection for compact stories over raw truths ... it takes considerable effort to see facts (and remember them) while withholding judgement and resisting explanations (pp. 63 – 64).

This type of bias is further complicated by human being’s innate affinity for stories...good stories as an essential cognitive mechanism for thinking and understanding (Lindsey, 2015). However, our affinity for stories does not translate

into accuracy, truthfulness or precision in communicating. In their classic research study, Borgida and Nisbet (1977) found that a small number of informal comments outweighed scientifically tested data in decision making and personal choices. More recently, Betsch, Haase, Renkewitz, and Schmid (2015) report “narratives have the strongest effect” in facilitating an emotional assessment of a new or uncertain event or situation (p. 257).

Contributing to the narrative fallacy bias is the confirmation bias which involves focusing on only the evidence that supports one’s position and ignoring or discounting any evidence that is contrary to one’s beliefs or understandings. Confirmation bias is described this way by Kahneman (2011), “contrary to the rules of philosophers of science, who advise testing hypothesis by trying to refute them, people (and scientists alike) seek data that are likely to be compatible with beliefs they currently hold” (p. 81).

Lastly, the Dunning-Kruger effect documents human’s common tendency to “hold overly favorable views of their abilities in many social and intellectual domains” (Dunning & Kruger, 1999, p. 1121). Based on the results of four studies, Kruger & Dunning propose, “those with limited knowledge in a domain suffer a dual burden: not only do they reach mistaken conclusions and make regrettable errors, but their incompetence robs them of the ability to realize it” (p. 1132). Kruger & Dunning also suggest that “highly competent individuals also show some systematic bias in their self-appraisals” (p. 1131). Awareness of these naturally occurring biases in everyday cognition is important as these biases will figure predominantly in the execution of the research investigation in both the data sources and with the researcher.

Though illogical, the underpinnings of why these phenomena take place can be found in the rudiments of neurocognition. Keeping in mind that the brain's primary purpose is survivability, Wolfe (2001) reminds us, "The brain is biological programmed to attend to first information that has a strong emotional content attached to it" (p. 87) or as Willis (2010) suggests, "is most critical to survival" (p. 50). The cognitive process continues as the prioritized incoming data looks for a familiar experience stored in the long-term memory to attach to and form or further develop a neural pattern. Hawkins (2004) describes the process this way,

Intelligence is measured by the capacity to remember and predict patterns in the world ... Your brain receives patterns from the outside world, stores them as memories, and makes predictions by combining what it has seen before and what is happening now (p. 97).

However, once a pattern is acquired, it is invariant and can be prone to errors (Hawkins, 2004).

The narrative fallacy, confirmation bias, Dunning-Kruger effect, and the collection of biases are just a few of hundreds of identified cognitive biases. Though an exact number is difficult to derive, the Society for Judgment and Decision Making (SJDM) and the European Association for Decision Making (EADM) hosts over 500 peer reviewed, scholarly articles on various aspects of this area of study. Baron (2009) points out that with the immense number of ways one's thinking can shortcut itself into poor conclusion, "Scholars across the centuries thus have asked, 'How can we help people to think more logically?'" (p. 4). The response brings us back to Taleb (2010), who observes, "Our minds are like inmates, captive to our biology, unless we

manage a cunning escape” (p. 67). Our escape, as Taleb puts it, is exercising the highest degree of critical thinking possible in this study by observing evidence of it in the research data and, perhaps most profound, developing it within the researcher.

Elements of critical thinking. After many years of distinguished research in the field of thinking and decision making, the renowned Nobel laureate Daniel Kahneman suggests, “little can be achieved without considerable investment of effort” (p. 415). He laments after many years of researching this very topic he still finds himself susceptible to a number of common cognitive biases. However, he suggests to adequately address overcoming the myriad of mental shortcuts that can trip up one’s thinking, one should:

1. Frame up the problem that is to be solved
2. Collect the relevant data and information leading to a decision
3. Reflect and review on the final decision adjusting as necessary (p. 418).

Chartrand, Emery, Hall, Ishikawa, and Maketa (2012) offer a similar model for developing and applying critical thinking in the service of sound decision making and overcoming cognitive biases called “Think RED”. In their model, the acronym RED stands for:

- Recognize assumptions
- Evaluate arguments
- Draw conclusions (p. 99)

The model is preceded by a grounding step to stop and think combined with a final fifth step of developing a plan of action to effectively execute the conclusions. The

model developed by Chartrand et al. is closely aligned with Kahneman's view and neatly postured for transfer from theory to everyday practice.

Another important aspect of escaping from Taleb's captivity is open-mindedness. After critical review of a number of studies that reviewed the relationship between good thinking and good outcomes, Barron (2009) observed that actively open-minded thinking aids in the reduction of biases. He observed, "That people who think in a way that is actively open minded are better at solving the problems, or less biased" (p. 212). Matlin (2005) advances Baron's insights by introducing the concepts of mindlessness and mindfulness. Mindlessness is an involuntary programmed type of thinking which captures a person in long-standing patterns of thinking "without being aware of new information available in the environment" (p. 382). Conversely, critical thinking can be served with a focus on mindfulness. This is an aspect of open-mindedness where one is aware of their thinking, is open to different perspectives and is enthusiastic about learning new and different things. Perhaps most important, particularly in research, is the willingness to look at situations from different points of view.

Donovan, Guss, and Naslund (2015) found training participants in the steps of deep processing and mindfulness contributed to improved performance in dynamic and complex tasks. Conversely, Garrett and Weeks (2017) found individuals who rely on their instincts or are prone to question facts as politically biased "are more likely to stand behind inaccurate beliefs."

Researching valid sources about critical thinking, writing about the subject in a scholarly accepted way, is barely half the battle. As this review has demonstrated so

far, transferring the concepts from the page to practice is more than a good intention but a critical, yet often overlooked, aspect of many learning episodes. However, in this instance, it is essential that these ideas be put into play, practiced, appraised, and refined. In the spirit of this endeavor, this review will take a look at opposing views and perspectives.

The 70:20:10 framework

The 70:20:10 framework is a reference model for workplace learning that is grounded on the general principles “that:

- around 70 percent of learning comes from experience, experimentation and reflection
- around 20 percent derives from working with others
- around 10 percent comes from planned learning solutions and reading” (Arets, Jennings & Heijen, 2016, p. 34)

The 70:20:10 approach combines these three aspects of learning into one combined, coordinated model for learning.

Origins of the framework. This approach is not new; Jennings (2016) suggests, its roots can be traced back to Socrates who perceived adult learning “to be a process of mental inquiry, not passive reception of transmitted content” (Knowles, Holton & Swanson, 2011, p. 34). However, this alone should not cast credibility on the roots of the practice as Schneider (2013) observes educators have been “free to identify a wide range of practices as Socratic” (p. 631) as “a clear definition of it had never emerged” (p. 634) and “there is no authentic version of the Socratic method” (p. 635). Jennings (2016) goes on to offer the following list of “learning theorists and

practitioners who have talked about the importance of experiential and social learning as well as those who carried out the early work underpinning 70:20:10”: Pavlov, Skinner, Paiget, Lave, Wenger, Bruner, Dewey, Banduar, Vygotsky, Siemens, Gardner, Kolb and Rogers, Maslow, and Kandel (para. 1) as a theoretical basis for the framework.

Scott and Ferguson (2016) argue references to the framework can be traced back to Tough (1971) who reports the findings of eleven major research studies on adult learning: “About 70% of all learning projects are planned by the learner himself, who seeks help and subject matter experts from a variety of acquaintances, experts and printed resources” (p. 1). However, to be more exact, Tough reports, “68% of all projects in our 1970 survey were self-planned” (p. 86).

Moon (2015) observes this model “has been around since the mid 1980’s” (p. 6). However, it was first formalized in 1996 as a result of a longitudinal study conducted by Center for Creative Leadership,

Development generally begins with a realization of current or future need and the motivation to do something about it. This might come from feedback, a mistake, watching other people’s reaction, failing at or not being up to a task – in other words, from experience. The odds are that development will be around 70% from job experience, working on tasks and problems; about 20% from feedback or working around good and bad examples of the need, and 10% from courses and reading (Lombardo & Eichinger, 2003, p. v).

Note the approximations of the percentages and the generalization in the tone of the citation. The authors are not suggesting hard and fast rules but broad guiding principles. The author's go on to suggest the value of combining all three aspects together in order to form a viable learning formula,

Where the realization of the need comes from is less important than having it, and once you know this, what is critical is to go after the need(s) with all the development remedies. Feedback alone won't do it; it only sets the stage. Just doing it won't work – experience by itself is a lousy teacher; it's too involving, too fragmented...neither courses and reading will work alone. At best they are knowing what to do better or differently and perhaps practicing in the safe environment of a course.

Transfer to the job is difficult. (Lombardo & Eichinger, 2003, p. v).

As previously noted in the roots of formal learning discussion, learning experientially through various activities is not new by any means but is ancient in its origins.

However, this evidence indicates this is the first formalized recognition and organization of this strategy into a cohesive, coordinated approach.

The contemporary framework. Jennings, Overton & Dixon (2016) observe “there is little to no academic research specifically into the 70:20:10” framework (p. 16). However, there is significant academic work on the various components and elements of effective workplace learning that the 70:20:10 methodology attempts to draw upon. A synthesis of characteristics of these representative academic works is well summarized by Marsick, Watkins, Callahan and Volpe (2006), “A preliminary review of research confirms the conclusion that informal learning is increasingly

pervasive and central to learning in organizations” (p. 797). Leslie, Aring and Brand (1998) (note that this reference is often incorrectly attributed to *Bruce*, Aring and Brand ... Bruce is Dr. Leslie’s first name and this error is perpetuated repeatedly in various references) report on their research regarding informal learning involving businesses in six states (Connecticut, Florida, Massachusetts, North Carolina, Pennsylvania, and Washington),

provides conclusive empirical evidence for two hypotheses: (1) that many critical skills for worker and company productivity are acquired informally, and (2) that this informal learning comprises a majority of the learning that occurs in the workplace. Recent Bureau of Labor statistics reinforce these hypotheses by suggesting that as much as 70% of all workplace learning may be informal (p. 13).

The referenced “recent Bureau of Labor statistics” are the findings from a research survey of nearly 12,000 establishments indicating,

Employees who work in establishments with 50 or more workers received an average of 44.5 hours of training in the period May-October 1995, according to a survey of employees conducted by the Bureau of Labor Statistics of the U.S. Department of Labor. Of these total training hours, 70 percent, or 31.1 hours, were spent receiving informal training, while 13.4 hours were in formal training (U.S. Department of Labor, Bureau of Labor Statistics, para. 1).

However, it is important to note that a U.S. Bureau of Labor Statistics of the U.S.

Department of Labor study conducted by Loewenstein and Spletzer (1998) found that

workplace learning fluctuates significantly from approximately 13% to 46% attributed to formal learning and 10% to 96% ascribed to informal learning (p. 40, Table 2).

Accordingly, Clark (2013) surmises, “The ratios depend greatly on context, such as the learners' type of job, skill level, organization changes, etc.” (para. 9). Yet despite these variabilities, informal learning is recognized as a significant influence through the life span both in and out of the workplace. Banks, Au, Ball, Bell, Gordon, Gutierrez, Heath, Lee, Lee, Mahiri, Nasir, Valdes and Zhou (2017) report, “Most of the learning that occurs across the life span takes places in informal environments” (p. 9) and their data “makes [it] clear that people spend the majority of their time from infancy to adulthood in informal learning settings” (p. 9).

Though there is limited juried, peer reviewed data on the framework; there is information in the form of sponsored articles and research composed by advocates of the 70:20:10 framework. Though descriptive, they do lack an impartial scholarly position that facilitates a fully objective assessment of the methodology. One prominent, “internationally recognized” study was produced by *Towards Maturity*, an independent British research firm that provides research and consultation to learning and development functions and organizations (Jennings, Overton & Dixon, 2016, p. 39). The report assesses the 70:20:10 strategy using data “drawn from the 2015 Towards Maturity Benchmark™ research conducted online during June-August 2015 with over 600 leaders in learning and development and 1,600 learners” (Jennings, Overton & Dixon, 2016, p. 2). In reviewing the 2015 Towards Maturity Benchmark™ research study design, the researchers were grateful to several recognized advocates of the 70:20:10 framework who “provided input into the 2015 question set” (Overton

& Dixon, 2015, p. 2) for the survey. This closeness to the data composition by advocates of the framework raises concerns about unintended influence that may inadvertently taint the report's findings. As previously reported in this review, "You can be committed to science, but as soon as you're committed to a hypothesis, you've walked off the trail of objective truth" Dawkins, 2017, (para. 1) and "... it takes considerable effort to see facts (and remember them) while withholding judgement and resisting explanations (Taleb, 2010, pp. 63 – 64).

With these considerations in mind, the 2016 *Towards Maturity* report "In Focus: 70+20+10=100" offers some helpful insights as to the nature of the 70:20:10 framework. Baker (as cited by Jennings, Overton & Dixon, 2016, p. 3) suggests the 70:20:10 approach is not new but "It's the way that we have been approaching apprenticeship's training for decades – mainly learning on the job, with some formal training too." Baker also dismisses "the – quite frankly daft notion – that the ratios of 70:20:10 are fixed" and inflexible. However, most important, the 2016 *Towards Maturity* report survey respondents found the benefits of employing the 70:20:10 framework include:

- 4 X as likely to respond fast to business change (30% vs. 7%)
- 3 X as likely to report improvement in staff motivation (27% vs. 8%)
- 2 X as likely to report improvement in customer satisfaction compared to those who do not (42% vs. 18%) (Jennings, Overton & Dixon, 2016, p. 12)

The report also suggests that organizations that reported gaining the most benefit from using the 70:20:10 framework already had many of the framework components in place organizationally. Jennings, Overton & Dixon (2016) report organizations using

the 70:20:10 framework were twice as likely to have improved: learning culture, responsiveness to business needs, and productivity and engagement. They go on to report barriers to using the framework generally stem from reluctance to embrace new ways of learning and new technology along with lack of the component skills necessary to employ the various aspects of the model. Additionally, the report indicates a significant barrier is that learning, in general, is not seen as a priority by management.

Criticism of the framework. There is also an absence of juried, peer reviewed scholarly articles offering criticism of the framework, however there is no shortage of opinion articles appearing in professional learning and development trade journals along with some sponsored research findings. Perhaps the most prominent study sponsored by the Aberdeen Group, a research organization that “helps business worldwide improve their performance” (Moon, 2015, p. 10) suggests breakdown different from the 70:20:10 structure:

- Experiential learning (40%): learning that occurs on the job
- Referential learning (17.5%): feedback, coaching and mentoring
- Relational learning (17.5%): learning from managers and peers in a social context
- Formal learning (25%): traditional coursework delivered in a classroom or online (Moon, 2015, p. 7).

Moon goes on to indicate that like the 70:20:10 model, the percentages are “really only meant to be a reference, not a hard and fast rule” (p. 8). Regardless of the readjusting of reference percentages, the Aberdeen work recognizes that learning is

multi-dimensional and cannot be relegated to only a classroom or online course delivery.

Jefferson and Pollock (2014) assert that while the “concept makes intuitive sense” (para. 1) there is no valid research that justifies the 70:20:10 ratio. Cohen (2015) questions the validity of data derived from the Center for Creative Leadership 1996 study suggesting the data was derived from survey responses not measured change. Interestingly, Cohen suggests much of the support for the 70:20:10 model is generated from “uninformed and unschooled professional public who has created this myth and instilled a potential major disservice to learning” (para. 9). In the realm of leadership development, the area where the framework became formalized, Sinar, Wellins and Ray (2014) report, “that 70-20-10 doesn't match either the reality of how leaders learn or how they prefer to learn” (para. 15) and their “research shows that the 70-20-10 model may be a misguided approach for planning leadership development because it bypasses the foundational role of formal learning and learning from others” (para. 16). Byham (2015) argues, “Though long-accepted, the ratio has never been validated with hard data” (para. 9) and therefore cites survey data collected by Development Dimensions International of 13,000 leaders world-wide asking “what experiences they learned from the most, as well as how they allocate their learning time” (para 9). Bynam reports a different percentage of learning using the 70:20:10 framework categories: 20 – 21 % formal learning, 25 – 27 % learning from others, and 55 – 52 % learning on the job. It is important to note that Byham is the Chief Executive Officer of Development Dimensions International a leadership development

and consultancy firm and Sinar, Wellins and Ray are senior executives with the same firm.

Mihai (2017) suggests 70:20:10 may not be the best name the framework “because the numbers are rarely that absolute; they’re guidelines” (para. 8). Instead, Mihai suggests, something akin to a three E’s model: Experience, Exposure, Education (para. 13) that has been explored by Tracey (2016) and Jennings (2016). Forman (2012) offers a similar strategy suggesting doing “away with the formula but keep the relevant categories — this is called the portfolio approach — many problems are eliminated, and the most important advantages of the original 70-20-10 model can be retained” (para. 8). Forman goes on to recommend that “the best mix depends on the goals, audience, infrastructure and desired outcomes of the intervention” (para. 9.) and the portfolio approach “helps to ensure a richer developmental experience — it avoids the common, simplistic approach of attending a training class and assuming development has been accomplished” (para. 22).

Overall Literature Review Summary

To recap the main themes of the literature review, learning is a natural part of the human endeavor occurring as a neurological process of stimulating brain cells to fire repeatedly in response to an experience. However, significant data indicates the effectiveness of formal workplace is generally low despite significant investments of time and money. The current system of formal workplace learning is a departure from how humans learn naturally. Contemporary human learning has not deviated a great deal from how hunter gathers learned which involves, to a notable extent, creating and developing experience. Developed in response to specific economic needs, formal

learning initially became a means of control and dominance as well as transfer of essential information often with the absence of facilitating authentic experience with the subject matter. However, as technology advanced, formal learning moved to apprenticeships which yielded the development of vital experience development and then to mass training as industries enhanced its scale and the need to efficiently train large numbers of workers increased. Many contemporary learning designs still struggle with achieving some degree of effectiveness despite significant investments of time and money. Yet, as current and future learning practices are investigated for effectiveness, the most effective will often be traced to hunter gatherer experiential learning roots. Learning theory, theorists and elements of cognition indicate the importance of experience in the learning process with some sources suggesting experience is, in itself, the essence of learning. Workplace learning decision makers tasked with selecting instructional methods are often ill-equipped to discern the effectiveness of an approach especially when inundated with a vast number of choices and options. Moreover, humans often succumb to cognitive biases and heuristics that compromise critical thinking and the ability to derive an objective, unbiased decision or conclusion. The 70:20:10 framework offers a formalized means to embrace the value of experience in the learning process by recognizing the role of informal learning in workplace learning. However, there is disagreement on the validity of the model albeit most in the form of opinion articles appearing in professional learning and development trade journals along with some sponsored research findings.

Chapter 3: Methodology

Problem Statement

Currently, the effectiveness of formal workplace learning in the U.S. remains low despite significant commitment of time and resources (Caffarella & Daffron, 2013; Merriam & Leahy 2005; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012) or as Silverman (2012) astutely observes, “So much training, so little to show for it” (para 1).

Purpose of the Study

The 70:20:10 framework provides a model that repositions how learning and development can be conducted with better results. However, exactly how much of this approach is founded on research-based learning theories and practices that can address the complexity of effective contemporary workplace learning? Or is this approach simply a scheme that is overhyped and well marketed but lacking in theoretical grounding and practicality?

The purpose of this study is to evaluate the 70:20:10 framework for evidence of research-based learning theories and practices. Further, the study posits how these findings may inform practitioners in workplace learning and development. By evaluating the connection of the 70:20:10 framework to research-based theory and practices, valid insights may be revealed that address the noted low effectiveness of workplace learning. This literature review did not reveal any other academically sponsored, scholarly research on the 70:20:10 framework suggesting this work may be the first.

Research Questions

1. What is the evidence of researched-based learning theories and practices in the 70:20:10 framework?
2. How might understanding these findings inform learning and development practitioners?

Program Evaluation

Program evaluations are specific, methodical studies that use unbiased data and analysis to respond to specific questions about the effectiveness of a program (Blome, 2009). The historical origins of program evaluation can be found dating back to the 17th century; however commonplace systematic evaluation research is a comparatively modern 20th-century application having steadily grown in sophistication and application since World War II (Rossi, Lipsey & Freeman, 2004). Program evaluation answers questions such as: is it effective, how effective is it, does it do what is intended, and does it function for the reasons we believe it does (Blome, 2009). Mertens and Wilson (2012) view program evaluation as a fairly new discipline that seeks to systematically collect data “for the purpose of making an informed decision” (p. v).

Evaluation or research? Mertens and Wilson (2012) clearly indicate there is significant overlap between research and evaluation. They suggest evaluation is a “major genre of systematic inquiry that both narrows and enhances the methodologies developed in the research community” (p. 12). The similarity of evaluation and research is illustrated by Rossi et al (2004) who use the terms evaluation, program evaluation, and evaluation research interchangeably (p. 6). However, Mertens and Wilson (2012) conclude, “although there is much overlap between the worlds of

research and evaluation, evaluation occupies unique territory” (p. 11) in that evaluation relies on merit and worth in deriving a judgement of the evaluand (subject of the evaluation). LaVelle (2017) provides this comparison of the two disciplines that distinguishes between significant characteristics:

Research:	Evaluation:
Seeks to generate new knowledge	Information used for decision making
Researcher-focused	Stakeholder-focused
Hypothesis	Key questions
Make research recommendations	Recommendations based on key questions
Publish results	Report to stakeholders

J. Kouame advises one cannot conduct an evaluation without research methodologies; however, he suggests evaluation is much larger than research alone and has a distinguishing feature that endeavors to elicit the value in the evaluand (personal communication, February 27, 2018). Mathieson (2007) concludes evaluation and research are different in the degree of what is specifically examined and the degree of the examination. Evaluation tends to particularize while research generalizes, evaluations look to improve the evaluand while research attempts to prove or disprove a theory, evaluation seeks to determine how well something works while research attempts to determine how something works (Mathieson, 2007; Chen, 2013).

Elements of evaluation. Essential to the uniqueness of evaluations as an instrument of inquiry are the dimensions of merit and worth. Merit is the “absolute or

relative quality of something, either intrinsically or in regard to a particular criterion” (Mertens and Wilson, 2012, p. 6) while worth is the “outcome of an evaluation and refers to the evaluand’s value *in a particular context* [emphasis in original text] (Mertens and Wilson, 2012, p. 6). Evaluand is a general term that applies to any object of an evaluation (Mathison, 2004, p. 139). Formative evaluation takes place during the development or execution of the evaluand while summative occurs at the conclusion of the evaluand. “When the cook tastes the soup, that’s formative; when the guests taste the soup that’s summative” (Stake as cited by Mathison, 2004, p. 160).

The American Evaluation Association (2017) outlines the importance of utility, feasibility, propriety, and accuracy in foundational standards in developing and executing viable evaluations.

Utility standards are “intended to increase the extent to which program stakeholders find evaluation processes and products valuable in meeting their needs” (American Evaluation Association, 2017). This aspect of program evaluation includes evaluator credibility, attention to stakeholders, negotiated purposes, explicit values, relevant information, meaningful processes and products, timely and appropriate communicating and reporting, and concern for consequences and influence (American Evaluation Association, 2017).

Feasibility standards facilitate the evaluation effectiveness and efficiency and consist of project management, practical procedures, contextual viability, and resource use (American Evaluation Association, 2017).

Propriety standards are those elements of the evaluation that assure what is proper, fair, legal, right and just in evaluations (American Evaluation Association,

2017). Essential considerations for propriety standards take into account responsive and inclusive orientation, formal agreements, human rights and respect, clarity and fairness, transparency and disclosure, conflicts of interest and fiscal responsibility.

Accuracy standards “are intended to increase the dependability and truthfulness of evaluation representations, propositions, and findings, especially those that support interpretations and judgments about quality” (American Evaluation Association, 2017). These standards include: justified conclusions and decisions, valid information, reliable information, explicit program and context descriptions, information management, sound designs and analysis, explicit evaluation reasoning, communicating and reporting (American Evaluation Association, 2017).

The final area, evaluation accountability standards, constitutes the final aspect of the accepted evaluation standards which includes: evaluation documentation, internal meta-evaluation, and external meta-evaluation (American Evaluation Association, 2017).

Approach

The research approach for this investigation is the Context, Input, Process, and Product or CIPP program evaluation model. It is a well-established, comprehensive framework for conducting formative, summative and developmental evaluations of programs, projects and organizations (Stufflebeam & Shrinkfield, 2007). First developed to facilitate improvement and accountability in public schools, the model has an extensive record of successful applications in a number of areas within the United States and internationally (Stufflebeam & Zhang, 2017). The structure of the CIPP model lends integrity to the evaluation process and combats illegitimate and

pseudoevaluations that allow for biased and corrupted findings (Stufflebeam & Zhang, 2017). Because of its quality, the CIPP model resides in the company of legitimate evaluations models that “convey valid descriptions and judgments of a program or other entity” (Stufflebeam & Zhang, 2017, p. 2). Additionally, the evaluation is conducted using the 2011 edition of *The American Evaluation Association Standards* for program evaluation to document how the quality evaluation indicators were addressed throughout the evaluation process. Using the CIPP evaluative analysis, conclusions are formulated regarding the degree to which the 70:20:10 framework is grounded in research-based learning theories and practices with insights that inform learning and development practitioners.

As previously noted, there are no shortage of examples regarding the successful use of the CIPP model in evaluating workplace learning and development programs. Examples range from employee training satisfaction in Korea (Jeon & Lee, 2014) to the quality and merit of nursing education programs in the United States (Lippe & Carter, 2017) to call center performance in Turkey (Kavgaoglu & Alci, 2016) to training evaluation in public organizations of Pakistan (Khalid, Rehman & Ashraf, 2012). Moreover, use of the CIPP model is commonplace as a dissertation format; so much so, that several doctoral programs offer a standard CIPP template for using the model in developing dissertations. In addition to these reasons for selecting the CIPP model, it also provides an enduring, reliable and robust structure to discern the value of workplace learning in the quickly changing, complex and complicated learning and development landscape as previously noted by Thomson, Pate, Schnidman, Lu, Andreatta and Deweet (2017).

To further ensure the integrity of the evaluation process, a meta-evaluation is conducted using the 2011 edition of *The American Evaluation Association Standards* for program evaluation to document how the quality evaluation indicators were addressed throughout the evaluation process. Employing the American Evaluation Association (AEA) standards adds an additional layer of evaluation support to ensure the quality, value and worth of the evaluation process. Beginning in the 1960's, these standards have slowly emerged into the current form in response to the question, "...what is required for a high-quality reflective evaluation practice in current North American, multicultural, globalized settings?" (Yarborough, Shulha, Hopson, & Caruthers, 2011, p. xxxviii).

From this evaluative analysis, conclusions are formulated regarding the degree to which the 70:20:10 framework is grounded in research-based learning theories and practices with insights that inform learning and development practitioners.

The following illustration and summary describes how the CIPP model's core concepts will be applied with this methodology:

Figure 1. The CIPP Model design arrangement and focus areas.

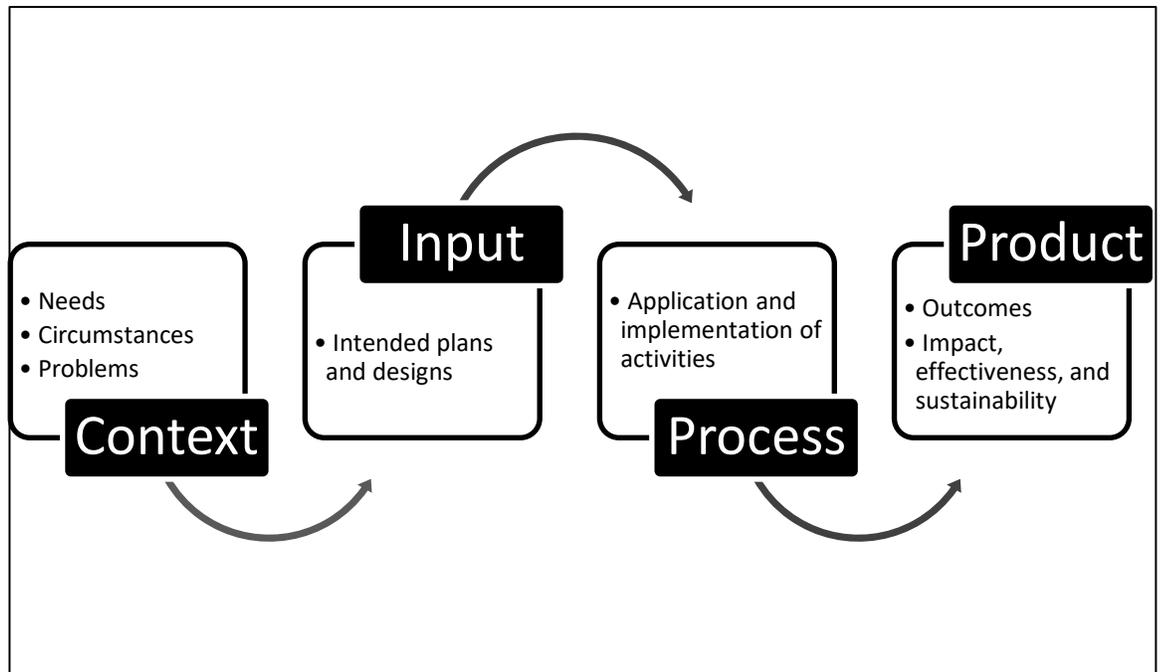


Figure 1. The CIPP Model illustrated.

Context. The context evaluation describes the big picture of the evaluand by defining relevant circumstances, assessing needs, recognizing problems that underlie needs, and determining if the program is sufficiently responsive to assessed needs (Stufflebeam & Shrinkfield, 2007). The essential questions for the context evaluation center on the background and situation; what is the problem, what are the needs, why the 70:20:10 framework program is necessary, and what the framework can accomplish (in the context of the research question).

Input. The input evaluation assesses the approach to implementation (Stufflebeam & Shrinkfield, 2007). It identifies and evaluates how the 70:20:10 model is designed and planned. In the context of the research question, the input evaluation investigates what planning, preparation and groundwork is needed to employ the 70:20:10 framework including assessing the framework's foundational strategy against relevant research.

Process. The process evaluation goes past the Input evaluation components and evaluates the application and implementation of the 70:20:10 framework activities (in the context of the research question) outlined in the data sources (Stufflebeam & Shrinkfield, 2007; Stufflebeam & Zhang, 2017). Focus areas target the 70:20:10 framework implementation and procedural designs, learning theory and practices that support the framework's practices and process.

Product. The product evaluation determines the 70:20:10 framework's ability to deliver on intended, critical outcomes including impact, effectiveness, and sustainability (Stufflebeam & Shrinkfield, 2007). In the context of the research question, this portion of the evaluation looks at what the 70:20:10 framework creates or produces, and what are the possible intended and unintended outcomes. Primary focus areas are how the framework combats low workplace learning effectiveness, inadequate connection with human learning basics and connection to researched-based learning theories and practices.

Data Sources

Determining the consistency of evidence derived from different sources is an essential aspect of evaluation process (Anderson & Braud, 2011). Therefore, diverse data sources of information are employed to build and justify themes in the data (Creswell, 2014). Referred to as triangulation, this methodology uses extant (existing) textual analysis, social media, and researcher experiences to reliably construct and substantiate valid themes and findings.

Primary data source. The primary data source for this investigation is an extant textual analysis of the *702010 Towards 100% Performance* manual published

in 2016. This work was selected because it provides the most current information and real-world applications of the framework available at the initiation of this study. The use of extant text analysis that treats existing texts as data to address research questions is relatively common (Ralph, Birks, & Chapman, 2014). Charmaz (2006) indicates the usefulness in this approach, “Researchers have valued texts because of their relative availability, typically unobtrusive method of data collection and, seemingly objectivity” (p. 37). Accordingly, this work offers a viable data source for the 70:20:10 framework.

Secondary data source. The second data source used to triangulate the data is the transcript of the November 2, 2017 “GREAT 70-20-10 Debate – Tweet Stream” consisting of an international collection of leading figures in the workplace learning and development field. The acceptance of Twitter for use in research, both in academic circles and in business is extensive and social media has attracted much attention from academics (Ahmed, 2017). Using social media raises some unique and important ethical considerations. The Association of Internet Researchers (AoIR) provides guidance for ethical internet research to aid researchers in navigating the complexity of ethical challenges. The AoIR 2012 report, *Ethical Decision-Making and Internet Research: Recommendations from the AoIR Ethics Working Committee (Version 2.0)* provided a comprehensive and exhaustive overview of considerations that ensure ethical treatment of the acquired data. This resource combined with Plymouth State University’s Institutional Review Board (IRB) process ensured careful treatment of any ethical considerations.

Third data source. The third data source in the triangulation is the researcher's experience carefully filtered for cognitive biases. The researcher has extensive learning and development experience that includes higher education, corporate, organizational, government, sports and military applications. Connecting to this body of experience provides opportunities for rich reflection and synthesis of the other data sources. However, Anderson and Braud (2011) suggest one's own awareness grounded in experience is not only an instrument of the research but is subject to influence from the research as one works with the research topic in concert with their own liminal and cognitive self. Merriam and Tisdell (2016) astutely warn, "The human instrument has shortcomings and biases that can have an effect on the study" (p. 16). In response to these considerations, these researchers suggest avoiding attempts to eliminate biases in favor of openly identifying and monitoring them.

The following description (i.e. researcher experience) outlines the researcher's experiences that support the evaluation of the 70:20:10 framework is written in the first-person tense as an element of first-hand data. To provide some context for the importance and relevance of these experiences, Hawkins (2004) suggests individuals acquire and employ stored neural patterns of experience that serve as the brain's reference point in making determinations for appropriate actions as it encounters the world around it. Therefore, as with all adult learners, the researcher has a rich mosaic of stored patterns of experience that are used to facilitate navigation through routine and everyday situations as well as new and different circumstances.

Researcher Experience. My enjoyment of outdoor activities and thirst for adventure initially emerging throughout my childhood and teenage years, flourished

when I first entered military service at the age of 17 as a U.S. Army combat engineer. By the time I was 19, I was leading combat engineer patrols along the (then) Czechoslovakian - West German border. Through this experience, I was introduced to a new type of learning ... training for performance ... that I had not yet experienced prior to the military. Knowing topic content wasn't enough, I had to be able to perform the topic, often under stressful and arduous conditions, and do it well; otherwise, the consequences could be perilous if not outright fatal. This type of training ranged from combat demolitions, land navigation, land mine warfare, armored vehicle operation, calling in artillery fire, tactical maneuvers, and leadership along with a host of other soldier skills necessary to execute the craft of modern warfare. Though each learning episode had a formal element, most areas were facilitated with a substantial experiential component that resulted in a hands-on performance-based outcome. Moreover, I found the most profound learning experiences were unplanned, unintended and unexpected.

I left active military service and attended the two-year associates in Forest Technology program at the University of New Hampshire's Thompson School. This curriculum featured a very heavy experiential aspect accompanied by an academic classroom component to complete the overall learning process. For example, timber cruising (scientifically measuring timber volume) instruction consisted of a weekly schedule that included several hours of classroom instruction accompanied by four to five hours in the field practicing and refining basic timber cruising techniques. With this applied know-how, I was selected for a summer timber cruising job over two students (a junior and senior) in the four-year forestry program at UNH simply

because I had the experience of conducting actual timber cruises and therefore actually knew *how* to cruise timber. During my time at UNH, I also rowed on the UNH crew team, being elected captain my second year on the team, and leading the team to our first undefeated season. I was also involved with student leadership in student government and alumni affairs. I attribute these leadership activities to the leadership training and experience I acquired while on active duty in the military. Moreover, the performance-based aspect required in athletics further served to reinforce the value of realistic training in attaining athletic achievement. This was experience was enhanced when complemented with informed applications on the science of human performance usually facilitated by a coach or peer.

My experience then moved west to Washington State where I became an assistant strike team leader for a twenty-person initial attack forest fire fighting crew and the following year, foreman of Engine 801, the fastest tanker on the Wenatchee National Forest. I found that experience fighting forest fires was the only coveted talent on fire crews as fire fighters were evaluated by how many fires they had been on and seldom by training or academic credentials. However, once again, I found experience, combined with information often delivered and cultivated by more knowledgeable person on fire behavior, fire safety and other related topics served as a powerful and comprehensive learning experience. During this time, I returned to college and completed a Bachelor of Science degree in Forest Resource Management. I went to work conducting non-point water quality surveys for several years before being selected for the coveted two-year Washington Agriculture and Forestry Education Foundation (WAFEF) Leadership Program. This program

develops exemplary leadership through a variety of experiential activities and real-life experiences that include regional, national and international travel and education.

During this program, I became a regional operations manager for central Washington State due in no small part from the experience derived from the WAFEF leadership program. It was also during this time that I reentered the U.S. Army Reserve and Army National Guard serving as an engineer sergeant and competing as a nationally ranked biathlete (cross-country skiing and rifle shooting). Because of this experience, I found that the degree of practice required to compete and eventually excel in biathlon was substantial. Yet, as previously mentioned, the performance-based aspect required in biathlon reinforced the value of lifelike training in reaching athletic success but only when supplemented with informed applications on the science of human performance usually facilitated by coach or peer.

I eventually returned to my New Hampshire roots taking a position as executive director of the state's rural development council. I also began an extended journey of discovery in pursuit of what is learning. I did so by returning to college to pursue a master's degree in adult learning and development, followed by a Certificate of Advanced Graduate Study (CAGS) in neurocognition and then acceptance into a Doctor of Education program. Upon completing the master's degree, I went to work in the following capacities:

- Learning and Development Consultant: Browne Center for Innovative Learning, Municipal Resources Incorporated, Center for Training and Business Development.

- Curriculum Developer, Learning and Development Consultant, Tele Atlas North America.
- Instructional Designer/Adjunct Faculty, Granite State College.
- Teaching Lecturer, Plymouth State University, College of Graduate Studies.
- Director of Faculty Development and Faculty Member, Granite State College (which included assisting in the development of the Primex NH experiential learning facility).
- Extension Associate Professor, Lean Green Belt, Learning and Instructional Design Specialist, University of New Hampshire Cooperative Extension. This experience included teaching cognition and critical thinking to incarcerated populations for over two years resulting in a documented drop in recidivism because of this instruction.
- Associate Professor, Lean Black Belt Instructor, New Hampshire Bureau of Education and Training (this position has an emphasis on continuous improvement training and application).
- Adjunct Faculty, Champlain College, Master of Science in Executive Leadership.

With hundreds of courses designed and delivered to a wide variety of learners ranging from graduate, doctoral level students to incarcerated learners, these experiences allowed me to refine my teaching goal of facilitating learning with impact through an effective transfer of learning that targets the learner's needs and objectives.

As Sousa (2012) suggests, through these experiences, I have developed deep patterns of experience that are constantly shaped and re-shaped because of new and different

experiences. These experiences serve as a critical reference point for the evaluation process outlined in this work.

Data Analysis

Analysis of the data is filtered through each element of the CIPP program evaluation model using the following process developed from concepts outlined by Charmaz (2014):

1. Read through all data sources and capture researcher reflections multiple times to become intimately familiar with the data.
2. Initial or open coding by hand beginning with the context evaluation followed by the input evaluation, the process evaluation and concluding with the product evaluation. Initial coding means labeling segments of data with a short descriptor that both summarizes and accounts for each piece of data at the same time. This is conducted through initial line-by-line coding of hand written field notes.
3. Initial memos about the findings are drafted elevating the initial coding to tentative topics and categories within the CIPP model. Initial memo writing is a critical step between data collection and writing draft findings. This step helps the researcher analyze data and codes early in the research process.
4. Return to data sources and focused coding to further refine the data by separating, sorting, and synthesizing. Testing emergent conclusions and understandings along with searching for alternative explanations are also included in this portion of the process.

5. Draft advanced but concise theoretical evaluative memos. These further refine the conceptual categories, comparing data from different vantage points and examining the concepts derived from the data for further empirical analysis. Supplementary theoretical sampling may be initiated to refine and collect any pertinent new data needed to address any and all assumptions, unknowns, and questions that support the investigation. Theoretical memo writing is further refined to clearly describe essential concepts of the findings until no new properties emerge (Charmaz, 2006). This writing begins to address the research questions directly.
6. Writing first draft of the findings and the foundation for Chapter 4.

Validity and Reliability

Stake (2005) acknowledges the ‘hazardous journey’ qualitative research can take when transitioning from reading to writing and warns the researcher needs to seek “ways of safeguarding the trip” (p. 455). Stake goes on to observe that the researcher, despite their best intentions, will lace the findings with “favor and doubt” and “will pass along to the readers some of their personal meanings and relationships - and fail to pass along others” (p. 455). These concerns are addressed using strategies for promoting validity and reliability as outlined by Merriam and Tisdell (2016):

- Reflecting critically on the investigator’s assumptions, worldviews, biases, and general theoretical orientation to the study that may influence the investigation.

- Discussing the study, the consistency of the emerging finding with the raw data, and the preliminary analysis and interpretations with colleagues and associates.
- Reflecting on the methods, procedures, and decision points made while conducting the analysis and recording them using an investigation log.
- Providing rich, thick descriptions that ensure effective contextualization and understanding.

Additionally, the evaluation will adhere to 2011 edition of *The American Evaluation Association Standards* for program evaluation to document how the quality evaluation indicators were addressed throughout the evaluation process. Stufflebeam and Zhang (2017) assert for the CIPP model to be properly executed, a meta-evaluation is recommended to ensure credible findings.

Chapter 4: Findings

As described in Chapter 3, the purpose of this study was to evaluate the 70:20:10 framework for evidence of researched-based learning theory and practices. Further, the study addresses how these findings may support learning and development practitioners. This evaluation uses three sources of data consisting of an extant textual analysis of the *702010 Towards 100% Performance* manual published in 2016, Tweet debate on the 70:20:10 framework from an international collection of leading figures in the workplace learning and development field, and the researcher's own experience (the Chapter 3 methodology provides an outline this experience). Further, the study recommends how these findings can support practitioners in workplace learning and development.

The following findings are categorized pursuant to the CIPP model: Context, Input, Process, and Product. Elements of the CIPP model are complementary to each other yet are considered to be independent evaluations specific to the respective evaluation element. These findings use the term "researcher" or "the researcher" to designate the author of this work, Charles M. Bagley. The findings described below are what the researcher can substantiate. Though the 70:20:10 framework is strategic in its overall conceptual structure, particularly with regard to the holistic organizational perspective the framework employs, the elements of the framework discussed throughout this evaluation are generally tactical in nature.

Context

Introduction. As noted in the methodology, the context evaluation describes the big picture of the evaluand by defining relevant circumstances, assessing needs,

recognizing problems that underlie needs, and determining if the program was sufficiently responsive to assessed needs (Stufflebeam & Shrinkfield, 2007) in the context of the research questions.

Workers as learners. A noteworthy aspect of the context element of the evaluation was the role of workers as learners within the organization and who benefits through workplace learning and development; the learner, the organization, or both. Brown (2018) addresses this by suggesting that “learning is an imperative for individuals, organizations, and societies” (p. 1) as learners and organizations alike are being required to adjust to the rapid changes in these areas. In response to these changes, a renewed effort is being made to understand the learner in ways that go past developing the individual for maximum productivity but as a person in order to authentically embrace their true motivations.

Individual differences and the effectiveness of learning and development are one of the most studied topics in industrial-organizational psychology (Brown, 2018). Kraiger and Mattingly (2018) recognize the importance of workplace learner motivation and engagement in the learning process as an essential consideration in designing a learning intervention. An emerging trend in this area is reallocating control of the learning experience and allowing the workplace learner the capacity to take charge of their learning and self-regulate training and development episodes (Donovan & Nicklin, 2018). While the organization benefits from enhanced worker learning and development, these emerging trends also serve to develop the worker as a learner with learning that serves the learner as an individual. In the Input section of this evaluation, examples will be presented on how the 70:20:10 framework embraces

these emerging trends by determining how, and more importantly, why learning should take place. In doing so, the 70:20:10 framework serves to acquire a learner's intrinsic motivation and dispense with the more traditional carrot and stick style of extrinsic motivation

The numbers. The numbers in the framework's title 70, 20, 10 are representative of informal/experiential learning, social learning (learning with and from others), and formal learning respectively. The evidence presented in the literature review supports the basic idea of an informal/experiential-social-formal learning continuum with a significant amount of learning occurring informally or experientially; however, the percentages can and do vary greatly. As noted in the literature review, a U.S. Bureau of Labor Statistics of the U.S. Department of Labor study conducted by Loewenstein and Spletzer (1998) found that workplace learning fluctuates significantly from approximately 13% to 46% attributed to formal learning and 10% to 96% ascribed to informal learning (p. 40, Table 2). The literature review goes on to share Clark's (2013) view, "The ratios depend greatly on context, such as the learners' type of job, skill level, organization changes, etc." (para. 9). The Learning in Informal and Formal Environments Center (LIFE) at the University of Washington and Stanford University reports, "Most of the learning that occurs across the life span takes places in informal environments" (Banks, et al., 2007, p. 9). Their work *Learning In And Out Of School in Diverse Environments, Life-Long, Life-Wide, Life-Deep* shares an impressive graphic that illustrates with remarkable clarity, "people spend the majority of their time from infancy to adulthood in informal learning settings" (p. 9).

Jennings (2017) qualifies the numbers succinctly in the *GREAT 70-20-10 Debate – Tweet Stream*, “It’s not about the numbers”; “The numbers are historical, Even with the originators no-one intended them to be ‘exact’” while Thalheimer (2018) astutely warns, “One of the most ubiquitous [pervasive] learning myths is that people remember a certain percentage of what they had learned depending on the perceptual modality or activity that they engaged in to learn.” This discomfort with the name is reiterated numerous times in the *GREAT 70-20-10 Debate – Tweet Stream* as evidenced by an emblematic tweet by Moore (2017), “Like the idea of 70:20:10, don’t like the numbers.” However, McDermott (2017) astutely tweets, “If it is not about the numbers, why have them?”

The numbers in the framework title do pose a challenge for the researcher as assigning specific numbers to such a complex dynamic as learning can be too rigid a classification. However, in concert with an ongoing series of cognitive bias reflections, the researcher recognizes the importance of experience in learning and, through the researcher’s own experiences, concludes that experience plays an important role in learning. The figures do concisely outline the three approaches of the framework consisting of formal, social and informal aspects of learning.

Learning not defined. The 70:20:10 manual does not present a comprehensive, central description of what learning is to provide context in which to anchor the framework’s learning elements. Additionally, there was no direct reference to andragogy (the theoretical study of how adults learn) but instead uses the more common term pedagogy. Though to some degree semantic, the difference is significant as pedagogy is derived from the Greek words ‘lead the child’ and defined

as the art and science of teaching children to learn (Merriam, Caffarella and Baumgartner, 2007; Knowles, Holton & Swanson, 2011). The *GREAT 70-20-10 Debate – Tweet Stream* also does not clearly offer a clear definition of learning but does imply the value of experience in the learning process. As noted in the literature review, the definition of learning used in this work defines learning as an experiential process where a learner can perform the intended learning repeatedly, skillfully and exponentially after the instructional episode is completed. This was used by the researcher as a reference element for this evaluation. Though it was eventually clear that the 70:20:10 author's view of learning was deeply experiential, the absence of a well-articulated, working definition of learning resulted in the lack of a reference point to functionally ground the framework elements to learning. Furthermore, failure to articulate a definition of learning raises concerns about the 70:20:10 author's degree of understanding of the learning process.

Roots of human learning. The 70:20:10 manual described the effectiveness of formal learning in the middle ages but did not dig into the roots of human learning that would illustrate 'the how' and 'the why' humans learn the way humans do, choosing instead to only pick up in relatively modern times with apprenticeships and guilds. This omission was significant because as effective learning strategies are explored, the pedigree of their success can often be found embedded in human learning characteristics of the hunter-gatherer era that relied on learning based on experience (Willis, 2010; Wolfe, 2010). As noted in the literature review, Gray (2008) observes that for millions of years as hunter-gatherers, humans did not distinguish between work (hunting and gathering), learning and play. It wasn't until the comparatively

recent advent of agriculture, followed by industrialization, that formal learning emerged and these three endeavors (work, learning and play) were separated (Gray, 2008). Today, there is now an emerging emphasis on developing experience among worker/learners thus reverting back to the early roots of human learning, albeit with the support of modern technology. Corrigan (2013) recognizes this in the context of experiential, active learning in contrast to an information delivery instructional design such as a lecture,

It seems that the failure of active learning practices to gain wider purchase in contemporary education, despite the current active learning movements, can be attributed in part to the common misunderstanding that lecturing is the traditional approach, not active learning. But, when we take an epochal perspective, it turns out that active learning has an ancient history, while lecturing is the fad, a blip in the history of learning (para. 14).

Using an epochal perspective, as Corrigan puts it, this ancient lineage of learning can be used to assess new and emerging learning strategies and thus avoiding unproductive “sophisticated learning solutions” (Arets, Jennings & Heijen, 2016, p. 27).

Though not overtly discussed in the *GREAT 70-20-10 Debate – Tweet Stream*, the discussion implies with significant clarity that there is value in the experience of workplace learning itself as evidenced by remarks such as, “We learn most through doing and least through formal teaching” (Ellis, P., 2017); “[the 70:20:10 framework] Helps a lot of people to understand that learning happens over long periods, not

isolated events” (Neaman, 2017); “If you want to be proficient at something you need to put #learning into #practice” (Randieri, 2017).

Exercising attention to cognitive bias and assumptions, the researcher found the roots of human learning consistent with the definition of learning used in this work.

Experience in learning. The 70:20:10 manual suggests “Working = learning” (Arets, Jennings & Heijen, 2016, p. 31) and this view was an essential consideration from a neurocognitive perspective. The importance of experience in learning was noted in the literature review initially by Sheckley and Bell (2006) who suggest learning is about constructing experience. Experience is derived from potentiation; meaning neurons (brain cells) firing over and over, and the result of repeated experience is “the process of building neural networks” in the brain’s long-term memory (Wolfe, 2001, p. 135). As it does this, the brain “constantly shapes and re-shapes itself as a result of experience” (Sousa, 2012, p. 1). However, the quantity of repetition, rehearsal and practice occurrences vary significantly from learner to learner and situation to situation therefore negating a numerical reference with regard to the number of repetitions, rehearsal and practice iterations. Hawkins (2004) suggests human intelligence is measured by the capacity to remember and predict patterns in the world. A human’s brain receives these patterns from the outside world through experience and then stores them as memories using them later on to makes predictions by comparing what it has seen before to what is happening in the present (Hawkins, 2004). Though everything the brain encounters can be inherently experiential not all experience educates and begs the question, is the experience beneficial to the learner

in support of the organization? This idea is also supported by many of the theories and theorists, and, perhaps most profoundly, speaks directly to human learning roots as previously discussed. Of the theories that support the view “Working = learning” (Arets, Jennings & Heijen, 2016, p. 31), the andragogic element ‘experience and learning’ appears to be the most proximal, and this experiential approach lies at the heart of learning that is beneficial to the learner in support of the organization. As noted in the literature review, Dewey (1938) recognized “all genuine education comes about through experience” (p. 13). Whereas, Boud, Cohen, and Walker (1993) observe,

We found it to be meaningless to talk about learning in isolation from experience. Experience cannot be bypassed; it is the central consideration of all learning. Learning builds on and flows from experience: no matter what external prompts to learning there might be – teachers, materials, interesting opportunities – learning can only occur if the experience of the learner is engaged, at some level. These external influences can act only by transforming the experience of the learner (p. 8).

The “Working = learning” (Arets, Jennings & Heijen, 2016, p. 31) comment clearly addresses this as does the 70:20:10 framework. This was supported by numerous remarks made by an international collection of leading figures in the workplace learning and development field during the *GREAT 70-20-10 Debate – Tweet Stream* such as Wise (2017), “[Put] Emphasis and weight on work experience” and Gaughan (2017), “workers learn more from doing the job” along with P. Ellis (2017) “We learn

most through doing and least through formal teaching” and Bixby (2017) “emphasizes that we learn by doing.” Additionally, Arets (2017) provides this view of experience within a learning episode that includes, “performance support, knowledge transfer within the org, deliberate practice, challenging tasks, providing task experience.” Additionally, the researcher used the previously mentioned definition of learning to triangulate the conclusions. Taking care to recognize cognitive bias and assumptions, the researcher concurs that experience plays a vital role in an overall continuum of learning.

The case for limits of formal learning. As noted previously in these findings, formal learning has an important but by itself incomplete role in an overall learning experience. The limits of formal learning and the value it plays in an overall learning stratagem is central to the 70:20:10 framework. However, the *702010 Towards 100% Performance* manual misses an opportunity to document the limitations of the formal aspect of contemporary workplace learning using extant resources. To illustrate, the 70:20:10 manual begins to set the stage for the value of the 70:20:10 framework by illustrating 2006 international research data suggesting “formal driving education does not significantly reduce the risk of accidents, compared to learning under supervision by a usually older non-professional driver” (Arets, Jennings & Heijen, 2016, p. 13). Due to evidence to the contrary, this may not have been the best example to introduce the framework to the reader. A 2015 study conducted by the University of Nebraska-Lincoln that followed more than 150,000 teen drivers over eight years found that driver's education significantly reduces crashes and traffic violations among novice drivers (Shell, Newman, Cordova-Cazar & Heese, 2015). The study's findings

support that teens are less likely to be involved in crashes or to receive a traffic violation during their first two years of driving after taking a driver's intermediate stage education in a graduated driver licensing system (Shell et al, 2015). Their overall, scientifically conclusion, "Driver education appears to make a difference in teen traffic outcomes at a time when risk is highest" (Shell et al, 2015, p. 45) contradicts the initial argument presented by the *702010 Towards 100% Performance* authors. Though in this instance the *702010 Towards 100% Performance* manual's assertion that learning from a more knowledgeable other was consistent with Vygotsky's constructivist theory, the driver's education example used in the *702010 Towards 100% Performance* manual selected to illustrate the limitations of formal learning alone can be disputed and therefore was problematic. While this evaluation was not about the merits of driver education, the fact that the manual uses a debatable example for its central argument raises concerns particularly when there are numerous other workplace-based examples available to illustrate this point. Conversely, there was extensive research literature documenting the fact that the effectiveness of formal workplace-based learning in the U.S., for example, remains low despite significant commitment of time and resources (Caffarella & Daffron, 2013; Merriam & Leahy 2005; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012).

The *GREAT 70-20-10 Debate – Tweet Stream*, however, provided numerous anecdotal observed, first-hand insights on the low effectiveness of formal workplace learning not only in the U.S. but internationally. Here was a representative sampling of these comments: "Most of the 10% (formal) horribly designed – no idea of workplace context, business need, of even what people DO" (Moore, 2017); "...most

10% are sadly designed, as top-down and not bottom up” (Gaughan, 2017); “Good message 702010 sends is a huge amount of learning occurs outside formal situations...” (Jennings, 2017); and, “...there are ways to learn beyond formal [learning]”(Wick, 2017). Further exploration into any of these experiences shared during the tweet debate may offer stronger examples to launch the introduction to the framework.

The researcher’s experience is consistent with the *GREAT 70-20-10 Debate – Tweet Stream* regarding the limits of formal learning. For example, the Thompson School of Applied Science curriculum is highly experiential and as a result the researcher was more successful competing against bachelor’s level forestry graduates for entry level forestry jobs simply because of the experience of actually doing essential forestry work tasks acquired through the Thompson School curriculum.

Primex NH is a risk management consortium for local governments in New Hampshire, U.S.A and one of the ways Primex manages risk is through worker training and development. Primex found that the traditional instructor centered training (where the instructor controls all aspects of the learning) absent of experiential learning was inadequate. The researcher was a member of a committee tasked with improving the training results and consequently “the Foundry” was developed. The Foundry features training programs that have a strong experiential element to them, offer multiple opportunities for practice, acquire feedback, and refine critical skills and abilities. Accordingly, Primex has seen an improvement in their instructional effectiveness although there has been a considerable challenge in

developing instructors using experiential approaches (E. St. Jean, personal communication, April 30, 2018).

Input

Introduction. As noted in the methodology, the input evaluation assesses the approach to implementation (Stufflebeam & Shrinkfield, 2007). It identifies and evaluates how the 70:20:10 model is designed and planned in service to the purpose of this study; to evaluate the 70:20:10 framework for evidence of researched-based learning theory and practices and address how these findings may support learning and development practitioners. In the context of the research questions, the input evaluation investigates what planning, preparation and groundwork is needed to employ the 70:20:10 framework including assessing the framework's foundational strategy against relevant research.

Design for the whole. The section in the *702010 Towards 100% Performance* manual on "Problems: tunnel vision" (Arets, Jennings & Heijen, 2016, p. 22) very briefly introduces why workplace training needs to be embraced and deliberated in a larger, holistic context. This argument suggests failure to understand the learning in a wider, systems level context may be the result of systemic organizational factors that compromise the learning. By "Looking before you leap" (Arets, Jennings & Heijen, 2016, p. 25) planners can design learning that meets the overall organization's goals and requirements versus limiting themselves to the narrow confines of tunnel vision "by seeing everything as a target for training rather than as a potential for improving performance" (Arets, Jennings & Heijen, 2016, p. 22). Lastly, failure to consider wider implications of the learning lends itself to single loop learning when double loop

learning is requisite to understand the profound and deeper ‘why’ learning may or may not be necessary. Argyris (1991) explains single versus double loop learning this way,

...a thermostat that automatically turns on the heat whenever the temperature in a room drops below 68 degrees is a good example of single-loop learning. A thermostat that could ask, “Why am I set at 68 degrees?” and then explore whether or not some other temperature might more economically achieve the goal of heating the room would be engaging in double-loop learning (p. 99).

Accordingly, the remarks about deficit thinking in the *702010 Towards 100% Performance* manual advocate for an in-depth analysis to check and challenge organizational and operational assumptions, norms and accepted conventions in the service of developing instruction that meets the requisite outcomes that satisfy a larger need.

The *GREAT 70-20-10 Debate – Tweet Stream* comments concur with these findings with no tweets suggesting anything other than a holistic approach to design. Mosher (2017) feels this perspective presents, “a very important dialogue with the business around what we should truly be designing for” while Powell (2017) appreciates “the emphasis on non-training solutions to performance problems.” Mosher (2017) embraces a holistic approach that goes past a training only focus, “we need to change the dialogue to one that starts with supporting performance” a view that is shared by Blake (2017), “there is more to learning and performance than single isolated classroom events” and Arets (2017), “Formal learning is important but not the only one solution to support performance in the corporate world.” R. Ellis (2017)

provides this summary, “70/20/10 reminds us of multiple ways to change and improve employee performance.” The *GREAT 70-20-10 Debate – Tweet Stream* participant’s experience facilitates a general chorus suggesting the need for a more holistic view of learning and development. Burnham (2017) asserts, “L&D should look beyond courses, events; see the bigger picture of performance” while Elizondo (2017) sums up the argument concisely with his view, “...real life is not one-size-fits-all.”

The researcher’s experience is limited to instruction and instructional design only. However, being exposed to a more holistic perspective offered by the 70:20:10 framework that goes past instructional design only was enlightening as it was a welcomed homecoming. The researcher has extensive experience with holistic natural resource management (or HRM) which is a regenerative agricultural management approach that embraces all aspects of farm, range or forestry operations. These aspects include business operations and connected economies, food quality, food safety and health, wildlife habitat, environment protection and human spirituality and quality of life. Focusing on just one discipline limits the overall potential that amalgamations of the holistic components can bring to an overall situation. Holistic Management International reports success stories are as abundant as they are far reaching (“Holistic Resource Management,” 2018). Though the researcher’s experience in learning is limited to design and instruction, the argument of a holistic approach is consistent with the researcher’s experience working in natural resource management settings.

Th holistic approach argument takes on greater significance as a result of an experience recently undertaken by the researcher where the researcher was involved in assisting an organization in facilitating its approach to implementing strategies to

advance the instructional strategies within the organization. In this situation, the organization's leader initiated and facilitated the researcher's involvement to advance learning strategies and applications within the organization specifically around instructor development and instructional design. Additionally, an internal survey had been previously conducted and the survey indicated support for this type of assistance. With leadership support and perceived organizational support in the form of an organization wide survey that indicated high interest for development in this area, the stage seemed to be set for success in implementing learning development strategies. However, after some time supporting the organization, learning and development strategies that worked well in other situations and circumstances failed to produce the anticipated changes for the organization. Though there was no question the interventions conducted by the researcher could have been improved, it eventually became clear that there were issues that exceeded the capabilities of learning interventions alone to solve. However, it eventually became clear, there was substantial evidence of several breakdowns in the organizational structure, numerous misaligned internal processes and the organization's leadership and strategy unconnected to realities within the organization and its products. The importance of going past instructional design is discussed in greater detail later in these findings; however, as this portion of the findings indicate in the Input stage, it is crucial to embrace such considerations while determining the approach to implementing an intervention.

Context Not Content. The *702010 Towards 100% Performance* manual identifies the critical importance of context not content in acquiring and maintaining

learner attention and facilitating motivation for learning. This approach to learning as outlined in the *702010 Towards 100% Performance* manual serves as the foundation for the framework and was consistent with basic definitions of learning discussed in the literature review. Specifically, Knowles, Holton & Swanson (2011) view of the importance of the orientation to the learning as a mainstay of Knowles' famous six assumptions of adult learning noting that adults are motivated to learn to the extent that they perceive that learning will help them perform tasks or deal with problems that they confront in their life situations. Furthermore, they learn new knowledge, understandings, skills, values, and attitudes most effectively when they are presented in the context of application to real-life situations. As also reported in the literature review, two essential considerations for learning motivation are comprehension and meaning (Macquire, Firth & Morris, 1999). Sousa (2012) asserts, "Of the two criteria, meaning has greater impact on the probability that the new information will be stored" (p. 49). Additionally, the *702010 Towards 100% Performance* manual recognizes that "people are forgetting machines" (Arets, Jennings & Heijen, 2016, p. 26) a perspective that was supported with Wolfe's (2010) view, "our species has not survived by attending to and storing meaningless data" (p. 87). However, determining what is important and what is meaningless varies significantly from learner to learner and situation to situation. The recommendation of delivering the learning, just in time, just enough, just in place, just for you (Arets, Jennings & Heijen, 2016) offers effective and practical applications for capitalizing on this critical aspect of human learning. The 'just in time' delivery provides relevance to the learner which is essential for the learning to pass through the brain's reticular activation system which filters incoming

data to determine if it is worthy of attention. The ‘just enough’ speaks to aiding the working memory functions by delivering limited amounts of learning carefully delivered in a contextualized learning environment. ‘Just in place’ addresses the importance of ecological validity; that is, does the instruction look and feel anything like how the learning will be actually used (Stein, 2010) and this relevance is crucial to an effective transfer of learning. Lastly, ‘just for you’ embraces the variability in human learning and the notion that humans are all wired differently and respond differently to different learning interventions. Put together, the ‘just in time, just enough, just in place, just for you’ approach outlined in the 70:20:10 framework was an example of an individualized transfer of learning strategy that is recognized as an emerging transformational influence in contemporary workplace learning (Ford, Baldwin & Prasad, 2018).

The importance of context was acknowledged in the *GREAT 70-20-10 Debate – Tweet Stream* such as Moore’s (2017) observation, “Most of the 10% (formal) horrifically designed - no idea of workplace context, business need, or even what people DO” and Draut’s (2017) view, “...downside of formal events is no repetition, context, practice.” MirjamN (2017) argues, “Message that numbers even matter? It’s about deciding which learning tasks/activities are most relevant in context” which is akin to Perry Slater’s view, “Not meaningful without organisational [sic] context. Don’t let a brain surgeon near my head with only 10% formal learning...” and “it’s really is about #context.” There was no evidence from the *GREAT 70-20-10 Debate – Tweet Stream* suggesting context did not play an important role in a viable learning episode.

The researcher's experience and the existing research considered in the literature review are consistent with the value of context in learning. Even upon reflecting critically on his experience, the researcher was unable to derive a viable opposing view.

Classic Theories and Theorists. The “overview of research on learning and working together” (Arets, Jennings & Heijen, 2016, p. 39) was a visually impressive outline of resources however, upon closer evaluation not all the resources should be considered credible research. Vesrespej's (1998) article in *Industry Week* was only interpretations of original research and was not the seminal work. The Kessels (2012) reference was in Dutch and an admittedly weak translation suggests it was actually a review of an opinion lecture given by Kessels that speaks to the value of leadership in higher education and was not a peer reviewed research article documenting the degree of informal learning in the workplace (though it can be argued that this was implied in the article; however, this would be somewhat generous). There were also irregularities with the citations. As previously reported in the literature review, the Bruce, Aring and Brand (1998) was incorrectly attributed. The correct reference is *Leslie, Aring and Brand (1998)* ... Bruce is Dr. Leslie's first name and this error is perpetuated repeatedly in various references which begs the question, did the authors review the original work? The reference to a 2013 OECD study was so vague that a search of OECD resources did not yield any results consistent with the resource listed. Eraut (2000) provides an informative typology illustrating the various aspects of informal learning in his investigation of the definition of informal learning. However, he uses the term ‘non-formal’ which has a different meaning than the intended term according

to Merriam and Bierema (2014) which they define as, “organized learning opportunities by institutions, agencies, and community-based groups whose primary mission is other than educational” (p. 16). Informal learning, Merriam and Bierema argue, are the learning activities embedded in everyday life (p. 16) while Noe, Clarke and Klein (2014) define informal learning as “learning that may be intentional or incidental, is not highly structured, and is a volitional behavior” (p. 247). Though they concur there is certainly overlap, they offer a different interpretation of non-formal learning that conflicts with Eraut’s view.

The references to De Grip (2008), Cross and Parker (2004), Brown and Duguid (2000), and De Laat (2012) are not listed in the bibliography making it difficult to discern the original text. Though it was presumed these references support the authors’ argument, these inconsistencies can provide substance to those who are skeptical of the framework. The authors may have served the cause of validating the significance of informal learning better by citing some of the more classic theories and theorists. References to Dewey, Knowles, cognitivism, constructivism, and mostly any element of andragogy would have easily supported the value of informal learning in the context of developing experience. However, despite the concerns discussed, much of the work cited appears to provide reliable insights on the value of informal aspects of a learning experience and are consistent with findings in the literature review.

Table 2.3 on page forty-one in the 70:20:10 manual provides concise definitions comparing formal learning to informal learning. Though there are a number of resources that could further support this illustration, one may be of

particular value. The Learning in Informal and Formal Environments Center (LIFE) at the University of Washington and Stanford University reports, “Most of the learning that occurs across the life span takes places in informal environments” (Banks, et al., 2007, p. 9). Their work below *Learning In And Out Of School in Diverse Environments*,

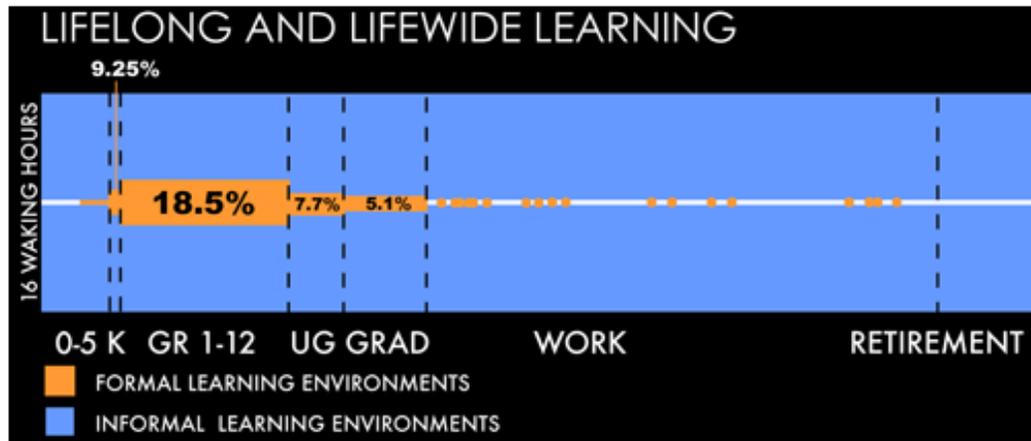


Figure 2. The LIFE Center Lifelong and Lifewide Learning Diagram by LIFE Center. Licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0.

Life-Long, Life-Wide, Life-Deep shares an impressive graphic that illustrates with remarkable clarity, “people spend the majority of their time from infancy to adulthood in informal learning settings” (p. 9).

The ‘20’ portion of the 70:20:10 framework, learning from each other, appears to be well grounded in social cognition theory along with the classic theorists Piaget (learning with others) and Vygotsky (learning from others). Social cognitive theory combines elements of both behaviorists and cognitivist orientations by positing “that people learn from each other” often in a social setting (Merriam et al., 2007). The design principles in the framework put an emphasis on social learning. “Smarter

collaboration is a key principle of 70:20:10 design” (Arets, Jennings & Heijen, 2016, p. 113) and maximizes the benefits of social cognitive theory. This was further evidenced by the 70:20:10 framework’s emphasis on social learning by observation, work teams practicing new skills together, worker/learner curating their own learning content, coaching, mentoring, cooperation, and facilitating learning through informal networks.

Conversely, the *GREAT 70-20-10 Debate – Tweet Stream* offers little in the way of theoretical evaluation only several remarks indicating the framework was not research-based (Neaman, 2017; Ball, 2017, Britz, 2017; Powell, 2017).

Performance versus Learning. Central to the argument in Chapter 3 in the *702010 Towards 100% Performance* manual was the quotation, “eighty percent of performance problems are not caused by individuals or a lack of competence but by organisational [sic] barriers” (p. 60) citing Piskurich (2002), Rummler (2004), Pershing (2006), and Bitech (2008). However, the quotation attributed to Piskurich (2002) was actually made by Ethan Sanders in *HPI Essentials* which was edited by Piskurich. Regardless, Sanders (2002) states, “research tells us that about 80 percent of performance problems have more to do with the performance environment than with the individual performance” (p. 7). However, no source of the research supporting that figure was mentioned in his statement in the text reviewed. The Rummler citation should include Brache pursuant to their 1995 findings, “While the figure varies somewhat in different jobs, industries, and countries, *we have found that about 80 percent of performance improvement opportunities reside in the environment*” [emphasis added in original text] (p. 73). Rummler and Brache (2013)

go on to acknowledge, “Our experience is consistent with that of W. Edwards Deming, who maintained that only 15 percent of performance problems are worker problems and 85 percent are management problems” (p. 123). Again, no detailed information was provided on how these figures were derived. However, it is important to note that Galagan (2008) reports Rummler to be a diligent opponent of fads and “phony research” (p. 10). For this reason, it can be presumed Rummler’s and Brache’s figures are at least reasonable to consider despite no evidence on how the numbers were acquired. Moreover, the Pershing (2006) reference corroborates the eighty percent figure this way,

The analysis issue became critical for me while working out of Paris during the 1960s. Though our company intended to solve performance problems mainly through development of programmed instruction solutions, it became clear that those who alleged to have “training problems” seldom presented problems that could be solved through instruction. In more than 80 percent of these client contacts, the appropriate remedy was something other than instruction. It was this reality that forced me to begin development of a performance analysis procedure that would quickly sort through the symptoms, identify the underlying problems, and point to relevant solutions (p. xxxix).

Note that though Pershing’s view is consistent with the central argument being made in Chapter 3 in *702010 Towards 100% Performance*, yet, again, there was no evidence of the eighty percent figure being formulated by a means other than observation. The referenced Biech (2008) citation noted in *702010 Towards 100% Performance* reads,

“data from multiple sources support the fact that when workers are not performing to standards, 80 percent of the time it’s not due to a lack of skill or knowledge, but rather to a poor work environment or lack of incentives” (p. 123). However, the actual author of this citation is Paul H. Elliot, Biech is the editor of the publication; once again, there was no information about the sources or about how the referenced data was acquired. Understanding that the 80 percent figure was essential to the message in *702010 Towards 100% Performance* Chapter 3, it seems greater prudence could be exercised to ensure the validity of the sources. Given the criticisms of the framework discussed in the literature review and the challenge validating the 70:20:10 approach, failure to do so may jeopardize support for the framework. Furthermore, selection of these sources hints of confirmation bias, namely focusing on only the evidence that supports one’s position and ignoring or discounting any evidence that is contrary to one’s beliefs or understandings.

GREAT 70-20-10 Debate – Tweet Stream offers some passing insights to this topic: “70:20:10 is a reference model to expand the role of L&D beyond formal learning. Supporting performance in the workplace” (Arets, 2017) and “A framework to support organizational performance” (Jennings, 2017). However, to be objectively transparent, it is important to note that these citations are from two of the manual’s authors who participated in the *GREAT 70-20-10 Debate – Tweet Stream*.

Adhering to critical thinking strategies (where one recognizes and checks assumptions, evaluates the available data and facts and then derives a conclusion), the researcher was still hesitant to unequivocally embrace the statement, “eighty percent of performance problems are not caused by individuals or a lack of competence but by

organisational [sic] barriers” (Arets, Jennings & Heijen, 2016, p. 60) without a higher degree of substantiated data to support the figure. However, the authors’ point was well taken; that a careful analysis of a situation is warranted as not all (and perhaps many) situations can be resolved through a learning intervention. Indeed, if the figures are anywhere close to correct (and the indications are that they are at least reasonable estimations), this perspective deserves critical consideration in the learning planning and development process.

Supporting the importance of performance analysis, Stolovitch and Keeps (2006) share this remarkably valuable insight discovered while researching the source of the eighty percent statement,

The term HPT [Human Performance Technology] refers to a powerful collection of techniques, procedures, and approaches intended to solve problems involving human performance. What kinds of problems? All kinds of problems, in all kinds of locations, for all kinds of people. Here is just a short sampling of the types of events that might trigger application of one or more HPT interventions, much as a leaky faucet or a decision to build a new house might trigger the need for a master plumber.

“These students have a bad attitude toward school.”

“Production is down in the shipping department.”

“These managers aren’t motivated.”

“My team doesn’t believe that they believe that they’ve been empowered.”

“It’s taking too long to get these people up to speed.”

“We’re having way too many accidents.”

“These people aren’t taking charge of their own health and safety.”

“Our Little League coach is a bully.”

“My dog piddles on the carpet.”

Each of these statements describes a symptom of a problem in need of attention, and each could benefit from the magic touch of HPT. That touch might involve any number of interventions (remedies), some involving instruction, and many not. But, regardless of the solutions applied, all are intended to improve the lives of their targets. There seems to be no limit to the types of human performance problems that can be profitably addressed, or the types of human situations that can be improved.

It wasn’t always thus. In earlier days, for example, every problem (or nonproblem) was treated with a single pill—instruction. Wrong attitude? Not motivated? Not authorized to do what they already know how to do? Not to worry; instruction will solve all. Instruction was seen as the remedy for almost every problem of human performance. The mantra seemed to be “If it moves, instruct it—and hang the cost, or the time required.” This was hardly surprising, since there were as yet no techniques to facilitate systematic analysis for defining the cause(s) of a problem, nor was there an array of remedies (other than instruction) with which those problems might be solved (pp. xxxviii – xxxix).

This first step in the 70:20:10 model provides methods to enable systematic analysis for recognizing the root cause(s) of a problem. This in itself was a remarkably powerful perspective that avoids the “if it moves, instruct it” approach. Maslow (1966) astutely observed, “I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail” (p. 15). Accordingly, educators are traditionally equipped with a variety of instructional strategies, techniques, and tools and with these resources, the researcher ascribed to the belief that one can teach their way out of anything ... but that perspective is now being questioned by the researcher and this different approach is now synthesized into the researcher’s real-life applications as the researcher no longer see only nails. No longer is it only good enough to aspire to be a good teacher but to endeavor to develop the capacity to acquire valid and reliable data on the business, performance and influences driving the root cause(s) of a situation within the context of the workplace.

10,000 hours. The *702010 Towards 100% Performance* text states as a foundational concept of the 70:20:10 framework, “Ericsson (1993) and Gladwell (2008) contend that it takes 10,000 hours to become an expert” (p. 198). However, Ericsson very strongly and explicitly rejects this statement in his 2012 critique *The Danger of Delegating Education to Journalists* and again in 2016, “Unfortunately, this rule [it takes 10,000 hours to become an expert] – which is the only thing that many people today know about the effects of practice – is wrong in several ways” (Ericsson & Pool, 2016, p. 110). Ericsson and Pool (2016) go on to suggest expertise is developed from a number of variables such as varying duration of skill development which varies significantly depending on the subject matter, the learner and the

situation but culminate into deliberate practice. Deliberate practice is a multifaceted concept that touches on several variables but can succinctly be defined as practice that is both purposeful and informed and moves the learner out of their comfort zone in pursuit of enhanced skill development (Ericsson & Pool, 2016). They also contend that 10,000 hours of practice alone does not automatically qualify the learner with expertise. Hambrick, Oswald, Altman, Meinz, Gobet and Campitelli (2014) contend that the concept of “deliberate practice alone is not enough to explain expert performance” and that “other factors should be considered to advance the science of expertise” (p. 34). This perspective was shared by Ericsson albeit in different terms and conditions and using different research criteria. The passage in text attributed to Hambrick and his colleagues on page one hundred and ninety-eight was consistent with Ericsson and his colleague’s findings. Therefore, including Ericsson’s work under a heading of the “The 10,000-hour myth” was inaccurate and may further invalidate the 70:20:10 framework by bringing into question the credibility of the model.

Process

Introduction. As noted in the methodology, the process aspect of the CIPP Model goes past the Input evaluation components and focuses on the application and implementation of the 70:20:10 framework activities (in the context of the research question) outlined in the data sources (Stufflebeam & Shrinkfield, 2007; Stufflebeam & Zhang, 2017) in service to the purpose of this study; to evaluate the 70:20:10 framework literature for evidence of researched-based learning theory and practices and address how these findings may support learning and development practitioners.

Emphasis was placed on the 70:20:10 framework's implementation and procedural designs, learning theory and practices that support the framework's practices and process.

Going Past Instructional Design. Chapter 3 in the *702010 Towards 100% Performance* manual describes the three elements of the performance detective aspect of the 70:20:10 model: business analysis, performance analysis, and influence analysis. The business analysis yields insights on critical business issues, client commitment and core processes. It maps the organization's needs and substantiates these findings with facts (Arets, Jennings & Heijen, 2016). The performance analysis provides data on current performance, desired performance, and the resultant performance gap. The final analysis focuses on influences affecting the workflow by analyzing organizational barriers and critical tasks. The manual outlines a methodology for using these analyses' in determining the factual cause of a situation, problem, or failure prior to developing a learning solution to a workplace situation. This degree of analysis may determine whether or not a learning intervention is needed or appropriate. In the researcher's experience, this type of analysis has been absent in most instructional design practices and at best often only lightly touched upon with many learning development and design models.

There was a strong response from the *GREAT 70-20-10 Debate – Tweet Stream* endorsing the value of performance analysis. For example, Jennings (2017) asserts the 70:20:10 framework supports organizational performance while Wise

(2017) observes 70:20:10 is a framework that focuses on performance to construct solutions that drive business outcomes. Arets (2017) suggests the 70:20:10 framework is for supporting workplace and organizational performance whereas Moore (2017) takes the concept further with the view, “Main point of 70:20:10 for me: L&D should look beyond courses, events; see the bigger picture of performance.”

The researcher has a significant background in instructional design and with this experience comes some degree of predisposition towards his experience (i.e. ‘I’ve always done it this way’). Therefore, it was important that the researcher’s views be carefully evaluated through critical thinking processes to ensure impartiality. Merriam and Bierema (2014) argue critical thinking is “the ability to assess your assumptions, beliefs, and actions” (p. 222) while Dawkins (2017) warns, “you can be committed to science, but as soon as you’re committed to a hypothesis, you’ve walked off the trail of objective truth” (para. 1). Kahneman (2011) reports, “people (and scientists alike) seek data that are likely to be compatible with beliefs they currently hold” (p. 81). With these insights in mind, the researcher found new and powerful revelations that further his understanding of the importance of performance as essential elements in a learning situation. In addition to an absence of a performance analysis, most formal learning removes the learner from the actual learning tasks and simulates the learning in an artificial context (Arets, Jennings & Heijen, 2016). Upon reflection, the focus on performance prior to facilitating a learning solution explains, with great clarity, why many learning interventions are not successful.

Finding Why the Learning Should Take Place. The performance analysis built into the 70:20:10 framework determines why workplace training

is required (or not required). Consistent with Knowles first of the six assumptions of adult learning, understanding ‘why’ a learning episode is necessary translates into effective attention and motivation for learners (Knowles, Holton & Swanson, 2011). Caffarella & Daffron (2013, p. 161) cite the following sources that drive an effective design:

- “Why are we doing this?” (Milano & Ullius, 1998);
- “What do we hope will change in the future?” (Gboku & Lekoko, 2007);
- “Why is the program worth doing?” (Rothwell & Cookson, 1997).

As noted in the literature review, if the neurocognition of the human brain is without attention and motivation for the learning, the entire learning process can be retarded (Wlodkowski, 2008). Macquire, Firth & Morris (1999) reminds us that meaning is an essential element to the attention and motivation quotient in learning. By connecting to an accurate, realistic reason for a learning episode to occur and avoiding situations where a learning intervention is not appropriate, one postures the learning for maximum authenticity. This can translate into genuine learner attention and motivation in the topic and provides a firm foundation for facilitating an effective transfer of learning. Transfer of learning “... is often referred to as the ‘so what’ or ‘now what’ phase of the learning process” (Caffarella & Daffron, 2013, p. 211) and is the crux of a learning episode; what is actually functionally used, applied, and acted on. By discovering the true roots of a situation, the learning intervention, if appropriate, will be much more likely to be on target, relevant and applicable to the learners. Moreover, a careful analysis will enhance conditionalization of the learning as explained by the National Research Council (2000),

Knowledge must be “conditionalized” in order to be retrieved when it is needed; otherwise, it remains inert (Whitehead, 1929). Many designs for curriculum instruction and assessment practices fail to emphasize the importance of conditionalized knowledge. For example, texts often present facts and formulas with little attention to helping students learn the conditions under which they are most useful. Many assessments measure only propositional (factual) knowledge and never ask whether students know when, where, and why to use that knowledge (p. 49).

By understanding the importance and need for the learning, the design can address the importance of conditionalization much more effectively. The 70:20:10 framework shifts the designer’s paradigm from a learning outcome to a work task focus. That is to say, the emphasis of the learning development changes in a way that allows the actual work tasks to be the focus of the learning versus facilitating learning away from where the learning will be applied. The 70:20:10 framework authors suggest, “Tasks determine the connection between the desired results, how work is done, how the results are achieved and what performance standards apply” (Arets, Jennings & Heijen, 2016, p. 117).

The best and brightest featured on the *GREAT 70-20-10 Debate – Tweet Stream* concurs with the importance of understanding ‘the why’ that is why the learning is desired or even necessary as evidenced by the following sampling of comments. Wise (2017) tweeted, “Agree...it gets us to the Point-of-Work to identify what breakdown [sic] and why to inform the right solution” while Topf (2017) observes, “...performance must be included as the ‘value’ of the 70:20:10 in the first

place. Often left out.” Blake explains the conversation with the view, “that there is more to learning and performance than single isolated classroom events” and Moore echoes this perspective, “Good msg from 70:20:10: Look at what ppl [people] do on the job, what makes it hard, what will help -- don't just throw courses.” Additionally, R. Ellis, (2017) argues, “70/20/10 reminds us of multiple ways to change and improve employee performance” whereas P. Ellis, (2017) argues, “the gold standard measure of #learning and #development must be ultimate #performance.” These insights suggest the importance of determining the why (performance) in assessing whether a learning intervention solution is appropriate, to what degree and how to deliver it if it is the correct response.

The researcher employed the program evaluation methodology in synthesizing data into these findings through a constant reflection of assumptions to avoid unwarranted conclusions. Additionally, the conclusions and findings in this section are consistent with the researcher’s experiences particularly with regard to lean process mapping and the importance of identifying the target condition or desired outcome of the planned learning episode that includes understanding why the learning is being considered.

Developing How the Learning Should Take Place. While many instructional episodes focus on the explicit, declarative knowledge, the 70:20:10 framework includes these aspects but also accentuates implied, tacit skill and task development that facilitates creating practical experience (Arets, Jennings & Heijen, 2016). As noted in the literature review, the Long Term Memory (LTM) is where learning resides and ensuring learning is properly encoded and stored there should be

the focal point of any learning episode. LTM uses billions of neural connections to store vast quantities of information and experience (Matlin, 2005). “When the brain forms memories or learns a new task, it encodes the new information by tuning connections between neurons” (Tafton, 2015, para 1). The more often this activity “repeats, the stronger and the denser the resulting neural connectivity” becomes (Goleman, 2006, p. 157). A common practice is to divide the long-term memory into declarative, procedural, semantic and episodic memory (Malan, 2005). The differences in knowing versus doing are stored in the declarative memory for knowing and the procedural memory for doing. Seldom do they translate very well between each other. Stolovich and Keeps (2002) provide this explanation for differentiating between declarative and procedural memory in learning:

1. Declarative knowledge – comes into play if the learning objectives require learners to: name, list, identify, define, differentiate between, match, point to, recall, select, state, explain, or in any way simply talk about something.
2. Procedural knowledge – comes into play if the learning objectives require learners to do something such as: perform an operation, manipulate objects, build, create, perform a procedure, solve a problem, or apply knowledge (p. 47).

As noted in the literature review, Ericsson and Pool (2016) provide this applied view of the process as it relates to the workplace,

The bottom line is what you are able to do, not what you know, although it is understood that you need to know certain things to be able to do your

job. When people are trained in the professional and business worlds, you find a tendency to focus on knowledge at the expense of skills. The main reasons are tradition and convenience: it is much easier to present knowledge to a large group of people than it is to set up conditions under which individuals can develop skills through practice (p. 131).

Additionally, by embedding learning in the actual workflow this aspect of the framework makes ample use of mistakes as natural parts of the learning process and are not only accepted but embraced as opportunities for individual and organizational growth and development. Moser, Schroder, Heeter, Moran and Lee (2011) report when a mistake is made, neural (brain cell) connections fire regardless of whether or not the learner is aware of the error and corrects it or is unaware of the slip-up. Put another way, they contend mistakes can grow and develop the brain. In addition to enhanced neural activity, Steuer, Rosentritt-Brunn and Dresel (2013) found the climate in learning environments where classrooms were “mistakes friendly” increased motivation to learn. Boaler (2016) argues that mistakes are “learning in action” and create an atmosphere where mistakes are “expected, inspected, and respected.” Recognizing mistakes and the like as viable learning opportunities also overlap with reducing stress in the learning environment. The 70:20:10 framework is augmented and enhanced by the use of the After Action Review (AAR) reflection on action process to capture key lessons learned in the service of continuous improvement. Lastly, the 70:20:10 framework employs a Four C model (Content, Context, Connection, and Continuity) to link the formal aspects of learning to the social and informal/experiential portions of the learning process. This intentional

integration of the formal aspects of a learning event with social and informal/experiential is critical to a successful learning stratagem. The Four C's model is further broken down into memorization and familiarization. These two areas are aligned with the bottom levels of Bloom's Taxonomy (remember and understand). However, avoiding instruction that relies only on the formal areas of instruction and combining the instruction with the other aspects of the 70:20:10 learning framework (social and informal/experiential) results in the learner ascending into the advanced levels of Bloom's classification (apply, analysis, construct, and evaluation). Furthermore, the Four C model shows evidence of learner attention and motivation through the context, connection and continuity aspects of the model in conjunction with experiential applications of learning found in the 70 portion of the 70:20:10 framework.

The *GREAT 70-20-10 Debate – Tweet Stream* supports these findings albeit in the cursory dialect of social media conventions. Representative of the great debate comments on this topic P. Ellis (2017) shares the view, “We learn most through doing and least through formal teaching” whereas Bixby (2017) believes, “we learn by doing; every time we DO something, we solidify learning” a perspective supported by Neaman (2017), “we know people learn best by doing where doing =authentic practice” However, much focus was put on the poor design of formal learning that the great debaters had experienced especially with regard to transfer of learning, “don't forget what happens after the learning event” (Gaughan, 2017); “Design training to specifically support after-training application, remembering, further learning”

(Thalheimer, 2017); “most of 10% [formal] are sadly designed, as top-down and not bottom up” (Mueller, 2017).

Upon critical review of the researcher’s experience with care given to avoid bias and assumptions, these views are consistent with the researcher’s experience. Multiple experiences support the basic 70:20:10 concept of creating experience through applied activities or connecting to existing experiences. The researcher was not able to discern any notable exceptions to the 70:20:10 framework or comments from the *GREAT 70-20-10 Debate – Tweet Stream*.

Evaluation. As outlined in the literature review, an evaluation effectively verifies the transfer of the learning back to the point of use or execution and measures the impact on the individual’s development or the impact on the organization’s bottom line results (Stolovich & Keeps, 2005). The 70:20:10 manual suggests limitations with traditional evaluation models such as Kirkpatrick’s evaluation model, proposing instead that performance measures should be evaluated not learning outcomes. Put in different terms, performance measures determine what the learner can do back on the job versus learning outcomes that outline what the topics the learner needs to deliver back in the learning venue. As the literature review also suggests, there are many who join in the chorus suggesting the need to move past the Kirkpatrick or more correctly, the Kirkpatrick—Katzell model,

there has been little agreement about how this can be undertaken with a series of models being constructed yet no evidence of widespread use of any particular models. This suggests that both researchers and organisations [sic] believe that Kirkpatrick’s work remains relevant

particularly where the potential limitations are understood and acknowledged within the evaluation design process (Mavin, Lee & Robson, 2010, p. 9)

Though Kirkpatrick's model evaluates learning at three levels followed by performance in level four and return on investment in level five, the 70:20:10 framework advises employing existing business measures as representative of the organization's culture as true performance indicators. Accordingly, the 70:20:10 framework suggests an evaluation model that, at least, attempts, to address the concerns about the Kirkpatrick model by evaluating for the 20 and the 70 into five cycles developed by Wenger, Trayner and DaLatt (2011):

- Cycle 1 Immediate value: activities and interactions
- Cycle 2 Potential value: knowledge as capital
- Cycle 3 Applied value: changes in practice
- Cycle 4 Realized value: performance improvement
- Cycle 5 Reframing value: redefine success (Arets, Jennings & Heijen, 2016, p. 272).

Examples of this evaluation include frequency of learning interactions and episodes, learner participation in projects and learning activities, analysis of social network, quantity and quality of products, new process and improvements, customer satisfaction, business measurements and metrics (Arets, Jennings & Heijen, 2016). The 70:20:10 framework for measuring performance further suggests triangulating metrics to ensure validity and reliability.

The *GREAT 70-20-10 Debate – Tweet Stream* did not dwell to any extent on evaluation and assessment per se other than to acknowledge the importance of evaluation in determining if the learner can perform the requisite tasks as a result of the instruction. Some even question the validity of contemporary evaluation practices, “Is learning being properly evaluated in workplaces? I venture not always ... or even not very often?” (Benson, 2017) and Gaughan (2017) posits, “Most projects aren’t evaluated” whereas Ferguson (2017) laments, “...often ‘proper eval’ is 2nd level mgmt. saying ‘they can do X now.’” Clark (2017) derides current workplace evaluation practices, “Evaluation is pathetic in L&D – mainly because of Kirkpatrick” while Jennings asserts, “Kirkpatrick probably put the evaluation of human performance back 50 years ;).” However, in general, Jennings (2017) provides this insight regarding the value of this evaluation approach, “Tracking activity is not the answer. Tracking results is more useful.” Jacobs (2017) agrees, “This is where learning pros [professionals] need to stop following lrng [learning] data and track business effectiveness.” Conversely, there were no comments from the best and brightest featured on the *GREAT 70-20-10 Debate* supporting traditional evaluation protocols.

The researcher’s experience was limited in this field with regard to formal learning evaluations but was extensive with regard to informal performance determinations such as results from an athletic competition or applied work situations such as the researcher’s experience on fire crews (where the rubric was simple: we put the fire out, the fire is still burning). As noted in the literature review, Stein (2010) suggests not all learning assessments are measurements as they cannot measure the

complexity of the human mind and there are only a limited number of psychological properties that are actually measurable. He recommends the concept of ecological validity which is simply: does the evaluation look anything like what you will have to do in real life (Stein,2010). The concept of ecological validity (does the environment and conditions where the learning takes place look anything like the environment and conditions where the learning will be applied) was consistent with the researcher's experience; yet few contemporary learning assessments do this. Stark (2013) describes the shortcomings of learning evaluations this way, "We don't measure teaching effectiveness. We measure what students say, and pretend it's the same thing. We dress up the responses by taking averages to one or two decimal places, and call it a day." As a Professor of Statistics at the University of California, Berkley, Stark suggests performance in learning after the measured course of instruction and career success may be better measures of the learning. However, he argues, time is required to make such measurements, and it would be difficult to track students over time. Furthermore, he suggests relying on long-term performance measures can complicate causal inference because the results may be difficult to attribute to a single course. Stark (2013) laments with a citation by Huff (1954), "If you can't prove what you want to prove, demonstrate something else and pretend that they are the same thing. In the daze that follows the collision of statistics with the human mind, hardly anybody will notice the difference" (Huff as cited by Stark, 2013). The difficulty in timing and measuring the learning has further compromised attempts to engage learners in assessing their own learning. Wilson's (2011) research has formulated his conclusion, "Don't ask, can't tell...human beings simply are not very accurate at assessing the

causes of their own feelings, attitudes, and behaviors” (p. 29). Chiaburu, Sawyer and Thoroughgood (2010) concur with this perspective suggesting there is a potential for biases in self-assessment. This perspective is echoed by Nobel laureate Daniel Kahneman (2011), “The confidence people have in their beliefs is not a measure of the quality of evidence but of the coherence of the story that the mind has managed to construct” (p. 29). Accordingly, viable self-evaluations appear to be elusive at best.

However, in reviewing all three data sources, Jennings (2017) previously mentioned remark captures the essence of what a workplace evaluation must be able to do, “Tracking activity is not the answer. Tracking results is more useful.” Though it may be helpful feedback, the idea of capturing learner comments and feedback as a measure of learning is inadequate and insufficient to determine if performance has been impacted. The 70:20:10 framework recognizes this and offers a reasonable approach to discerning meaningful results from the learning episode.

Product

Introduction. As described in the methodology, the product evaluation determines the 70:20:10 framework’s ability to deliver on intended, critical outcomes including impact, effectiveness, and sustainability (Stufflebeam & Shrinkfield, 2007). In the context of the research questions (to evaluate the 70:20:10 framework for evidence of researched-based learning theory and practices and address how these findings may support learning and development practitioners), this portion of the evaluation looks at what the 70:20:10 framework creates or produces, and what are the possible intended and unintended outcomes. Primary focus areas are how the framework combats low workplace learning effectiveness, inadequate connection with

human learning basics and connection to researched-based learning theories and practices.

Effective Transfer of Learning. As previously noted in the literature review, transfer of learning (also referred to as learning transfer) is a learner's ability to "effectively and continually apply what they learned in training to their jobs" (Noe, 2013, p. 152). However, transfer of learning remains one of the most challenging topics in workplace learning (Bell, Tannenbaum, Ford, Noe, and Kraiger, 2017). An important aspect of low effectiveness rates in workplace learning is the low transfer of learning (Hutchins, Burke and Berthelsen, 2010); conversely it is an effective transfer of learning that lies at the heart of the 70:20:10 framework. The *702010 Towards 100% Performance* manual suggests many traditional workplace learning strategies employ a "push" approach to deploying the learning in that learning content is pushed on the learner facilitated through "control, efficiency, standardised [sic] and explicit knowledge, and often old fashioned tests of the kind used in schools" (Arets, Jennings & Heijen, 2016, p. 138). Embracing elements previously discussed namely, roots of human learning, attention, motivation and skill development in the long-term memory, the 70:20:10 framework focuses on "pull" learning solutions that pull from the learner what the learner needs to learn and thereby facilitates a meaningful relationship between the learner and the learning. A "pull" learning strategy provides choice of learning resources and processes that the learner finds useful and in doing so promotes a degree of learner control in the learning process. Howardson, Orvis, Fisher and Wasserman (2018) report employee productivity along with learning and development generally increases when afforded independent and self-directed work.

The 70:20:10 framework also employs various other means that facilitate effective transfer of learning that include the following elements that have been well documented in the literature review and throughout these findings

- Pre-assessment of performance needs to determine if a learning solution is an appropriate intervention;
- Raelin's Work-Based Learning model which is an offspring of the well-known Kolb's learning cycle;
- Development of tacit and implied knowledge and skills through the reduction in the far transfer of the learning by embedding the learning in the work flow (far transfer is where the learning application is moderately to significantly different than the learning venue and conditions. Noe, 2013) and allowing for authentic opportunities for practice;
- Social learning and cooperation through coaching, mentoring, management support, networks, communities of practice, team and workgroup learning (evidence of Piaget, Vygotsky, Eisler's partnership education and social cognition learning theory);
- Ecological validity (the similarity between the learning environment and the environment where the learning will be used);
- Experience creation through direct and immediate application of learning and quality practice (building neural connections in the long-term memory); and
- Effective feedback and error management strategies (i.e. effectively responding to and learning from errors and mistakes).

Many of these concepts not only facilitate an effective transfer of learning but can be embedded so deeply into the workflow that the transfer can be innate and seamless. This was consistent with the findings of Salas, Tannenbaum, Kraiger, Smith-Jentsch (2012) who assert successful workplace learning transfer entails learner needs assessment, providing opportunities for practice and feedback, enhancing motivation to learn through facilitating relevance in the learning, eliminating transfer of learning impediments, and facilitating a work performance-oriented evaluation. Additionally, Blume, Ford, Baldwin and Huang (2010) reviewed 89 studies and found work climate to be the most significant contextual factor in facilitating effective transfer; followed by support with supervisory support being a stronger indicator than peer support. Also aligned with the performance detective approach in the 70:20:10 framework was the view of Ford, Baldwin, and Prasad (2018) who suggest a deeper investigation into the job context and individual's needs for learning prior to the learning intervention. This aspect of the 70:20:10 framework touched upon in the Performance Detective phase endeavors to determine if the organization is aligned in a way that allows a learning intervention to be successful. Lastly, there was evidence of Schlenker's accountability theory where one is answerable for performing prescribed standards that are relevant to their work responsibilities (Schlenker, Britt, Pennington, Murphy, Doherty, 1994) in the form of the 70:20:10 framework's 70 toolbox such as: organizational alignment, work instructions, checklists, decision trees, task analysis and standards for performance support (Arets, Jennings & Heijen, 2016). This finding was also consistent with the data on informal learning as reported by Banks, Au, Ball, Bell, Gordon, Gutierrez, Heath, Lee, lee, Mahiri, Nasir, Valdes and Zhou (2017), "Most of

the learning that occurs across the life span takes places in informal environments” (p. 9) and their data “makes [it] clear that people spend the majority of their time from infancy to adulthood in informal learning settings” (p. 9).

The *GREAT 70-20-10 Debate – Tweet Stream* supports many of these perspectives as exemplified by Thalheimer (2017) who emphasizes, “Design training to specifically support after-training application” while Cheraimie (2017) observes, “Also known as training transfer and [is] the cornerstone of L&D in the workplace.” Strong transfer of learning requires multiple opportunities for application, “We learn most through doing and least through formal teaching” P. Ellis (2017) in no small part because according to Moore (2017), “Most of the 10% (formal) horrifically designed - no idea of workplace context, business need, or even what people DO.” Blake (2017), echoes this view, “...there is more to learning and performance than single isolated classroom events.” None of the comments from the *GREAT 70-20-10 Debate – Tweet Stream* suggested the transfer of learning had little to no importance.

After applying caution to assess assumptions and theories (Merriam and Bierema, 2014), the researcher found consistency with the previous data sources on this topic. While maintaining objectivity, the researcher was finding this work further nudges the researcher’s understanding of the nature of the workplace learning process towards an even more authentic version of learning that facilitates actual, viable results. Upon reflecting on the 70:20:10 framework came the enlightening realization that real workplace learning is performance. As pointed out in the manual, “It’s not enough for an instructional designer to work with exemplary performers or content specialists to translate implicit knowledge into explicit knowledge and then

disseminate this, often out of context, through formal learning solutions” (Arets, Jennings & Heijen, 2016, p. 138).

Research Gaps

Although this evaluation followed accepted protocols of an established and credible evaluation model, gaps in the landscape of the research topic exist and provide opportunities for further research as outlined in Chapter 5. To advance the research towards a more complete mosaic, further study of workplace learning using 70:20:10 applications should be considered using a well-defined indicator analysis that would measure the effectiveness of the 70:20:10 framework. This would involve a research design that selects primary sources of data such as direct observation of the learner over time or interviewing learners and supervisors followed by interpreting the results in the service of assessing the effectiveness of the 70:20:10 framework and evaluating its impact on workplace learning. The defining characteristics of the selected indicators should have the following attributes

- Normative statistics (data that describes what is typical in a defined population such as workplace learners at a specific point or period of time) that measure changing conditions such as business metrics or specific workplace performance observations;
- Longitudinal time series comparison over time that separate data into identifiable, component elements; and
- Theoretical basis of findings by enlarging on this work and including other theoretical fields such as organizational development, performance and change management.

This type of investigative research would require an embedded participant observer or observation of a control group that, for example, could be used to follow a company's learning and development efforts over a set period of time.

Conclusion

The CIPP evaluation methodology provides a natural opportunity for improvement and accountability in the quest for clear and unambiguous answers about the evaluand (Stufflebeam & Zhang, 2017). Stufflebeam and Zhang (2017) go on to assert,

The CIPP Model is configured specially to enable and guide comprehensive, systematic examination of social and education programs that occur in the dynamic, septic conditions of the real world, not the controlled conditions of experimental psychology, double-blind experiences of medicine, and the split-plot crop studies in agriculture (p. 53).

These criteria build a powerful case for employing this approach in deriving answers to the research questions posed in this work. The proponents of the model see it as an essential means to advance societal progress and the well-being of individual, groups and programs (Stufflebeam & Zhang, 2017). "Above all", Stufflebeam and Zhang (2017) report, "the CIPP model is keyed to the proposition that the evaluation's purpose is not only to prove but, more importantly, improve (p. 53).

The purpose of this study was to evaluate the 70:20:10 framework for evidence of researched-based learning theory and practices and address how these findings may support learning and development practitioners. Employing the CIPP evaluation

methodology provides an opportunity to address the research questions and use the findings of this evaluation to offer greater insights to the subject of this evaluation.

The following chapter discusses the conclusions as a result of these findings.

Chapter 5: Conclusions and Suggestions for Further Research

Given the low effectiveness of formal workplace learning in the U.S. (Caffarella & Daffron, 2013; Merriam & Leahy 2005; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012), the 70:20:10 framework provides a model that repositions how learning and development can be conducted with better results. The purpose of this study was to evaluate the 70:20:10 framework's grounding in research-based learning theories and practices. Further, the study addresses the complexity of effective contemporary workplace learning to determine how these findings may support learning and development practitioners. This chapter briefly recaps the findings in Chapter 4, reviews recommendations for further research, discusses a call to action for workplace learning practitioners followed by an invitation for feedback on this work, and closes with the overall conclusions of this evaluation.

The Findings in Review

While it is useful as a reference guideline for supporting and improving human and organizational performance, the 70:20:10 framework evolved in response to data on workplace learning that strongly suggest a significant amount of contemporary workplace training often falls short of the intended outcomes and that current workplace learning situations require greater learning effectiveness (Arets, Jennings & Heijen, 2016). To counter this, the 70:20:10 framework employs a significant amount of research-based learning theories and practices outlined in the literature review. For example, the findings from this evaluation suggest the 70:20:10 framework literature touches on the roots of human learning and experiential learning discussed in the literature review by creating contextually relevant experience as an integral part of the

learning process and by doing so the literature describing the 70:20:10 framework expands the limitations of formal learning. Moreover, the 70:20:10 framework literature advocates for a holistic design approach that looks at learning in a much larger context than just offering up a single and sometimes uncoordinated learning solution. The framework literature suggests focusing on “the why” of a situation or, in other words, why (or why not) a learning intervention may be appropriate. As noted in the findings, carefully discerning these why questions make it easier to develop a learning response that is relevant and effective in addressing the underlying needs of the learning episode. Additionally, the evidence from the evaluation suggests doing so allows for an effective transfer of learning and begins to address the complexity of the learning process referenced by Caffarell and Daffron (2013) in Chapter 1 of this dissertation; which is mainly the failure to adequately deal with the challenge of using the learning effectively once the learning episode is completed, referred to as the transfer of learning process.

Though the 70:20:10 framework literature offers positive contributions to workplace learning, the evaluation findings outlined in Chapter 4 identified several areas where the framework falls short. These include the *702010 Towards 100% Performance* manual misstating the true origins of the mythical 10,000-hour rule, not offering a comprehensive definition of learning and failing to recognize andragogy (the art and science of how adults learn) in the discussion about learning theory. Additionally, when investigated, the *702010 Towards 100% Performance* manual’s presentation of theoretical references intended to provide support for the framework was unconvincing in several respects as outlined in detail in Chapter 4. This was

ironic as there was ample, valid evidence of research-based learning theory interlaced throughout the literature on the framework. Given the importance of this topic being central to the 70:20:10 framework's argument, it appears this could have been presented with more compelling detail.

Recommendations for Further Research

There are many topics available for further research. Perhaps the most intriguing yet challenging is a comparative investigative analysis that looks at a 70:20:10 framework in action, side by side with a similar operation that employs applications outside of the 70:20:10 framework such as mass formal training absent of any social or experiential components. Facilitating this type of investigation could further address concerns voiced by critics of the 70:20:10 framework and identify areas for improvement to the framework.

Another possible research area for further study is deriving data on informal workplace learning. Noe, Clarke and Klein (2014) define informal learning as "learning that may be intentional or incidental, is not highly structured, and is a volitional behavior" (p. 247). As reported in the literature review, a significant amount of workplace learning can be informal however ongoing, up-to-date research on informal learning remains elusive. Though there is a growing body of existing literature and research available that addresses the complexity of informal learning and more is beginning to emerge, this area of workplace learning is ripe for contemporary, concentrated exploration, study and research.

A third area that is intriguing for further research is pointed out by Huang, Ran, and Blume (2018) regarding the learning relationship between the learner and the

work settings, along with the viability of learning interventions in the transfer of learning over a given period of time. As suggested by Huang et al. (2018) data on this dynamic is limited and developing this area of research focus may yield additional insights that speak to the viability and possible augmentation of the 70:20:10 framework.

Recommendations for workplace learning professionals - a call to action

Fundamentally, when formal workplace training fails, the results can be more than just lost time but may be harmful to individuals and organizations. During the summer of 2017, the U.S. Navy experienced two separate collisions between destroyers and cargo vessels in the Pacific Ocean. Despite advanced sophisticated navigation equipment, the U.S. Navy vessels were found to be at fault. The primary root cause was inadequate training, “The Navy's Surface Warfare Officers School in Newport, R.I., is the premier training facility for surface warship officers. In the past decade, junior officers have spent greatly reduced time there” (Bowman, 2017). During the same period, New Hampshire businesses in the United States were pleading for workers who were adequately trained and prepared to enter the workforce (Rajala, 2017). At the same time a U.S. Defense Intelligence Agency instructor lamented about the low effectiveness of their Foreign Area Officer (FAO) training and how they are sending off FAO's to their overseas duty assignments unprepared due to ineffective instructional practices (R.K. Rizzo, personal communication, August 16, 2017). And all too often the news reports of police officer involved shootings that are of questionable legality continue to occur (Tate, Jenkins, & Rich, 2017). These

situations are not unique but are representative of training related organizational weaknesses that occurred during the initial timeframe while writing this work.

Though organizations spend significant amounts of money on workplace learning with some positive results, businesses and organizations could be getting a better return on their learning and development investments (Ford, Baldwin, and Prasad, 2018). Undoubtedly some business and organizations do workplace learning well. However, with millions of dollars spent every year on continuing education and training that by some estimates only yields a 10% improvement in work performance (Merriam and Leahy, 2005, p. 1), a call to action to repair the deficiencies in traditional workplace learning is critically important. Workplace learning practitioners reading this work are encouraged to counter “the conspiracy of convenience” (Jennings, 2010, para 20) and facilitate learning that enables an effective transfer of learning. Workplace learning practitioners can no longer succumb to the maladies of “tradition and convenience” (Ericsson & Pool, 2016, p. 131) that prohibit effective learning in the workplace and must embrace ideas and practices that moves learning to a higher degree of effectiveness. Consequently, workplace learning practitioners should consider undergoing a critical examination of their understanding of learning and embrace new and different ideas in the service of change towards a better way of conducting workplace learning.

As the literature in this evaluation suggests, this work alone has only limited value in a learning process and cannot facilitate the reader’s comprehensive learning development unaided. In order to truly implement the ideas outlined in the 70:20:10 framework literature, workplace learning practitioners need to develop deeper

experiences in broadening their skillset. As outlined in the framework literature, one can use the framework's initial analysis process (referred to as the performance detective) to identify needs especially organizational challenges that may impede the implementation of new and different ideas. Engaging with others (the social or 20 aspect of the framework) will certainly help process ideas and acquire ever so helpful feedback and reflection. However, most profound is putting ideas into practice and developing experience; the 70 aspect of the framework. "What you practice you become, what you become has consequences" (anonymous). Nevertheless, awareness and caution are urged when deciding what you wish to practice because as noted throughout this work, what is practiced becomes one's work and life performance.

Criticisms and opponents of this evaluation are welcomed and applauded as they represent differing viewpoints that aid in critical thinking. The diversity of perspectives are valuable as one seeks to capture an entire picture of the topics discussed in this work. The "Ultimate truth, if there be such a thing, demands the concert of many voices" (Jung as cited by Braud and Anderson, 2011, p. 71). Therefore, differing perspectives offer rich viewpoints to further explore the topics discussed and determine if these findings and conclusions are correct or if they are incomplete, biased, overreaching, or found to be in error.

As feedback and criticism are offered regarding this work, gaps and inadequacies in this work will be addressed and assimilated into revisions to make the work stronger. Such revisions will take the form of improved conclusions and shared with any interested parties. Additionally, new and different insights, resources and data about the 70:20:10 framework will be incorporated into revised evaluations of the

70:20:10 framework literature in order to embrace new ideas and concepts and promote those that have credibility and validity.

Conclusions

This evaluation studied the evidence of research-based learning theories and practices in the 70:20:10 framework literature and consequently this evaluation suggests the 70:20:10 framework literature has merit. Carefully noting that the 70:20:10 framework is a workplace performance model (that is, a model that underscores doing work tasks versus only knowing about them), this investigation finds the majority of the framework literature was well grounded in the basic elements of human learning outlined as in the literature review, and, additionally, there was sound evidence of research-based learning theories and practices woven throughout the framework literature. However, as noted in Chapter 4, a weakness of the overall framework's literature was some of the sources cited do not accurately reflect research-based learning theory and practices.

These findings based on the 70:20:10 framework literature have the potential to support workplace learning practitioners by suggesting the framework and the overall approach to workplace learning outlined in the framework has legitimacy. Accordingly, workplace learning practitioners following the basic concepts of the 70:20:10 framework literature may find opportunities to enhance workplace learning. There are also applications for this framework as described in the literature to be applied beyond its intended use as noted by the authors in such areas as social and human services (C. Jennings, personal communication, June 12, 2018).

Additionally, the 70:20:10 framework literature aligns with how workplace learning is developing in the twenty-first century. Noe, Clarke and Klein (2014) suggest, “Learning based on formal training and development programs, informal learning, and knowledge sharing influences” (p. 248) is a firm basis for developing human capital that are necessary for a competitive twenty-first century workplace. This view is remarkably similar to the basic 70:20:10 tenets of formal, social and informal/experiential learning. Furthermore, Noe, Clarke and Klein (2014) also suggest the importance of the relationship of human capital resources to individual and organizational performance and to overall strategic alignment by expanding the development of traditional learning outcomes to include organizational level needs and outcomes. This wider, holistic focus is organizationally and strategically aligned with the 70:20:10 framework literature. Given these similarities, it was clear the overall approach to workplace learning outlined in the 70:20:10 framework literature has validity and provides an outline for how learning may evolve in the 21st century. Embracing these considerations can address the noted low effectiveness of formal workplace learning in the U.S. and make better use of the significant amount of time and resources committed to workplace learning.

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Adherence to Standards of Program Evaluation

Standards of Program Evaluation.

The American Evaluation Association has outlined the following standards for program evaluation and these standards are used pursuant to the prescribed methodology process for this study to ensure the integrity of utility, feasibility, propriety, accuracy, and accountability of this evaluation.

Utility Standards

These are standards intended to increase the extent to which the program stakeholders find evaluation processes and products valuable in meeting their needs.

U1 Evaluator Credibility. Though the principal investigator has composed several research proposals and one evaluation proposal, the investigator has no experience putting them into play and, as presented in the literature review, experience lies at the heart of effective learning. Accordingly, this research approach, while attempting to gain greater insight on a problem, will be elementarily and mindfully implemented using basic research evaluation skills as the investigation unfolds and valuable evaluative investigative experience is acquired and developed.

U2 Attention to Stakeholders. The primary stakeholders of this investigation are the dissertation committee followed by the authors of the *702010 Towards 100% Performance* text and learning and development practitioners that may benefit from the findings of this examination. The second research question speaks directly to the learning and development community in how might understanding the findings from this research inform learning workplace practitioners.

U3 Negotiated Purposes. This standard refers to identifying, discussing and revisiting the purposes of the evaluation based on the needs of the stakeholders. The primary stakeholders (dissertation committee members) will be responded to as needs are communicated. The authors of the *702010 Towards 100% Performance* text have been contacted in December, 2017 to determine interest and desires. The only response has been as of June 1, 2018, “Your work is certainly of interest to my colleagues and me and we would be happy to learn more and engage in dialogue” from Charles Jennings one of the *702010 Towards 100% Performance* authors. Once the preliminary findings have been drafted, a concise report will be forwarded to the *702010 Towards 100% Performance* authors for their review. However, no plans currently exist for direct outreach to learning and development practitioners that may benefit from the findings of this examination. However it can be reasonably assumed that the *702010 Towards 100% Performance* authors may facilitate some outreach based on the nature of the research findings.

U4 Explicit Values. This standard clarifies and specifies the individual and cultural values underpinning the research evaluation purposes, processes and judgements (Yarborough, Shulha, Hopson and Caruthers, 2011). There is sensitivity to the position of the *702010 Towards 100% Performance* authors taking care to ensure strongly held values are not inappropriately challenged. In doing so a neutral, academic, scholarly tone was used throughout the work. In the conclusions section, differing voices were invited to share diverse views and insights especially negative reactions. The individual and cultural values requiring clarification include the geneses of the framework being investigated originating in Europe primarily in the United

Kingdom and the Netherlands. Though there are some linguistic and semantic differences, there are important cultural differences that require the researcher to take pause to consider the pedigree of the evaluand element.

U5 Relevant Information. The results of this evaluation are intended to be more than an academic rite of passage but a profound learning experience for the researcher and offer insights to the learning and development community. Accordingly, only the most pragmatic data and information has been included in the evaluation and impracticable resources discarded from consideration. In doing so, findings support the learning and development community with insights regarding the viability of the framework. This includes being “open to unexpected but pertinent sources of information from a variety of sources” (Yarborough et al., 2011). As previously noted, the conclusions section, invites differing voices to share diverse views and insights especially negative reactions. This certainly includes new or previously unknown sources of information and data.

U6 Meaningful Processes and Products. Closely akin to standard U5, this evaluation *may* provide results that could enhance the methodology and the field of practitioners. The Context, Input, Process, and Product (CIPP) evaluation model and associated processes provide adequate rigor in discerning viable conclusions about the nature of the each evaluation subject.

U7 Timely and Appropriate Communicating and Reporting. This project will be conducted with prudent efficiency while ensuring accuracy, credibility and reliability of the findings. Yarborough et al. (2011) identify a possible hazard within this standard that may be encountered by relying on individuals internal to the process

to adequately discern the data and making numerous assumptions about key stakeholder commitment and responsiveness to a timely process. Diligence in facilitating stakeholder involvement is an emerging concern and therefore an important focus for the researcher.

U8 Concern for Consequences and Influence. The researcher will be diligent in the responsibility for safeguarding against inadvertent adverse consequences and misuse of the project resources and outcomes.

Feasibility Standards

The feasibility standards provide for enhanced evaluation effectiveness and efficiency.

F1 Project Management. The primary investigator holds a lean project management green belt credential and uses this capability to adequately plan and execute the evaluation project. The process will employ basic project management techniques including setting time windows, deadlines, expectations, and carefully constructed meeting agendas that include decision points and action items.

F2 Practical Procedures. The means for assessing, evaluating and making conclusions about the data uses the CIPP methodology and are detailed in the Chapter 3 Methods. The methodology procedures also carefully outlines the process steps required for ensuring the fidelity and utility of data collection and analysis. Given the nature of the evaluation, the Institutional Review Board (IRB) determined an IRB was not required for this evaluation project.

F3 Contextual Viability. The project engaged in due diligence in recognizing, discerning, and weighing the cultural and political sensitivities of all individuals and groups associated with this body of research.

F4 Resource Use. This process of inquiry ensured resources are employed effectively and efficiently as well as ensuring there is adequate data to facilitate meaningful contributions by the data analysis pursuant to the research questions.

Propriety Standards

These standards ensure proper, fair, legal, right and just throughout the evaluation process.

P1 Responsive and Inclusive Orientation. This process ensured sensitivity to the stakeholders and their communities to ensure appropriate responsiveness. As previously mentioned, the Chapter 5 invites opposing and contradictory views and data in service to strengthening the overall argument.

P2 Formal Agreements. No formal agreements or memoranda were required to carry out this work other than covenants required by Plymouth State University, Department of Educational Leadership, Learning and Curriculum, doctoral candidate requirements.

P3 Human Rights and Respect. Prudent care was exercised to ensure these imperative considerations are not infringed upon or inadvertently overlooked during any aspect of the project. As previously noted, given the nature of the evaluation, the Institutional Review Board (IRB) determined an IRB was not required for this evaluation project.

P4 Clarity and Fairness. This work ensured every effort was made to be clear and reasonable in the process and product outcomes. This is a cornerstone of the research evaluation methodology and is addressed through diligent adherence to the methodology procedures. Additionally, the findings described are what the researcher can substantiate. Though there are some discoveries in the evaluation that emerged as noteworthy, the researcher was unable to support or repudiate the discovery with a search of existing peer-reviewed, juried literature and data or with the triangulated data sources.

P5 Transparency and Disclosure. Chapter 4 provides a comprehensive description of findings and conclusions taking care to ensure all findings are “credible, complete, and honest” (Yarborough et al., 2011, p. 141). No legal and proprietary obligations were identified other than copyright protections of the author of this work.

P6 Conflicts of Interests. Evaluations should openly and honestly identify and address real or perceived conflicts of interests that may compromise the evaluation. This is addressed in two ways: (1) even though an Institutional Review Board (IRB) process was not required, the researcher has is bound by the Plymouth State University’s IRB conflict of interest disclosure statement and (2) the researcher has completed and adheres to the Collaborative Institutional Training Initiative (CITI) conflict of interest training.

P7 Fiscal Responsibility. There were no fiscal considerations.

Accuracy Standards

The work is consistently diligent in ensuring the accuracy of the evaluation findings. This focus is a cornerstone of the research evaluation methodology and is

addressed through diligent adherence to the methodology procedures especially in regard to methodological integrity elements of fidelity (trustworthiness, dependability) and utility (usefulness, effectiveness).

A1 Justified Conclusions and Decisions. All conclusions and findings are defensible by following to the evaluation methodology and taking care to employ quality information, data and resources, sound logic and adherence to critical thinking, and exploring plausible alternative interpretations of data and information. The findings described are only what the researcher can substantiate. Though there are some discoveries in the evaluation that emerged as noteworthy, the researcher was unable to support or repudiate the discovery with a search of existing peer-reviewed, juried literature and data or with the triangulated data sources.

A2 Valid Information; A3 Reliable Information. Care has been taken to ensure all information serves the intended purposes and safeguards the validity (strength, soundness) and reliability (dependability) of the evaluation findings and conclusions through diligent scholarly research and accepted evaluation protocols.

A4 Explicit Program and Context Descriptions. The 70:20:10 framework will be described in its intended contexts with appropriate detail and scope for the evaluation purposes using rich descriptions.

A5 Information Management. Care will be exercised to employ systematic information collection, review, verification, and storage methods. However, there are no requirements for handling confidential information due to the fact that there is none collected.

A6 Sound Designs and Analyses. As outlined in the procedures section of this methodology, this research will employ technically adequate designs and analyses that are appropriate for the effective evaluation of the 70:20:10 framework namely the Context, Input, Process, and Product (CIPP) evaluation model and associated processes. The CIPP model provides adequate rigor in discerning viable conclusions about the nature of each evaluation subject.

A7 Explicit Evaluation Reasoning. All conclusions leading from information and analyses to findings, interpretations, conclusions, and judgments are clearly and completely documented and delineated either in the work itself or investigation log.

A8 Communication and Reporting. Attention will be employed to ensure all communications associated with the project will protect against misconceptions, biases, distortions, and errors.

Evaluation Accountability Standards

This aspect of the evaluation standards protocol addresses adequate documentation of evaluations and a meta-evaluative check concentrating on improvement and accountability for the evaluation. These include evaluation documentation (E1), internal (E2), and external (E3) meta-evaluations to ensure the integrity of the research and reliability of the evaluation findings. This will take the form of scholarly research and citation standards conducted by the researcher (E1 internal), adherence to research evaluation criteria for validity, reliability and integrity along with triangulation of the data (E1 internal) supplemented with critical review by dissertation committee members (E3 meta) and associated independent reviewers (E2 external).