Developing a Measure of Learning Needs: Linking Creativity, Learning, and Work Motivation

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ABSTRACT

Experiential Learning Theory (Kolb, 1984) and learning styles have been used extensively in leadership and management development. Critiques of this theory focused on the problem of its scoring systems and the inability to confirm the four styles. In this paper, we extend a Learning Needs Theory of Motivation (Lingham, 2010) to develop a measure based on underlying needs associated with each style and their relation to the three main streams of research: Learning, Creativity and Work Motivation. We present a measure based on the learning needs and show the development and testing of the measurement model. We also then use this robust and reliable model to profile an individual’s learning tendencies and flexibility while also showcasing how this can be used to measure tendencies in one’s innovative and execution capacities.
INTRODUCTION

Organizations and educational institutions have used learning styles to help leaders, managers and students develop self awareness in terms of their preferences in grasping and transforming knowledge. Although Experiential Learning Theory or ELT (Kolb, 1984) and the Learning Style Inventory or LSI (Kolb, 1999) have been used in such settings and established as one of the more influential theories that is used in managerial and leadership development programs (Vince, 1998), our work involving ELT and using the LSI over the past decade as faculty, researchers and educators/trainers in executive education surfaced a simple yet profound consistency of underlying needs associated with the four learning styles that have not been explored and linked to work motivation.

In this paper, we propose that understanding the underlying needs for each of the learning styles can be very useful when working in teams or when working with others. More explicitly, we argue that learning styles and work motivation are intrinsically tied. This paper therefore begins by exploring key motivation theories (since the 1960s) and creativity research (as early as 1926) and how this has informed our work based on underlying needs associated with learning styles derived from Experiential Learning Theory or ELT (Kolb, 1984). We than discuss ELT briefly and the Learning Needs Theory of Motivation (Lingham, 2010) that translate the knowledge based theory of ELT to one of underlying needs of learning styles that translate this to a motivation theory. The next part of the paper deals the development of a measurement model that is tested using measurement theory and showcase how this measure can be used to profile an individual’s learning focus, learning flexibility, and also be used to capture tendencies of one’s innovative and
execution/implementation capacities. We believe that such a robust and reliable measure can be used to help individuals and teams in the work environment.

**LITERATURE REVIEW**

We begin with a review of motivation theories emphasizing work motivation followed by theories of creativity with emphasis on the creative process because of its relevance to organizational life with the intent to present two specific capacities that relate to the work environment.

**Motivation Theories and Work Motivation**

Motivation theories emerged in the 1960s and have not been developing much since then. In the early 1960s, Victor Vroom (1964) defined motivation as a process controlled by the individual in making behavioral choices that lead to desired results. In a more recent definition, Latham and Pinder (2005) included the situation an individual is embedded in as a factor to be considered in motivation and so define motivation as a psychological process resulting from the interaction between the individual and the environment. Underlying these definitions are three fundamental components of motivation: *what* motivates people; *why* people behave the way they do; and how they align with the environment or the situation. Although numerous motivation theories exist, they can be categorized into these two fundamental components: content theories (i.e., what motivates people) and process theories (why people behave the way they do) (Dolan & Lingham, 2008). However, few deal with alignment the situation individuals find themselves in especially in the work context. Dolan and Lingham (2008:56) assert that content theories “stem from the understanding of motivation that is based on the attempts to satisfy unmet needs.” Examples of content theories are Maslow’s Hierarchy of Needs (Maslow, 1943), Alderfer’s ERG Theory (Alderfer, 1972); McClelland’s Socially Acquired Needs Theory (McClelland, 1965) and
Herzberg’s Motivator-Hygiene Theory (Herzberg, 1966). Process theories, they argue, are concerned with explaining the behavioral and thought processes through which individuals attempt to satisfy their needs. Examples of process theories include Expectancy Theory (Vroom, 1964), Goal Setting Theory (Locke & Latham, 1990), and Equity Theory (Adams, 1963).

Drawing from these foundational works on motivation, researchers have recently identified work motivation as an area relevant to management and organizational behavior research (e.g., Pinder, 1998; van Knippenberg, 2000; Eccles & Wigfield, 2002; Latham, 2007; and Curral & Marques-Quinteiro, 2009). As one of the key issues in organizational behavior research (van Knippenberg, 2000), work motivation has been defined as a phenomenon that involves both intrapersonal and interpersonal dynamics (Pinder 1998); involving both cognitive and affective processes (Curral & Marques-Quinteiro, 2009); and as a function of needs, values and beliefs (Latham, 2007) and goals with action (Eccles & Wigfield, 2002). In this paper, we extend work motivation to include the significance of alignment with situational or environmental needs – especially in the work context. We propose that motivation and learning are intertwined and therefore focus on developing a measure to align with the Learning Needs Theory of Motivation (Lingham, 2010). We hope that developing and testing the measurement model of Learning Needs would propel an emergent stream of research that would blend motivation and learning (as it is based on needs) and to also expand to include both individual and team settings. We believe that this would be significant as organizations become more team oriented.

Creativity: What Capacities Underlie this in Organizational Work?

Creativity is everywhere (McNiff, 2003) and has a profound effect on change at the individual, organizational and even paradigmatic levels. Leaders and managers are beginning to focus more on understanding how to work within a volatile and unpredictable environment and also
developing the skills to work with others as team members and also to lead teams. This new organizational landscape has created a marked increase in understanding creativity and the creative process (Henry, 2001) and a critical topic for organizational research and consulting (Nemiro, 2002). Researchers and practitioners would readily agree that organizations are constantly undergoing processes of change or development with the ability to adapt and innovate constantly. Spearheaded by Guildford (1950) as a stream in psychology, research on creativity has increased exponentially (Barron, 1969) with recent ideas from management scholars such as Blue Ocean Strategy (Kim & Mauborgne, 2005) and disruptive innovation (Christensen, 1997).

Research on creativity has been focused more on the characteristics of the phenomenon itself and not much on the creative process. Although Barron (1969) presents a great overview of the exponential increase in research on creativity since the 1950s that focus on the phenomenon itself, research on the creative process was scant. The existing models of the creative process have been described as a linear stage model (Guilford, 1950); a componential model (Amabile, 1996); focusing on sub processes such as problem solving, divergent and convergent processing, attention-demanding processing, and combination and reorganization (Mumford, Mobley, Uhlman, Reiter-Palmon, & Doares, 1991; Mayer, 1999); as a highly recursive process (Eindhoven & Vinacke, 1952; Mumford et al., 1991; Runco, 1994); and suggesting a dynamic instead of a linear stage model (Lubart, 2001). In 1926, Wallas formalized the four-stage model as “preparation” which involves mainly conscious work, “incubation” involving unconscious work or literally taking a break away from conscious work, “illumination” which could be framed as the emergence of the idea(s) from the unconscious to the conscious, and finally “verification” which involves evaluating, refining and developing of the idea(s). In recent work, Nemiro (2002) provides a four-stage model of the creative process: idea generation, development, finalization/closure and evaluation. This
four-stage model presents the process from conceptualization to evaluation with capacities related to ideation, precision, project/task management and action or completion. Yet, not much work has linked the creative process with learning and these related capacities especially experiential learning. What follows is a discussion of Experiential Learning Theory (ELT), critiques of ELT and how the Learning Needs Theory of Motivation was developed from ELT while overcoming the inherent psychometric issues embedded in Kolb’s ELT by developing a measure called the Learning Needs Inventory.

**Experiential Learning Theory**

Experiential Learning Theory or ELT (Kolb, 1984) is a learning process involving the combination of grasping and transforming knowledge through experience (see Lingham, 2008 for a concise explanation of this theory). The theory presents two ways in which we grasp knowledge: Apprehension and Comprehension (presented as the vertical axis); and two ways in which we transform knowledge: Intension and Extension (presented as the horizontal axis).

**Grasping knowledge.** Apprehension and comprehension are two key aspects central to the theory of Experiential Learning and represent the dialectically related ways in which we grasp knowledge. The Apprehension-Comprehension dialectic is derived from dual knowledge theory, which states that there are two, yet inseparable ways, of knowing: Concrete and Abstract. This dialectic can be stated as the emotional-conceptual dialectic\(^1\). We grasp experience by either being involved through Apprehension using the concrete experience (or CE) learning mode or Comprehension using the abstract conceptualization (or AC) learning mode. The CE mode is one where we interact with our environment through immersion, experiencing it with our senses (Ittelson & Cantril, 1954; Donceel, 1963), feelings and emotions (Dalgleish & Power, 1999;  

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\(^1\) This emotional-conceptual dialectic corresponds to the affective and cognitive process inherent in work motivation (Curral & Marques-Quinteiro, 2009).
Ekman & Davidson, 1994). On the other hand one can also grasp knowledge through the AC mode by exercising one's cognitive capacities instead of senses and/or emotions. We can think about, analyze and theorize to gain knowledge without being immersed in the environment.

Comprehension is defined as “Abstract Knowing”, which is experienced as the linguistic, conceptual, interpretive process based in the newer left cerebral cortex of the brain (de Bono, 1969; Gazzaniga, 1985).

**Transforming knowledge.** Apart from how knowledge is grasped, Kolb (1984) articulates that the transforming of knowledge is also central to the theory of Experiential Learning. Simple perception of experience alone is not sufficient for learning; something must be done with what we have taken in, or grasped. Intension is the act of reflecting on or observing some state or experience whereas extension is the actual action - deliberate or experimental - that will generate new states and experiences. This dialectic involves the praxis of action and reflection\(^2\). We transform knowledge by either being involved through the reflective observation (or RO) learning mode or the active experimentation (or AE) learning mode. The RO mode is one where we incorporate diverse perspectives from the knowledge we gained through reflection or observation. The dialectical related AE mode is one where the focus is to do something about the knowledge we gained.

**Learning Styles**

The combination of preferred modes for grasping and transforming knowledge is highlighted as an individual’s preferred learning style. Such a combination creates four learning styles. Kolb (1984) asserts that learning is maximized when an individual goes through all four modes of learning beginning at a mode that is reflective of that individual’s learning style. It is

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\(^2\) This dialectic of action and reflection corresponds to the goals with action aspect inherent in Eccles’ and Wigfield’s (2002) review of motivation.
when we interact with others that we may notice they also have such learning tendencies. As we progress into adulthood, we develop certain predispositions or preferences for how we grasp and transform knowledge. This tendency to choose certain learning modes is indicative of a preferred learning style. A brief description of each style is discussed.

**Diverging.** An individual with a diverging learning style tends to choose the CE mode in grasping information and the RO mode in transforming knowledge. Such individuals tend to be personally involved in any situation or event and are sensitive to feelings and people. Individuals with a diverging learning style also tend to view issues from many and/or different perspectives, look for the meaning of things and also carefully observe a situation before making any judgments. Their interest in knowledge and idea generation is the reason for such a style to be labeled as “diverging.” As such, they tend to do well and even thrive in situations that involve the bringing together of diverse perspectives such as brainstorming. Their passion for gathering information is ideal for tasks or work involving creativity or the arts, entertainment and service. Such people also tend to be imaginative, have the ability to listen with an open mind, and to function as excellent team players. In a classroom setting, discussion forums work well for individuals having diverging learning styles.

**Assimilating.** Individuals with an assimilating learning style tend to use the AC mode to grasp knowledge and the RO mode for transforming knowledge. People with this preferred style tend to look at diverse perspectives but with a specific intention to understand and to distill information to seek clarity and precision. They tend to logically analyze ideas, and to plan systematically. People with this learning style have a tendency to remove themselves emotionally and instead seek to understand situations intellectually. Their focus on achieving clarity make them thrive in tasks or work areas involving theories, and ideas that promote precision such as the
sciences, research and development and most academic environments. They tend to work well on their own and have very high standards in their work. In a classroom setting, assigned readings, listening to lectures and developing conceptual models work well for individuals with this preferred style.

**Converging.** Sharing the preference for the AC mode in grasping knowledge with the assimilating learning style, people with a converging learning style tend to also prefer the AE mode in transforming knowledge. Individuals with this learning style have an interest in not just understanding a situation or event but they also want to be able to take action using this knowledge. Unlike individuals that focus on the soundness of a theory (those with assimilating learning styles), an individual with a converging learning style focuses on the practicality of theoretical models. Their propensity to use ideas to solve problems makes them ideal for careers in technology, engineering, and design. As such, they prefer to work with technical tasks than to deal with social problems or interpersonal issues. Individuals with converging learning styles thrive when they are given tasks with clear parameters or boundaries. In a classroom setting, using case studies, simulations and laboratory assignments work well for people with converging learning styles. Educational environments that focus on examinations and tests also align with the converging learning style.

**Accommodating.** Individuals with an accommodating learning style tend to prefer immersing themselves in the CE mode to grasp knowledge and the AE mode to transform knowledge. Similar to individuals with diverging learning styles, those with accommodating learning styles tend to be sensitive to feelings and people as they are concerned about relating to others. However, people with this learning style are also very focused on being able to get things done, taking risks and influencing people through action. They tend to accommodate (or adapt) to
the environment they are immersed in. Such individuals focus on having “hands-on” experience as their primary mode of interacting with their environment, tending to act on their ‘gut’ rather than using logical analysis. They also do well in tasks or jobs related to sales, marketing and management due to the emphasis on action or getting things done. As with the diverging learning style, those with an accommodating learning style also like to work in teams but with the focus on getting things done, completing a project or doing fieldwork. In a classroom setting, completing assignments, fulfilling tangible tasks and doing presentations work well for individuals with this preferred style.

**Critiques of ELT from Research**

Despite the established use of ELT and learning styles in educational and organizational settings, learning theorists and researchers have critiqued the Learning Styles of ELT largely stating that the ipsative (forced ranking) scoring system of the Learning Styles Inventory or LSI (Kolb, 1999) is problematic as it does not lend itself to be tested and validated by employing statistical analysis that use measures of central tendency. Some researchers have also translated the ipsative scoring system to that of a scale so as to test the four styles. In a UK review of learning styles (Coffield, Moseley, Hall, & Ecclestone, 2004), some studies that used this translated scoring to that of a scale showed different combinations of the learning modes (e.g., where apprehension and intension combined as one factor with extension and comprehension as another or where apprehension and extension combined as one factor while comprehension and intension combined as another). These findings questioned the validity of the existence of four learning styles as either two or three styles emerged when the ipsative scoring system was translated into a scale and tested with analytical approaches such as Exploratory Factor Analysis was used.
One of the motivations for developing the Learning Needs Theory of Motivation was to develop a scale to measure learning needs underlying each learning style instead of treating the styles from a knowledge perspective as theorized by ELT. It is hoped that this scale would demonstrate the existence of four learning styles using analytical approaches that are based on central tendency such as those identified to test measurement models (i.e., EFA and CFA). Below we discuss how the concept of learning styles is translated to underlying learning needs as conceptualized by Lingham (2010).

**A Learning Needs Theory of Motivation**

As Experiential Learning Theory (Kolb, 1984) is considered one of the more influential theories used or referenced to in leadership and managerial development programs (Vince, 1998), Lingham (2010) proposed a Learning Needs Theory of motivation as a perspective to understand work motivation and its link to learning styles. We present the underlying needs for each of the four learning styles based on work the authors have done over a decade. As proposed by Lingham, people with balanced or centered learning styles would be able to work with what the situation or task requires (i.e., having flexibility or comfort to work with what is best for the situation) and do not get stuck with getting frustrated if underlying needs are not met. This approach also suggests that there are learning situations that correspond to the four learning needs and that individuals can develop flexibility to both align and motivate others in diverse learning situations. Based on the 15 years of experience Lingham and colleagues have working with ELT and learning styles, what follows is the underlying need inherent in each learning style (Lingham, 2010).

**Diverging – the link to ideation.** Individuals who prefer diverging learning style are motivated by information. In a work environment, such people tend to throw out information to ensure that different perspectives, thoughts or ideas are considered. Such individuals, however, are
not wedded to their ideas. The need to ensure that as much information as possible is considered important to individuals with diverging learning styles. They would ask questions such as “Have we considered this idea?”, or “What about looking at this from another angle?” In short, people with diverging learning styles have an underlying need to work with, uncover or entertain information.

**Assimilating – the link to precision and clarity.** Individuals with this preference need to develop clarity and precision in what they do. In a work environment, such people tend to focus on why they are doing a task. They need to have a clear idea of the purpose or rationale concerning the task, product, or deliverable. Even goals or objectives need to be made clear to them or they will ask questions to achieve clarity. They tend to ask questions like “Why are we doing this?”, or “Can you help us understand this objective?”, or “How does this align with the overall goal of the organization? In short, people with assimilating learning styles have an underlying need for clarity and understanding the purpose of any task given to them.

**Converging – the link to working with constraints and expectations.** Individuals with this learning style function well when they are given parameters, guidance or expectations associated with the task. Such individuals need to work around knowing what is expected of them or what their clients/customers need. They will ask expectation related questions such as “How long do we have to complete this task?”, or “Can you let us know what is it that you are expecting from us?”, or “I need to know what the clients really wants so that we can give them what they want.” Without some sense of parameters, guidance or expectations, they would feel lost and even frustrated. In short, people with converging learning styles have an underlying need for parameters when embarking on any task assigned to them.
Accommodating – the link to completion and evaluation. Individuals with this preference tend to push for action and need to have a sense that they are doing things to accomplish a task. Such individuals love to work fast and come across as dynamic and quick in what they do. They react adversely to having to deal with questions or clarifications as they feel like these behaviors stall or hinder the momentum of action. They will ask questions like “Can we move along?”, or “Do we need to have such lengthy discussions? We need to push on and start working on the project/task.”, or they may make statements like “Don’t worry about details. We will work it out as we progress through the task.” Such individuals love to work fast and as such are not concerned about being mired in clarity or details. In short, people with accommodating learning styles have an underlying need for action.

Table 1 shows the underlying needs for each learning style and its relevance to work motivation (Lingham, 2010).

METHOD

Developing a Measure of Learning Needs

Item Development. Based on the work of Lingham (2010), the authors developed a scale to measure learning needs for each style. The initial pool of 28 items (7 items per learning style) were developed over 18 months and sent to experts for review for face validity. As the authors have also worked extensively with ELT and learning styles, our expertise and experience were also used to check the development of each item in the pool. We used a 5-point scale to measure each item (Peterson, 1994). Items were only included after extensive discussion and review and finally tested in a pilot study (Spector 1992; Netemeyer, Bearden & Sharma, 2003; DeVellis, 2003). After
removing influential and problematic items, the items remaining were reviewed in-depth by the authors and refined. The final set of 24 items (6 items per style) was selected for further testing with the intent to keep an equal number of items per style. This set of items was used over two years to collect enough respondents (our intent was to collect up to 5 responses per item). We managed to collect a total of 207 responses for our initial sample to test the 24-item measure. Data screening and cleaning ended up with 205 responses that was used for our initial analysis. We tested the four factor model and had to refine the items and reword them to capture face validity more accurately. We then tested the refined inventory by collecting more data for EFA and CFA analyses.

**FINDINGS**

**Initial Analysis (EFA)**

After collecting enough data (n=636) we cleaned the overall sample and ended up with a total of 615 responses, which we used for both EFA and CFA analyses. For our EFA we took 30% of the sample (n=186) and the data was analyzed using Exploratory Factor Analysis (EFA) suing Principal Axis Factoring and Promax Rotation (Pedhauzer & Schmelkin, 1991); Harman, 1976; Kim & Mueller, 1978). Results show a four-factor solution but with some items having problematic cross loadings or loading on other factors. We systematically analyzed each factor and ended up with a set of 16 items that were robust and loading as conceptualized by Lingham (2010) according to the underlying need in each style. The sample demographics is shown in Table 2 and the EFA loadings and correlations are shown in Table 3 below. We also include an example of an item developed for each learning need in Table 3.

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Insert Tables 2 and 3 about here
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Measurement Model (CFA)

Having refined the items, we then collected data over the next two years to test the measurement model through Confirmatory Factor Analysis (CFA) using AMOS. We used the remaining 70% of the data (n=430) and ran the CFA using the EFA as the model. Our model fit indices indicate that the model is acceptable based on established criteria. Table 4 shows the CFA results.

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Insert Tables 4 about here
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The measurement model supports the Learning Needs Theory of Motivation as theorized by Lingham (2010). The survey can be used to measure the extent to which individuals need different learning motivational needs based on the Learning Needs Theory of Motivation. We are able to show that the higher the need in each of these dimensions, the higher the inherent need of the individual. As discussed earlier, learning needs also highlight learning situations as part of project work or teamwork. We propose that in alignment with learning needs, situational needs also involve information, developing clarity, working with parameters and finally the need to get things done. Based on our experience in project work, we propose a model of project work based on learning situations emphasized in the process. This process is shown in Figure 1 below.

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Insert Figure 1 about here
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Our measurement model’s robustness and reliability permits us to use the Learning Needs Inventory or LNI as both a diagnostic and prescriptive tool. As a mapping system, the LNI can be used to profile individuals’ inherent learning needs that may align (or not) to situational needs
when working in a team. Figure 2 below shows an example of an individual’s profile of learning needs. We also propose that averaging the scores for each need could be used to show an individual’s innovative and execution capacities. Hence, we believe that the LNI can be a very useful tool to help individuals develop learning flexibility (i.e., to align with different phases of project work from a learning perspective) and to also develop their own capacity to innovate or execute in the work environment. We discuss this further in the next section.

Insert Figure 2 about here

Transforming Learning Needs into Innovative and Execution Capacities

Since Kolb’s Experiential Learning Theory was also built from Guilford’s (1950) work on creativity, transforming learning styles to learning needs and using a scale that can be tested using EFA and CFA analyses, we can combine specific aspects of motivational needs to determine one’s innovative and execution capacities. We define innovative capacity as the ability to develop quantity and quality of ideas (Ideation) and the ability to make choices that are feasible and meet expectations (Synthesis and Selection). We also define execution (or implementation) capacity as the ability to ensure that expectations are clear (Clarity) and that actions are carried out as laid out (Action). We put forward that the higher the level of needs a person has, the more that person would push for these aspects at work displaying higher capacities at the individual level and hence contribute to the innovative and execution capacity when working in a team.

Innovative Capacity. A person’s innovative capacity is the ability to generate, assess, and build ideas with the goal to craft a feasible design for execution. The ability to generate a high quantity and quality of ideas is defined as Ideation. This process, though similar to brainstorming, also requires that individuals are open to a wide breadth of ideas while looking for linkages or
associations within these thoughts to be able to reach better and more integrative solutions through holding ideas lightly or bisociation (Koestler, 1964). The ability to be able to select and to design projects based on what is expected and by what can be actualized is labeled as Synthesis and Selection. This process requires a person to be able to develop a clear understanding of objectives, constraints, while simultaneously being open to possibilities generated during the ideation process.

**Execution/Implementation Capacity.** A person’s execution capacity involves both implementation and a clear appreciation about what needs to be done and why (e.g., goals, tasks, purpose(s), and objectives) as well as the ability to follow through so as to effect the best possible delivery or implementation. This capacity involves both the ability to develop clarity around what needs to be done and to also be able to actualize or to deliver outcomes above expectations. This can involve providing feedback as a sounding board to clarify others’ points or reactions as a way to develop precise thoughts while simultaneously engaging in perspective taking. The chart below (Figure 3) shows the mapping of an individual’s Innovative and Implementation Capacities.

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Insert Figure 3 about here

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**DISCUSSION**

In this paper, we begin with the aim to explore the limitations of learning styles from ELT (Kolb, 1984) uncover the underlying needs in each of the learning styles and test its psychometric properties to develop a robust, reliable measurement model. We realized that such a measurement model based on learning needs is tied to work motivation (Lingham, 2010) but we wanted to present its relation to individual capacities linked to the creative process in organizations.
Developing a framework based on three foundational streams of work (i.e., Learning (L), Creativity (C), and Work Motivation (M) or LCM) has resulted in a reliable and psychometrically valid inventory that can be used in organizations to help individuals understand what they would push for or encourage when working in a team or leading a team while also being able to identify their own capacity for innovation and execution in the work environment. This would also facilitate the possibility to help individuals develop flexibility and improve their innovative and execution capacities through an effective coaching structure and methodology. This inventory could also be used to identify the profiles and capacities of members in a team to help with creating a team that can function effectively and be also simultaneously high performing. This possibility to help individuals and teams would make the Learning Needs Inventory (LNI) useful for use across levels in any organization.

When considering the creative process in organizations, our proposed model is one that incorporates learning, creativity and motivation or LCM by suggesting that this process involves four phases: 1) ideation; 2) precision; 3) design and selection; and 4) action (see Figure 1). Embedded in these four phases are two overarching processes – the Innovative Process and the Execution Process. We believe that such a model does not focus on creativity as a phenomenon but presents a feasible understanding of the creative process that is immediately translatable to organizational work and life and would be useful and meaningful to both researchers and practitioners. Although this aligns somewhat with existing models, our proposed model can be measured and tested in future research involving the creative process.

Since the LNI is designed as a scale and not one based on ranking (ipsative scoring system) which is a critique of Kolb’s learning styles (Coefield et al., 2004), research can be done to show
the impact of Learning Needs on outcomes such as work or job satisfaction, team effectiveness or team potency, or other measures impacting organizational effectiveness or performance.

From an educational standpoint, with the AACSB focusing on student learning, such an inventory could be used to capture entry and exit assessment of student learning in undergraduate and graduate programs in business/management schools. This could also be extended to other fields in educational institutions. These assessments coupled with the possibility to incorporate coaching to help students improve innovative and execution capacities would promote programs that include development of skills relevant to work or organizational settings and align with needs of prospective employers of our graduates.

Possible Future Research

From an educational perspective, our experience working with and advising doctoral students have shifted our view of the doctoral journey as not one marked by hurdles they have to jump through (e.g., comprehensive examinations, proposal defense, dissertation, defense) but rather marked by specific learning emphases (e.g., diverging, converging, assimilating and accommodating). Broadly, in the first few years, students are expected to learn and gather information about their field of study by attending courses, seminars and extensive reading (diverging); followed by a qualifying or comprehensive examination to test their knowledge (converging); identifying their research questions and clear design (assimilating) and finally data collection, analysis and writing up the dissertation document (accommodating). Interestingly, although we use stringent criteria to bring in the best and the brightest, in the US, 50% of doctoral students leave and do not complete (Golde, 2000) their Ph.D. Such shocking data highlight the significance of learning styles and motivation. A group of researchers in our university is currently designing a research project to help identify specific learning emphases in the diverse disciplines at
the doctoral level with the aim to highlight doctoral success from a Learning Needs Theory perspective and transitioning from an advising approach to both coaching and advising.

From an organizational perspective, we believe that the LNI can be used to study the impact of learning needs on organizational outcomes and also to embark on further studies on the creative process using the LNI as a concrete, robust and reliable measure. Further research could also be conducted to explore the causal relationship between the creative process and intra- or inter-organizational collaborations

**CONCLUSION**

Learning, motivation, and creativity are core concepts in organizational behavior. It is a personal attribute that is affected by a person’s background and attitudes, various external conditions and by individual learning preferences as well. The success of any organization in today’s global environment would rely on the ability to manage a diverse body of talent that can bring innovative ideas, perspectives and views to their work. This is especially true for multinational companies (MNCs) who have operations on a global scale and employ people of different countries, ethical and cultural backgrounds and learning styles. As Experiential Learning Theory is one of the most influential theories in leadership and managerial development, understanding the underlying needs for each learning style can indeed help managers and leaders manage upward by understanding their managers learning style; manage clients and customers; and motivate (and develop) their employees in the work environment. We propose that a Learning Needs Theory of Motivation and the Learning Needs Inventory can be an effective applied perspective to help leaders, managers and educators due to its intrinsic link work motivation and creativity, which relates to performance, development and satisfaction.
REFERENCES


Table 1
A Simple Framework to Understand Underlying Needs of Different Learning Styles, Related Work Foci and Developmental Suggestions

<table>
<thead>
<tr>
<th>Learning Styles</th>
<th>Underlying Need</th>
<th>Examples of Tasks that Align with Learning Styles</th>
<th>Preferred Engagement Mode</th>
<th>How to Frame Tasks/Projects and Guide Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverging</td>
<td>Work with, uncover or entertain information. Gathering information from diverse sources</td>
<td>Market research; Benchmarking; Brainstorming; Managing teams and dealing with multiple opinions; Creating lively discussions; and Working with cross-functional or inter-professional task/projects.</td>
<td>Teams</td>
<td>Present projects as needing information or gathering information bounded by structures or limitations. Give them some freedom. Gently guide them not to stray too far.</td>
</tr>
<tr>
<td>Assimilating</td>
<td>Clarity and understanding the purpose of any task given to them. Understanding and knowing why</td>
<td>Clearly defined projects; Setting clear goals and objectives; Refining work; work requiring high standards; and Editing reports.</td>
<td>Individual</td>
<td>Present projects as getting a better understanding and coming up with clear recommendations. Give them time. Gently guide them to work faster.</td>
</tr>
<tr>
<td>Converging</td>
<td>Parameters when embarking on any task assigned to them. Requirements, guidelines or expectations.</td>
<td>Working with clients who have high expectations; Deriving parameters (scoping); problem solving; and Client management.</td>
<td>Individual and teams or clients</td>
<td>Present projects as guided by specific guidelines or parameters. Give them specific guidelines. Gently guide them to be creative.</td>
</tr>
<tr>
<td>Accommodating</td>
<td>Action -- Working Fast</td>
<td>Projects with short deadlines; Task oriented projects (list of things to do); and Networking or working in teams to get work done.</td>
<td>Teams (Individual if scope is manageable)</td>
<td>Present projects as urgent and requiring actions that need to be carried out or done. Give them trust. Gently guide them to be more precise.</td>
</tr>
<tr>
<td>Type of Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational(^a)</td>
<td>462</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work(^b)</td>
<td>153</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>328</td>
</tr>
<tr>
<td>Male</td>
<td>287</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>60 years or older</td>
<td>8</td>
</tr>
<tr>
<td>50-59 years old</td>
<td>37</td>
</tr>
<tr>
<td>40-49 years old</td>
<td>97</td>
</tr>
<tr>
<td>30-39 years old</td>
<td>148</td>
</tr>
<tr>
<td>20-29 years old</td>
<td>321</td>
</tr>
<tr>
<td>19 years and younger</td>
<td>4</td>
</tr>
</tbody>
</table>

\(^a\)Educational groups ranged from graduate to doctoral levels. Graduate students were from Masters programs in Organizational Development, Operations and Supply Chain, Full Time MBA, Part Time, Global MBA (China, India and US), and Non-Profit. Doctoral students were from Executive Doctoral Programs and Organizational Behavior PhD students. 

\(^b\)Work Groups ranged from IT professionals (US), University Staff from various departments (US), professionals from an International Hotel Chain (China), professionals from a manufacturing/chemical organization (US), and senior professional from Latin America.
Table 3
Pattern Matrix from EFA\(^a\) (30%, n=186) of Full Dataset arranged by Factors

<table>
<thead>
<tr>
<th>Items(^b)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1</td>
<td>0.752</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 3</td>
<td>0.832</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 11</td>
<td>0.673</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 16</td>
<td>0.551</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 2</td>
<td>0.606</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 10</td>
<td>0.815</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 18</td>
<td>0.545</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 21</td>
<td>0.586</td>
<td>0.263</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 4</td>
<td></td>
<td>0.699</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 9</td>
<td></td>
<td>0.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 12</td>
<td></td>
<td>0.455</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 20</td>
<td>-0.204</td>
<td></td>
<td>0.655</td>
<td>0.252</td>
</tr>
<tr>
<td>Item 5</td>
<td>-0.278</td>
<td></td>
<td>0.388(^c)</td>
<td></td>
</tr>
<tr>
<td>Item 6</td>
<td></td>
<td></td>
<td>0.622</td>
<td></td>
</tr>
<tr>
<td>Item 19</td>
<td></td>
<td></td>
<td>0.572</td>
<td></td>
</tr>
<tr>
<td>Item 24</td>
<td></td>
<td></td>
<td></td>
<td>0.679</td>
</tr>
</tbody>
</table>

Factor Correlation Matrix

<table>
<thead>
<tr>
<th>Factor 1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.063</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-0.085</td>
<td>0.277</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.456</td>
<td>0.305</td>
<td>0.233</td>
<td>1</td>
</tr>
</tbody>
</table>

Examples of Items for Each Factor

<table>
<thead>
<tr>
<th>Factor</th>
<th>Sample Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I prefer to establish clear goals before work gets done</td>
</tr>
<tr>
<td>2</td>
<td>I prefer discussing to explore or build ideas</td>
</tr>
<tr>
<td>3</td>
<td>I prefer working fast on tasks/projects</td>
</tr>
<tr>
<td>4</td>
<td>I prefer when criteria or expectations are developed to ensure tasks/projects are manageable</td>
</tr>
</tbody>
</table>

\(^a\)EFA Analysis was conducted using PAF Extraction and Promax Rotation
\(^b\)We maintained a model that would have equal numbers of items per factor
\(^c\)We kept this item as we wanted four items per factor and also that the cross loading on Factor 3 was negative
Table 4
CFA Results with 70% of the data (n=430)

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>CMIN</th>
<th>DF</th>
<th>P CMIN/DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Model</td>
<td>218.6</td>
<td>97</td>
<td></td>
<td>2.25</td>
</tr>
<tr>
<td>Model 1</td>
<td>141.5</td>
<td>92</td>
<td></td>
<td>1.54</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model Fit</th>
<th>NFI</th>
<th>RFI</th>
<th>IFI</th>
<th>TLI</th>
<th>CFI</th>
<th>RMSEA</th>
<th>PCLOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Model</td>
<td>0.859</td>
<td>0.826</td>
<td>0.916</td>
<td>0.895</td>
<td>0.915</td>
<td>0.054</td>
<td>0.233</td>
</tr>
<tr>
<td>Model 1</td>
<td>0.909</td>
<td>0.881</td>
<td>0.966</td>
<td>0.955</td>
<td>0.965</td>
<td>0.035</td>
<td>0.986</td>
</tr>
</tbody>
</table>

Notes:
1. All parameter estimates were significant at $p<.000$
2. In Model 1, we only correlated error terms with modification indices $>10$. All fit index criteria are acceptable.
3. The overall Cronbach-$\alpha$ for the scale is 0.730
Note:
The numbers in the quadrants above indicate the learning situations (Boyatzis & Kolb, 1999). “1” is the Valuing Situation; “2” is the Thinking Situation; “3” is the Deciding Situation; and “4” is the Acting Situation.

Figure 1. The Process of Project Work Highlighting Learning Needs, Learning Situations and the Embedded Innovative and Execution/Implementation Processes
Note:
The top profile shows an individual who has a Diverging Learning Style with little flexibility. The bottom profile shows an individual that is also Diverging but has more flexibility in the Assimilating and Converging Styles.

*Figure 2.* An Individual’s Profile of Learning Needs Showcasing Learning Style and Learning Flexibility.
Note:
The diagram above shows an example of an individual’s innovation and execution capacities along each of the axes. Although quite balanced, as far as his/her innovative capacity is concerned, this person is able to balance quantity and quality of ideas (Ideation) but tends to push for selection/synthesis based on what is expected. As far as his/her execution/implementation capacity is concerned, this person tends to clarify expectations and prefers to check off tasks over getting feedback.

*Figure 3.* Diagram Showing an Individual’s Innovative and Execution/Implementation Capacities.