A Measure to Assess, Coach, and Develop Individuals: Integrating Learning, Creativity, Design Thinking, Innovation, and Work Motivation

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Abstract

In our current turbulent and unpredictable global work environment, organizations need to develop adaptability, the capacity to innovate and execute, as well as motivate employees to engage effectively. Current research and practice highlight the need to develop adaptability as a competitive advantage, to constantly focus on innovation, to ensure that innovations do not stagnate at idea generation, and to push for execution.

We push this further to link theories and concepts related to learning, creativity, design thinking, innovation, and work motivation as an integral part of adaptability, innovation, and execution. The one theory that includes all these six aspects is the Learning Needs Theory of Motivation (Lingham, 2010). Our aim is to develop a measure to assess an individual's adaptability profile as well as their innovation and execution tendencies focusing on behavioral indicators. Such an approach would facilitate the possibility to assess, coach, and develop individuals in organizations and educational institutions so as to develop higher self- and other-awareness and achieve higher levels of engagement when working on projects and tasks with others or on a team.

To achieve our aim, created items based on Lingham's (2010) Learning Needs Theory of Motivation and used measurement theory and methods as well as scale development to test the theory with empirical data. We tested the scale in a pilot study (n=205) to further refine the scale. We then tested our refined scale using a research sample (n=615). We conducted Exploratory Factor Analysis (EFA) on 30% (n=186) of the sample and the results showed a robust set of 16 items in four clear factors with loadings in each factor ranging from a minimum of .39 to .83 with cross loadings <.3 and correlations across each factor from 0.277 to 0.063. Using the remaining 70% of the sample (n=430), we ran Confirmatory Factor Analysis (CFA) and the fit indices showed good fit (NFI = .91, IFI = .966, TLI = .955, CFI = .965, and RMSEA = .035).

These results show that the measure (which as call the Learning Needs Inventory or LNI) integrate all the six theories and concepts. The LNI can be used to profile an individual's adaptability profile and their Innovation and execution tendencies. Such a scale can be used effectively

in organizations and educational institutions to help assess, coach, and develop individuals to higher levels of self-and other-awareness. Using this scale as part of training and development programs will help organizations achieve High-Impact Engagement.

Keywords: *Adaptability, Innovation, Execution, Learning Needs, Learning Needs Theory of Motivation, Assessment.*

INTRODUCTION

The experience of change has never been so fast paced and chaotic as in the last few decades. Across the globe, organizations increasingly have to innovate and evolve to thrive in such an unpredictable yet competitive landscape. Adaptability has become a key factor in achieving competitive advantage (Reeves & Deimler, 2011) and is a new competitive capability in response to the uncertainty of the new century (Garcia-Salmones & Yin, 2014). The need to adapt and thrive in such an increasingly complex and volatile work environment have driven organizations to recognize the importance of developing their leaders and employees to increase internal capacity to innovate and enhance performance.

People do not work alone. Research has established that 85% of work in organizations is done in teams (Hardy-Valle, 2012). With the integration of technology and the fusion of both the virtual and physical worlds of work (Haeger & Lingham, 2014), the need to evolve faster to survive and thrive is unprecedented. Today, as these advancements in technology break down physical geographical and national boundaries, being able to interact effectively across the globe with others transcends diversity of gender, culture, race, and nationality. We now have a complex workforce (Lingham & Richley, 2018) and the ability to engage effectively requires higher levels of self- and other-awareness specific to understanding and interacting with what drives or motivate others when working on projects or tasks with others, or in a team. Suggesting innovation and execution as two sides of the same coin, Govindarjan and Trimble (2010) state that focusing on ideas may unleash immediate energy but focusing on execution is far more powerful. They also suggest that innovation has to include both ideas and motivation.

Our Evolving Global Work Environment highlight the need for organizations to adapt, innovate, and execute. Since the 2010s, researchers and practitioners suggest that in order for organizations to thrive in our evolving work environment, being adaptive, innovative, having the ability to execute, and the ability to motivate are competencies intrinsically linked and central to organizational vitality. This makes it especially important for organizations to develop adaptability, innovation and execution, and motivate employees across individual, interpersonal, and team levels within the work context. In this paper, we further incorporate learning as another critical component to help organizations thrive. The purpose of this paper is to develop a measure to assess an individual's adaptability, innovation and execution tendencies, as well as their motivational needs when working with others in the work environment. We believe that such an assessment has the potential to help employees in organizations and students in educational institutions develop higher self- and other-awareness when working on projects or tasks.

TEAMS HAVE BECOME A FUNDAMENTAL WAY OF WORK

Teams are everywhere. In fact, most organizations are designed with a team approach in mind. Teams can be found across all levels in an organization from boards, top management teams, to ad hoc and work teams. Inherent in this team structure is a unique design where a team leader in one team may be a team member in a team at a higher level or a team member in one team could be a team leader in a team at a lower level (Lingham & Richley, 2018). To add to this, employees would find themselves in multiple teams. The general definition of teams as people coming to together to complete a task is no longer sufficient. Teams should be considered as living entities in an organization and

should be developed in their own specific work contexts. Richley stated in Lingham & Richley (2018: 4) that: "Teams are engines that drive businesses, they are the force bringing innovations to life, and they are the central organizing for all work relationships."

TO DEVELOP TEAMS, WE NEED TO DEVELOP INDIVIDUALS

The need to provide effective team training and development programs is needed now more than ever for organizational survival and success. However, before being able to develop teams to have high-quality engagement, and capacities to innovate, and execute, organizations will need to invest in training individuals to develop adaptability, and skills to innovate and execute effectively. They need a strong and engaged workforce to ensure their success. Gallup's 2018 study on the state of the global workplace indicated that disengaged employees cost the organizations across the globe between $450 and $550 billion per year. The critical need to be able to develop self-awareness and other-awareness is a first step in achieving higher levels of engagement when working with others (Goleman, 1985) or in multiple teams. Although there is a plethora of training programs to develop individuals in organizations and educational institutions, extending this to help individuals develop an equal capacity of other-awareness is vital. Training programs that help individuals develop both self- and other-awareness cannot be understated and should be a prerequisite for team training and development programs. In this paper we focus on developing a measure to assess, coach, and develop *individuals* to achieve higher self-awareness and other-awareness regarding their motivational learning needs when working on tasks or projects.

Developing the skills to lead and work in teams is certainly a critical need for organizations and educational institutions as the majority of work done in organizations is done in teams (Hardy-Valle, 2012). Yet, most training programs are focused on the individual level with very few on how individual awareness is linked to awareness at the interpersonal and team levels. Most training programs focus on individual leadership or supervisory skill development but very few are designed from individual, interpersonal and team levels. In organizations, the need to have teams that are more adaptive with the capacity to innovate and execute cannot be understated as such teams (that we call 'High-Impact Teams' or HITs) have the ability to influence the system in which the team is embedded (i.e., the next level up, internal customers/ clients, and external customers/ clients) leading to organizational success. However, to create, lead, and sustain HITs training and development should involve both self- and other-awareness specifically to assess, coach and develop individuals to increase their adaptability, innovative tendencies, and execution tendencies. We put forward that training programs that focus on these three aspects enable High-Impact Engagement (Lingham & Richley, 2018) which in turn fosters organizational level adaptability, innovation, and execution. As mentioned earlier, in this paper, we present a measure that will enable the assessment, coaching, and development of an individual's adaptability, innovation, and execution capacities, and in so doing help develop other-awareness especially when working on projects or tasks in the work context. To develop this measure, we incorporated various theories that include experiential learning, creativity, design thinking, innovation, and work motivation.

In the next section, we briefly highlight some of these theories and present how integration of these theories is critical to develop a measure based on behavioral skills in the work environment to facilitate competencies related to adaptability, innovation, and execution. Based on our own experience and training related to these theories, and our own experiences working successfully on projects and tasks as team leaders and members in organizations, we decided to create a reliable, valid, and robust measure using measurement theory and methods (Pedhauser & Schmelkin, 1991) and scale development (Peterson, 1994; Spector 1992; Netemeyer, Bearden & Sharma, 2003; and DeVellis, 2003). Our aim was to create a scale that can be used to assess individuals' adaptability, innovation and execution skills based on behavioral indicators to facilitate competency development in these three areas as well as their individual fundamental

motivational needs that are critical to accomplishing project/ task success in the work environment.

FOUNDATIONAL THEORIES, CONCEPTS, AND COMPETENCIES ASSOCIATED WITH ADAPTABILITY, INNOVATION, EXECUTION, AND WORK MOTIVATION

Experiential Learning Theory: The Need to Expand Beyond a Knowledge-based 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 and two ways in which we transform knowledge: Intension and Extension.

The combination of preferred modes for grasping and transforming knowledge is highlighted as an individual's preferred learning style (Kolb, 1999). Such a combination creates four learning styles (i.e., Diverging, Converging, Assimilating, and Accommodating). 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 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. Refer to Lingham (2008) for a summary of Experiential Learning Theory and Learning Styles. As Experiential Learning Theory is a knowledge-based theory, it would be necessary to expand this to include behavioral indicators that can be distilled to competencies in the work environment.

Creativity: The Need to Focus on Capacities 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) with 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. Rosner and Abt (1970) focused on the creative experience by interviewing 23 artists and scientists based on recognition from their peers, and often the informed public at large and their creative contribution in their respective areas. However, an analysis of their interview data highlighted three broad clusters of skills: Ideational, Individual, and Process Skills. Recent work such as Puccio et. al (2020) focuses on creative problem solving in groups and published guides such as Puccio, Cabra, & Schwagler (2018) may not necessarily focus on the creative process. Although there is a vast body of creativity research, we highlight some that suggest linear or dynamic models of the creative process.

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). Some of 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).

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 Experiential Learning Theory (ELT) (Kolb, 1984).

Design Thinking: The Need to Transform Concepts and Processes into Skills

This concept is a recent trend in organizations and educational institutions. A few models have surface, which includes phase, characteristics, and skills. Phase models are presented as having three or four phases. Three phase models range from inspiration, ideation, and implementation; constructing, using, and communicating artifacts (Avital, Boland, & Lyytinen, 2009); hearing, creating, and delivering (Brown & Wyatt, 2010); and discover, define, develop, and deliver (Design Council, 2005). The four-phase model presented by Bevan, Glenn, Bate, Maher, & Wells (2007) begins with reflection (including analysis, diagnosis, and description), imagination and visualization, modeling (which includes planning, and prototyping), and action and implementation. Characteristic models have been articulated as having cognitive, attitudinal, and interpersonal aspects (Dunne & Martin (2006), incorporating diverse learning styles (Beckman & Barry, 2007), and focusing on overlapping latent, technological, and business needs (Bicen & Johnson (2015). When framing design thinking as a set of skills, scholars have indicated that the activities associated with design thinking involve engagement. The three forms of engagement are engaging in empathy, engaging in dialogue, and engaging in collaboration (Benson & Dresdow, 2015). Finally, some scholars have proposed design thinking as appropriate at the team level (Glen & Baughn, 2014).

Some of these models have foundations in creativity. In reviewing these three major concepts, we identified phase models, characteristic or descriptive models, and models related to skills and behaviors. We studied all three major concepts and focused on those related to skills and behaviors as they are framed as competencies that can be developed. Skills common to all three concepts can be summarized as ideation, evaluation or analytical skills, implementation, collaboration or interaction skills.

Innovation: The Need to Incorporate Processes into Skills

Co-founders of *Humantific*, VanPatter and Pastor (2016) provides a comprehensive timeline of innovative methods over eighty years focusing on knowledge and evolution but not the evaluation of effective innovative methods. Innovation defined by Kanter (1984) is the generation, acceptance and implementation of new ideas, processes, products or services. Dyer, Gregersen, and Christensen (2009) highlight five specific skills at the individual level: Associating, Questioning, Observing, Experimenting, and Networking.

Nonetheless, in terms of innovation, organizations typically focus on "new delivery mechanisms, customer service strategies, and business models" or are new products born in R&D laboratories (Christensen, Anthony, & Roth, 2004: 293). Business innovations must contribute to the bottom-line. Conversely, social agents (e.g., non-profit managers, philanthropists, activists) want innovations that solve societal problems. Social innovations must contribute to humanity. Innovation that specifically exist at the intersection of business and society has been theorized as Social Business Innovation or SBI (Richley, 2009). Yet this line is becoming increasingly blurred as businesses try to learn how to enact socially responsible practices and non-profit agents enroll in management schools to learn how to exploit business knowledge. Additionally, both areas are striving to compete for limited resources in a global economy while struggling to survive in order to fulfill their critical missions.

New organizational forms are needed to meet these hefty demands in global work environment that is constantly changing. Emergent research on innovation provides evidence that successful organizations regardless of industry are those that are

flexible, adaptive and collaborative suggesting a move away from top-down closed system designs to those that are fluid, open and cooperative (Hargadon, 2003; Rogers, 2003). Two common factors exist between the interest in, and the need for innovation: 1) people and 2) learning. Both business and social agendas need people and knowledge to foster and implement innovation. In this regard the innovation process can best be understood as a network of relationships "among people, ideas and objects" (Hargadon, 2003: 8) and as a learning process (Van de Ven, Polley, Garud & Venkataraman, 2008). If the aim is to understand how to enjoin business and social objectives then it is necessary to trace the innovation process of successful initiatives in a way that highlights the role of both people and learning.

When looking at an individual level, Dyer, Gregersen, and Christensen (2009) identified 5 skills which also expands beyond one's intra-level ability to include networking (i.e., involving others). In this paper, we broadly define innovation at the individual level as the skill to generate new ideas and possibilities, as well as synthesizing, selecting, and developing these ideas and possibilities to align or exceed the intent or goal of projects/tasks and the strategic direction of the organization. Although this also applies at the team level, to align with the intent of this paper, we focus our attention at the individual level.

Motivation Theories and Work Motivation: The Need to Incorporate Skills Associated with Learning

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). 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 our introduction, we mentioned that innovation, execution and motivation (Govindarajan & Trimble, 2010) are all part of critical competencies for organizations to develop. We propose to include that motivation and learning are also intertwined.

THE LEARNING NEEDS THEORY OF MOTIVATION: INCORPORATING LEARNING, CREATIVITY, DESIGN THINKING, INNOVATION, AND WORK MOTIVATION

Creating a measure that incorporates adaptability, innovation, and execution would require the integration of skills associated with the four major theoretical foundations discussion above. As the goal of this measure is to focus on behavioral indicators or

skills in the work environment at the individual and interpersonal levels (to develop higher levels of self- and other-awareness), it would have to incorporate competencies related to learning (grasping and using information), creativity (ideation, precision, project/task management and action) design thinking (ideation, evaluation or analytical, and implementation), innovation (generating new ideas and possibilities, synthesizing, selecting, and development) and work motivation (cognitive and affective as a function of needs).

Essentially, the measure would have to capture individuals' needs associated with learning styles, ideation, clarity, evaluation, selection, and implementation. One theory that incorporates the centrality of needs associated with these competencies is the Learning Needs Theory of Motivation (Lingham ,2010). In the article, Lingham theorizes that the Learning Needs Theory of Motivation involves four major Underlying Motivational Learning Needs (Table 1, p. 111): 1. Information—a focus to work with, uncover, entertain information, or gather information from diverse sources; 2. Clarity—a focus to achieve clarity and understanding the purpose of any given task; 3. Parameters—a focus on ensuring parameters, requirements, guidelines, or expectations when embarking on any given task; and 4. Action—a focus of getting things done.

Our intent is to use the stringent criteria established in measurement theory and methods (Pedhauzer & Schmelkin, 1991) and scale development (Peterson, 1994; Spector 1992; Netemeyer, Bearden & Sharma, 2003; and DeVellis, 2003) to develop a measure based on the Learning Needs Theory of Motivation. We hope that developing and testing the measurement model of Learning Needs would propel an emergent stream of research that would blend fundamental needs associated with learning, creativity, design thinking, innovation, and work motivation specific to working on projects and tasks within the work context so it is significant, meaningful, timely, and relevant to organizations in todays' global work environment.

METHOD

Developing a Measure to Assess and Profile Adaptability, Innovation, and Execution

Item Development

Based on the Learning Needs Theory of Motivation (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).

We collected 207 responses for our pilot sample. Data screening and cleaning resulted in 205 responses that was used for our initial analysis. After removing influential and problematic items, the items remaining were reviewed in-depth by the authors and refined. We tested the four-factor model and had to refine the items and reword them to capture face validity more accurately. The final set of 24 items (6 items per underlying motivational learning need) was selected for further testing with the intent to keep an equal number of items per motivational learning need.

Research Sample

Once we had our refined set of 24 items (6 items per underlying motivational need), we collected our research sample over two years from educational and work settings. Our data was collected as part of educational and training sessions. Only completed responses were used and any responses with missing data were removed from the analysis.

Demographics of the sample is shown in Table 1. Age of the respondents ranged from <19 years and younger to <60 years with the mode being 20–29 years of age (321 respondents). We had relatively equal responses from females (328 or 53% of the sample) and males (287 or 47% of the sample). Respondents from educational settings ranged

Table 1: Demographics of Sample

(n=615)

Type of Group	
Educational[a]	462
Work[b]	153
Gender	
Female	328
Male	287
Age Group	
60 years or older	8
50–59 years old	37
40–49 years old	97
30–39 years old	148
20–29 years old	321
19 years and younger	4

[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 Masters in 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 professionals from Latin America.

from students at the graduate to doctoral levels with respondents from the US, China, and India). Respondents from work settings ranged from IT professionals, staff from higher education, professionals from IT, Hotel industry, manufacturing, and senior professionals from Latin America.

Analytical Approach

After collecting enough data (n=636) we cleaned the overall sample and ended up with a total of 615 responses, which we used exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). We extracted the first 30% of the sample (n=186) and the data was analyzed using Exploratory Factor Analysis (EFA) using Principal Axis Factoring and Promax Rotation and the remaining 70% of the sample were used to conduct CFA analysis (Pedhauzer & Schmelkin, 1991; Harman, 1976; Kim & Mueller, 1978) using AMOS (Arbuckle, 2014). A total of 615 completed responses received were used for exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

FINDINGS

Psychometrics

Based on the pilot, research samples 1 and 2, the psychometrics are reported in Tables 2 and 3, the results show discriminant and convergent validity is shown in the Exploratory Factor Analysis or EFA in Table 2 (after removing problematic items due to cross loadings or weak loadings). The items loaded across four factors as theorized. The overall Cronbach α for the scale is 0.730. Also, the correlations across the four factors range from .063 to .277 suggesting four distinct factors.

Initial Analysis (EFA)

Results show a four-factor solution but with some items having problematic cross loadings or loading on other factors. Removing items with cross-loading problems based on established criteria (<.3), we systematically analyzed each factor and ended up with a set of 16 items that were robust and loading as conceptualized by the four underlying motivational learning needs (Lingham, 2010). The EFA loadings and correlations are shown in Table 2 below. We also include an example of an item developed for each learning need in Table 2.

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 (Arbuckle, 2014). 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 3 shows the CFA results.

The measurement model from our empirical data 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

Table 2: Pattern Matrix from EFA[a] (30%, n=186) of Full Dataset arranged by Factors

Factors				
Items[b]	1	2	3	4
Item 1	0.752			
Item 3	0.832			
Item 11	0.673			
Item 16	0.551			
Item 2		0.606		
Item 10		0.815		
Item 18		0.545		
Item 21		0.586	0.263	
Item 4			0.699	
Item 9			0.58	
Item 12			0.455	
Item 20	-0.204		0.655	0.252
Item 5			-0.278	0.388[c]
Item 6				0.622
Item 19				0.572
Item 24				0.679
Factor Correlation Matrix				
Factor	1	2	3	4
1	1			
2	0.063	1		
3	-0.085	0.277	1	
4	0.456	0.305	0.233	1
Examples of Items for Each Factor				
Factor	Sample Items			
1	I prefer to establish clear goals before work gets done			
2	I prefer discussing to explore or build ideas			
3	I prefer working fast on tasks/projects			
4	I prefer when criteria or expectations are developed to ensure tasks/projects are manageable			

[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

of the individual

DISCUSSION

As mentioned earlier, our goal is to develop a measure that captures individuals' needs associated with learning styles, ideation, clarity, evaluation, selection, and implementation. Specifically, we wanted to create a scale that captures an equal number of items for each of the Underlying Motivational Learning Needs as proposed by Lingham (2010). Our aim is to focus on behavioral indicators or skills in the work environment at the individual and interpersonal levels (to develop higher levels of self- and other-awareness). We achieved this goal by having 4 items for each of the four categories of Underlying Motivational Learning Needs—a total of 16 items.

Empirical Support for the Four Underlying Motivational Learning Needs

The Learning Needs Theory of Motivation was first

Table 3: CFA Results with 70% of the data

(n=430)

χ^2	CMIN	DF	P CMIN/DF
Initial Model	218.6	97	2.25
Model 1	141.5	92	1.54

Model Fit	NFI	RFI	IFI	TLI	CFI	RMSEA	PCLOSE
Initial Model	0.859	0.826	0.916	0.895	0.915	0.054	0.233
Model 1	0.909	0.881	0.966	0.955	0.965	0.035	0.986

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 good.
3. The overall Cronbach α for the scale is 0.730

proposed by Lingham (2010). As researchers, we are always looking to support, refute, or refine theories based on concrete data. The four underlying needs presented in Lingham's (2010) Learning Needs Theory of Motivation (Lingham, 2010) was empirically supported with further refinements to each of the four major dimensions based on the wordings and framings of each item as well as the label for each dimension based on the four items that fell into each factor. In reviewing the factor analysis (both the EFA and CFA), we looked at the items that loaded in each factor to identify why they load in that factor. Based on the items' wordings, we established that there are indeed four major factors that comprise Underlying Motivational Learning Needs when individuals are working on projects/tasks (individually or on teams) within their work context.

1. Underlying Need for Information (Exploration Skills).

Individuals with this underlying need tend to push to obtain or explore information from multiple sources, getting ideas from others, getting information so as to exceed expectations, and to obtain diverse perspectives. Each of the four aspects within the Need for Information can be observed by how individuals frame questions or act when they are working with others. Such individuals tend to push for idea generation.

2. Underlying Need for Clarity (Clarification Skills).

Individuals with this underlying need tend to push to ensure clarity and purpose by working systematically so as to be thorough, ensure clarity in developing concrete plans, ensure clarity by developing clear criteria and/or expectations, and to ensure that no one is confused. Each of the four aspects within the Need for Clarity can be observed by how individuals frame questions or act when they are working with others. Such individuals tend to push for clarity and purpose, which could lead to buy-in from others.

3. Underlying Need for Parameters (Selection Skills).

Individuals with this underlying need tend to push to adhere to clear goals, expectations, ensure that there are some criteria and expectations to adhere to, and to adhere to clear guidelines. Each of the four aspects within the Need for Parameters can be observed by how individuals frame questions or act when they are working with others. Such individuals would tend to seek confirmation that ideas, tasks, and choices made confirm to or are aligned with the given goals and guidelines and help select the best approach.

4. Underlying Need for Action (Actualization Skills).

Individuals with this underlying need tend to push to get tasks done fast, maintain momentum when getting tasks done, get the urgent tasks done first,

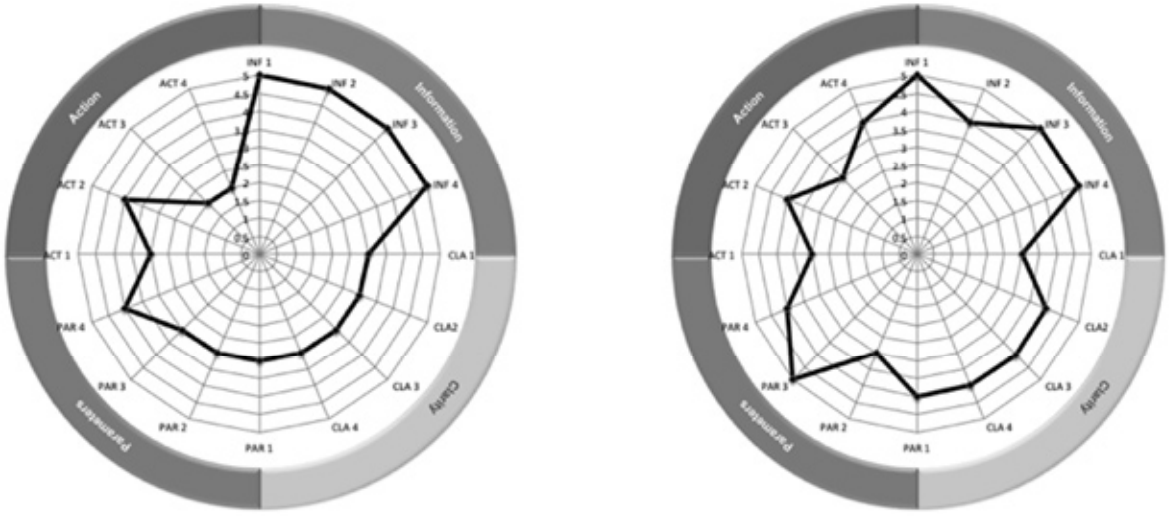

Figure 1: Example of Two Different Profiles of Adaptability

and to ensure no (or minimal) delays when getting things done. Each of the four aspects within the Need for Action can be observed by how individuals frame questions or act when they are working with others. Such an individual would push for task completion.

THE LEARNING NEEDS INVENTORY

The Learning Needs Inventory (LNI) emerged from the EFA and CFA analysis supporting that it is an assessment that integrates theories of learning, creativity, innovation, design thinking, and work motivation. The results of our analysis show that the LNI is a reliable, robust, and valid measure that combines established research and concepts on experiential learning, work motivation, and creativity/innovation. The purpose of the LNI is to create an adaptability profile based on the strength of an individual's learning needs and to chart one's own innovative and execution tendencies.

The psychometrics of the LNI were encouraging and we felt confident to test the robustness of our scale globally over 10 years. We have used the LNI as a methodology for assessment and coaching in for-profit and nonprofit organizations as well as in educational settings across the globe. Having used the LNI in the US, China, countries in Africa, Asia, and Latin America, we have been able to establish our measurement model's robustness and reliability both as a diagnostic (assessment) and prescriptive (coaching) tool. As a mapping system, the LNI can be used to profile individuals' strength of each of the underlying motivational learning need. The higher the strength of an aspect embedded in category of Underlying Motivational Learning Needs, the more the individual would push to meet that aspect when working on projects or tasks both individually and in a team.

Profiling an Individual's Adaptability

The LNI report profiles a person's adaptability to flex to changing conditions when working on projects or tasks. Figure 1 shows two examples of adaptability profiles showing how unique each profile is for individuals. The profile also helps effective coaching at the individual level to help them develop adaptability associated with their profession and work environment/demands.

Identifying Individual's Tendencies in Innovation and Implementation

Results from the Learning Needs Inventory not only profile an individual's adaptability but also their behavioral tendencies in relation to innovation and implementation. Since a person would push the team to meet his/her learning needs, this push is experienced as a behavioral tendency in the

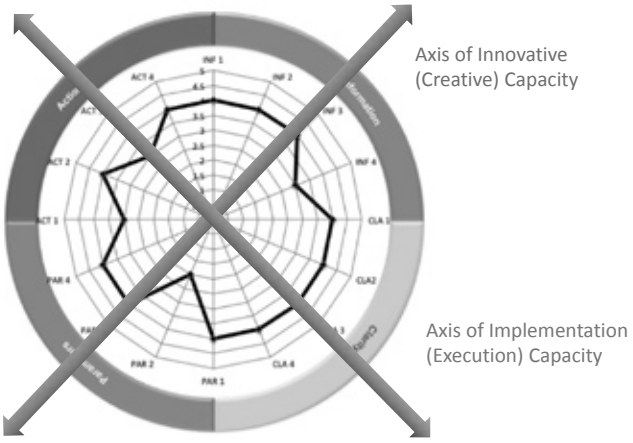

Figure 2: The Innovative and Execution Axes

work environment.

As the items in the LNI are designed based on behavior and measured based on the extent of the push in behavioral terms in the work environment, combining certain behaviors that aligns with one's motivational learning needs would be related to one's capacity. Competencies are a combination of both intent and behavior (Boyatzis, 1982: 22). The needs align with intent and the level of push in the related need aligns with the behavioral tendencies. When two tendencies are combined, it presents one's capacity related to the two specific tendencies. As such, one's innovation capacity involves the combination of two needs where one combination is the "ideation tendency" and the other combination is the "selection/synthesis tendency." Ideation is a combination of the level of one's Need of Information and the level of one's Need for Clarity. Selection/Synthesis is the combination of the level of one's Need for Parameters and the level of one's Need for Action.

One's implementation capacity involves combinations of the other two needs where one combination is the "clarification tendency" and the other combination is the "action tendency." Clarification is the combination of the level of one's Need for Clarity and the level of one's Need for Parameters. Action is the combination of the level of one's Need for Action and the level of one's Need for Information. Figure 2 below shows the Axis of Innovation and the Axis of Implementation and their respective combinations of learning needs.

Unfolding of a Project or Task Based on the Four Underlying Motivational Learning Needs

The four Underlying Motivational Learning Needs can be best understood as a process with four major steps. The first step (Ideation) is focused on pushing the Need for Information. In this step, information is collected based on individuals' contribution of ideas, opinions, or thoughts and to extract the ideas that are relevant to the project assigned and those that are seemingly not relevant. These two groups of ideas are then clustered into possibilities. Once the ideation process is completed, the next step (Evaluation/Development/Selection) is focused on pushing the Need for Parameters. In this step, the clusters of possibilities is evaluated, developed, and selected based on those that are easily done or feasible (what some have labeled as "low hanging fruits") and those that would require more time but are important and aligned with the expectations, goals, or guidelines given by supervisors or higher level management. Both these categories can be further broken down into possibilities that have high potential for innovation and change and those that have lower potential. These two steps follow the process of innovation/design thinking/creativity. We label this the Innovation Axis (as shown in Figure 2).

Once the possibilities are identified into the four groups (some of which may overlap) as feasible, important, high potentials and low potentials, it is important to revisit the purpose of the project and

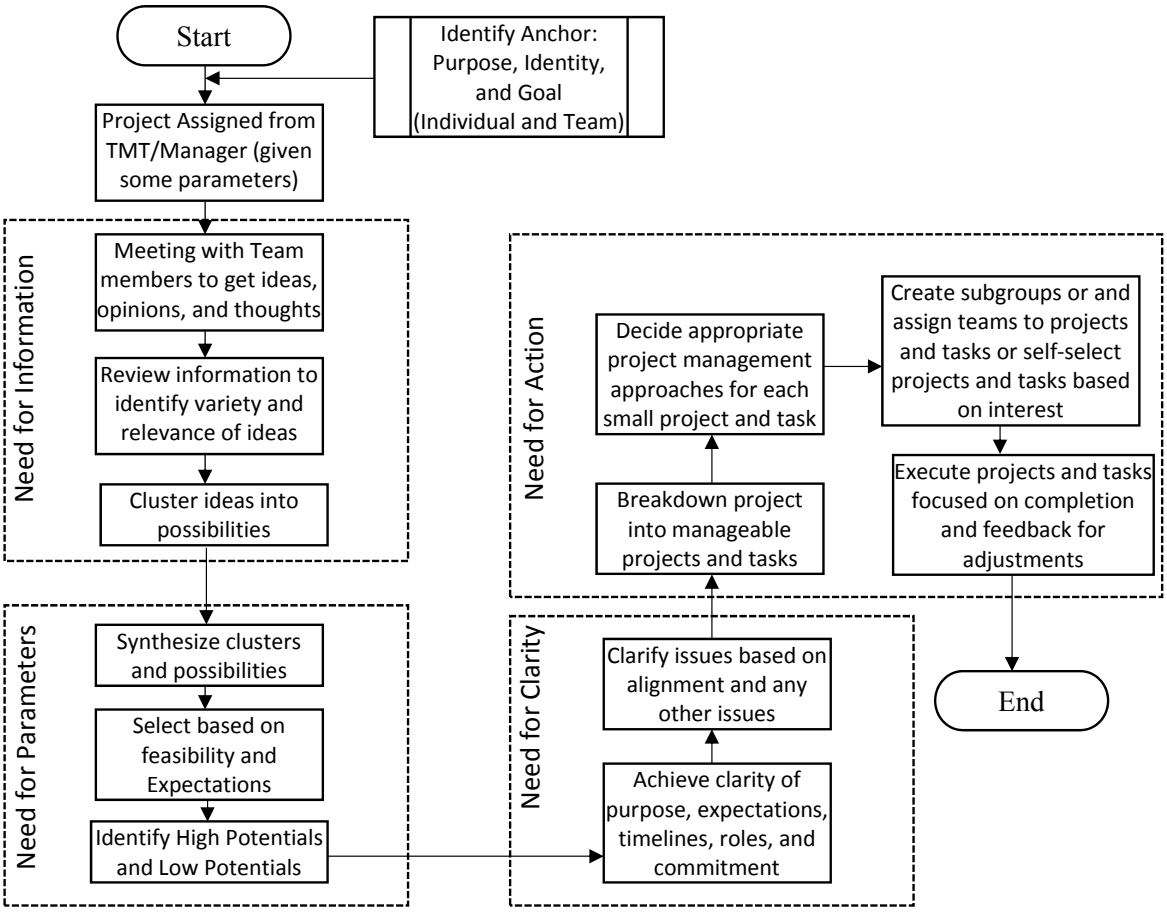

Figure 3: Unfolding of a Project or Task Based on the Four Underlying Motivational Learning Needs

the purpose of the job/ role of the individual or the purpose of the team as Embedded in the larger system. This step is focused on the Need for Clarity and would involve clarifying roles, timelines, plans, and commitment to the project as well as clarifying the purpose of the project against the purpose/ function of the team. This step should also allow for any other issues that may be confusing and needs clarification. Once this is clear and agreed upon, the final step is focused on the Need for Action. In this step, the project is broken down into smaller, more manageable projects and tasks so as to get the overall project done. To manage, monitor, and deliver the overall project assigned by managers/ clients outside the team, assigning appropriate project management approaches to these smaller projects and tasks will ensure each of the smaller projects or tasks are executed effectively and efficiently. However, deliverables would take two forms: those that can be completed and those that would require feedback from those impacted or those that will be helped by implementation of the project. These two steps follow the process of effective execution. We label this the Execution Axis (see Figure 2). A simple representation of this entire process is shown in Figure 3 below.

CONCLUSION

Purpose of the Learning Needs Inventory

The Learning Needs Inventory (LNI) was developed and tested over four years. In the 10 years that we have used the LNI for assessment and coaching, it is effective as a diagnostic and prescriptive tool. Our initial results presented in this paper shows that the LNI is a reliable, robust and valid measure that combines established research and concepts on

Experiential Learning, Work Motivation and Creativity/Innovation. The purpose of the LNI is to present one's adaptability profile based on the strength of the individual's learning needs and to also chart one's innovative and execution capacities. As the intent of this paper is to focus on the assessment and development of individuals, we suggest that the LNI be used as the initial assessment and coaching for individuals to promote intra-personal and inter-personal awareness when working on tasks or projects.

Significance and Timeliness

In our current volatile global work environment, teams are being used extensively in organizations to complete projects, develop innovative ideas, and contribute to the organization's success. However, team training and development programs do not necessarily begin at the individual and interpersonal levels to include evidence-based coaching and development before moving to the team level. In this paper, we present the need to assess and develop individuals prior to team level training and development. With the LNI, individuals will be able to develop skills to be flexible and to be able to adapt to shifting motivational learning needs as well as the capacity to innovate and execute. Team leaders will be required to have the competency to manage a diverse body of talent to ensure members feel valued, appreciated, and to allow them to contribute and influence the larger system by contributing innovative ideas, perspectives, and views. Team leaders should also develop the competency to help teams take leadership and to take the initiative to create projects that will help organizations thrive.

In terms of higher education, this assessment is grounded on actual behavior and underlying motivational needs when working on projects in the work environment. It helps individuals understand what motivates others based on how matters and issues are framed when working together hence improving self- and other-awareness in real time interactions. This approach also improves skills and competencies associated when working with others that may be perceived as different not only in terms of professional training but also deeper underlying basic human interactional needs. This approach is meaningful as it provides real-time data about relevant skills within the context of working with individuals on a team as well as how underlying needs are framed. Such a process would certainly help when following up with team coaching and development.

NOTE

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