The Role of creativity in naturalistic decision-making environments: A systems approach

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THE ROLE OF CREATIVITY IN NATURALISTIC DECISION-MAKING ENvironments: A SYSTEMS APPROACH

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The role of creativity in naturalistic decision-making environments: A systems approach

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The purpose of this study was to examine the role of creativity in problem solving situations. Previous research suggested that both background knowledge and the inability to transfer knowledge across contexts are important factors in how a problem is ultimately resolved. Given these findings, the researcher undertook a study on the role creativity might play when individuals lacking sufficient background knowledge are faced with a novel real world problem. A question raised by the researcher whether an absence of background knowledge might encourage novices to be more creative than their more experienced counterparts in novel problem solving situations.

Findings of the study demonstrated that the role creativity plays is influenced more by support from the environment and understanding the regularities of the environment than background knowledge of a specific problem. More experienced others in the study were as creative, but used creativity differently than novices. It was found both novices and more experienced others faced a system of eroding goals that placed pressure
to lower goals concurrently with taking creative actions to resolve the problem.
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CHAPTER 1
INTRODUCTION

This research addressed the role of creativity in naturalistic decision-making (NDM) environments. Specifically, the researcher looked to define any affordances, constraints, or points of leverage within dynamic systems that supported or detracted from the use of creativity when resolving novel situations. Using the Complementary Analysis Research Matrix Application (CARMA) the researcher observed exhibitors in a large convention environment. Observing a number of novel situations, the researcher was able to identify gaps (creative tension) between the expectations of the exhibitor and the evident challenges they faced in developing solutions. The findings were used to construct a system using relationships identified between NDM environments and factors of creativity. These relationships demonstrated a system of eroding goals as exhibitors use creativity in an attempt to reduce the gap and maintain their expectations. Based on findings the researcher recommends service training focused on the primary point of leverage, maintaining exhibitor expectations.

The researcher’s primary reason for exploring how creativity is utilized in NDM environments was based on previous literature on decision-making, which stressed the importance of both background knowledge (experience, roles and scripts) and modeling as key factors for making correct decisions (Lipshitz, Klein, Orasanu, & Salas, 2001; Solomon,
Surprenant, Czepiel, & Gutman, 1985). However, this same literature did not appear to adequately address how decisions are made when background knowledge or example behaviors are limited or non-existent. While researchers argued that background knowledge is vital in areas such as problem solving, decision-making, and interpretation (Lipshitz & Pras, 2005; Mayer, 1983; Reynolds, Taylor, Steffensen, Shirey, & Anderson, 1982), research also indicated skills and knowledge used in one context did not necessarily transfer to another (Brookfield, 1987; Bransford, Brown, & Cocking, 2003; Singley & Anderson, 1989).

With transfer limited and background knowledge considered vital, the researcher questioned whether when solving novel problems in natural environments, if creativity plays a fundamental role in filling the gap? The researcher proposed that for problems where background knowledge and/or transfer are limited, (i.e. a novel problem), the role of creativity should be explored.

Supporting the study, the researcher reviewed literature on systems theory, which provided a foundation or theoretical framework for the study. Within this framework, background knowledge and creativity were not considered products isolated primarily to the individual as some theories would suggest, but were considered parts of a system influenced through interactions within a community. Knowledge within the system was considered distributed and the opportunity for creativity was the result of tension or disequilibrium within the system (Senge, 2006). For
purposes of the study, it was argued that creative tension or a state of
disequilibrium within a given system promotes those attributes defined
within the literature review as an NDM environment.

Given the framework of the study, the researcher also conducted a
review of literature on naturalistic decision-making and creativity. Within
NDM literature, the researcher found a focus on domain specific
problems and that importance was given to the role of background
knowledge while creativity was given little, if any consideration (Lipshitz
et al., 2001; Pruitt, Cannon-Bowers, & Salas, 1997). In contrast to the
literature on NDM environments, literature on creativity supported the
idea that background knowledge may assist in developing solutions, but
that it is just one component of the overall creative process. As a
product, literature on creativity stated that creativity requires certain
skills (background knowledge) and/or dispositions that allow for
relatively novel solutions or ideas that are appropriate for resolving the
task at hand (Sternberg, 2007).

Literature on both NDM and creativity, indicated support of a systems
perspective with explicit recognition of how interactions within a system
may influence the decision-making process. NDM literature referred to
uncertain dynamic environments, multiple players, and organizational
goals and norms as fundamental to a naturalistic decision-making
environment (Lipshitz et al., 2001), while literature on creativity
supported the concept that it is easier to enhance creativity by modifying a system or environment than an individual (Csikszentmihalyi, 1996).

Last, to provide additional context for the study, literature was reviewed pertaining to critical incidents taking place in the service industry. Findings of the literature suggested that consumers of service products use roles and scripts to identify and solve problems (Gremier, 2004; Chell & Pittaway, 1998; M.J. Bitner, Booms, & Tetreault, 1990). Within the studies no apparent consideration was given to the role creativity may play, instead background knowledge was considered the primary factor. In novel situations research suggested an individual draw on background knowledge in attempt to utilize what the person perceive to be an approximate script to resolve a service failure. Based on the literature it appeared the service industry could be considered a dynamic system capable of providing adequate NDM environments in which to explore the role of creativity.

After conducting the literature review the researcher selected a methodology driven by the focus of answering what role creativity plays in decision-making under factors found in natural environments and for the potential application of findings in workforce development, specifically the modification of systems within the service industry.

Given these criteria, the Complementary Analysis Research Matrix Application (CARMA) was selected as an appropriate methodology to accomplish the research objectives. This method is based on applied
research methods through description, interpretation, and transformation of the setting or environment (Putney, Wink, & Perkins, 2006). CARMA supports a systems approach consisting of similar phases to the decision-centered design methods for modification of systems including preparation and elicitation, analysis and representation, followed by transformation through applied design (Crandall, Klein, & Hoffman, 2006). By way of CARMA, the researcher used the concept of transformation to recommend modifications to the system identified to exist in a convention environment.
CHAPTER 2
LITERATURE REVIEW

When exploring how systems influence the use of creativity in solving real world problems, several areas of previous research provided valuable insight. The theoretical framework for this study consisted of five integral components (figure 1); systems theory, social views of knowledge acquisition, creativity, naturalistic decision-making, and critical incidents in the service industry.

Figure 1 – Theoretical Framework

First, it was necessary to review how systems are defined and how previous research on systems theory could be applied to the proposed study.
Second, it was important to emphasize and support a social view of knowledge acquisition. In the real world learning is foremost a social process. While various components of learning can be reduced to individual differences, the learner is never truly alone. This epistemological stance promotes that everything individual is primarily social, including the mind of the individual (Putney, 2006). In addition to the individual as a social being, communities of individuals help shape processes, dictating not only various affordances and constraints, but the development of decision support systems. These systems in turn help guide how individuals interact within a society (Norman, 1988). Between the individual recognized as an integral part of society and society unveiled as a complex system of affordances and constraints, a social view of knowledge acquisition was considered an accepted premise for the research.

Third, literature on creativity was reviewed as a core construct for the proposed research and a key element in determining how people come together to solve problems within a system. While certainly many problems are mitigated daily by those with the requisite background knowledge in a given field or discipline, the resolution of the problem detracts from the question the role creativity plays. It was proposed that when a problem exists and background knowledge is inadequate, it is at this point that creativity moves to the forefront, with creativity defined in
terms of novelty and the ability of a new solution to be applied to the task at hand (Sternberg, 2006a).

Fourth, the proposed research considered solving problems in the real world as a natural process, not one that relies on multiple choice answers or laboratory results. While some studies of NDM environments have included computer simulations or a more controlled environment, it is preferable to study incidents in their natural setting (Lipshitz et al., 2001; Lipshitz, Klein, & Carroll, 2006). For these reasons the review of literature included research on how individuals and teams work within the constraints of a natural environment when making decisions.

Last, literature was reviewed specific to critical incidents in the service industry. This supported the researcher’s site selection, provided a dynamic system from which to operate, provided context to the study and was consistent with the use of applied research methods. The review looked at problem-solving in the service industry using six seminal studies out of 141 identified by Gremier (2004) using the critical incident technique (CIT).

These six studies supported the concept that customers use pre-defined scripts and roles to navigate critical incidents. For instance, when a customer goes to place an order at a fast food restaurant they play the role of the customer, while the employee behind the counter, the cook, and the manager all play roles as well. Each person in the transaction has a script to follow. When a person deviates from their
assigned script or their role it can create a critical incident. Building off the concept of roles and scripts when resolving critical incidents, the researcher suggested by definition a novel problem will not necessarily have pre-defined roles or scripts. Therefore, findings of the service industry studies provided additional support for exploring the role creativity may play in environments where critical incidents take place.

**Systems Theory**

While subtle differences exist between system dynamics, systems thinking, systems engineering, organizational systems, systems perspectives, a systems approach, etc., they all relate to a general systems theory. This theory supports the idea that the universe is comprised of a vast, complex network of interrelated parts working in a manner so that each part has either a direct or indirect impact on how the system works as a whole (Boulding, 1985; Laszlo, 1996). Within this broad world view, systems thinking begins to look at individual systems and the interrelatedness of the forces and sees these forces as part of a common process (Senge, Kleiner, Roberts, Ross, & Smith, 1994). From a world view down to the most basic level, a system then becomes an interaction of parts that have lesser to greater degrees of influence on the overall system (Dick, Carey, & Carey, 2001).

Within systems theory the interaction of parts is not displayed as a linear process, but consists of a series of relationships between concepts.
The relationships form balancing or reinforcing loops based on conditions that exist within the system.

Figure 2

![Diagram showing balancing or reinforcing loops](image)

(Senge, 2006)

Laszlo (1996) points out that it is the above interaction that fails to allow the common practice of reductionism. If any component of the system is removed it ceases to exist or operate in the same manner. An example is a crowd that is made up of individuals. The crowd is a complex whole that only survives based on characteristics of the interactions that take place and therefore remains irreducible to the individual.

From a historical perspective systems theory is relatively new, but already the theory plays a dominant role in a wide range of fields. This has caused a shift or re-orientation in scientific thinking as systems thinking encompass all fields of knowledge (Bertalanffy, 1969). In the 1920’s systems theory was developed as a means to explain how various
organisms worked together in sustaining an ecosystem (Bale, 1995). Then during the 1930’s and 40’s, Kurt Lewin began promoting a systems perspective within organizational theory in contrast to a behaviorist approach (Weisbord, 1987). In 1956, MIT professor Jay Forrester took what had developed into primarily an industrial or mechanistic view and applied a systems perspective to social systems, creating the field of system dynamics (Aronson, 1996-1998).

To this day, a struggle occurs between organizations being viewed as a social system, i.e. a learning organization verses a company full of assets to be treated as parts in a machine (Geus, 2002). Both views support a systems perspective, but only the view of an organization as a living entity promotes a social perspective as well. It is this living view that was of interest when exploring the use of creativity within systems. Within a living or dynamic system elements change over time and as these elements evolve and influence each other, novel situations are produced (Thelen & Smith, 2006).

Figure 3

(Senge, 2006)
Representing this change over time, systems theorist use graphs that show relationships between concepts and how behavior changes over time (Figure 3). With change over time comes novelty and with novelty comes imbalance as a system that is living is constantly struggling between growing and equalizing any perceived inequities within the system. If the living system is aware of an inequity, creative tension becomes a force that seeks resolution (Senge, 2006).

An example of how novelty and creativity interact within a system is demonstrated by a case involving a savings and loan institution that operated without a CEO for 18 months in 1994. Instead of immediate replacement of the CEO which would have been considered the normal action to take, the finance director, commercial director, and information systems manager formed a head that worked closely with a ten-person management committee while searching for a suitable replacement. During this time without a CEO the collective group increased profits by 22 percent in 1993 and 37 percent in the first quarter of 1994 (Geus, 2002). It was not the increase in profits that was important, but rather the lack of a CEO that produced a novel situation. It created a disequilibrium considered unique and/or noteworthy by competitors within the same industry. And, if we accept the creation of a new temporary executive structure as modification to the system, the case demonstrates how elements within a dynamic system change over time.
With literature supporting the production of novel situations in dynamic systems and creative tension forming when there is an imbalance within the system, the researcher submitted systems theory as a strong platform from which to explore the role of creativity in natural environments.

Social Learning Perspectives

In educational psychology a number of theories are posited regarding the exact nature of knowledge acquisition. Some theories, such as behaviorism and cognitivism, focus on the individual experience with little or no emphasis on the role of social factors. Other theories, such as social constructivism and sociocultural theory, take an alternate view that emphasizes the influence of society and culture in learning (Reynolds, Sinatra, & Jetton, 1996). While no consensus appears on the exact nature of how one develops or acquires knowledge, social perspectives take into account the complexity of communal interactions. Acquiring knowledge takes place within communities or systems, which in turn supports the Vygotskian concept that individuals do not learn in isolation (Putney, 2006). These social interactions were a key factor in the study. For this reason, the researcher looked at both sociocultural and social cognitive theories for support when exploring creativity within a dynamic system.
Sociocultural theory was initially conceptualized by Lev Vygotsky in Russia during the 1920’s and 1930’s. It was his belief that development could only be studied in the social and cultural contexts in which it occurred (Bjorklund, 2005). The approach emphasized the interdependence of social and individual processes in the coconstruction of knowledge. This interdependence was demonstrated throughout Vygotsky’s writings to include individual development and social mediation (John-Steiner & Mahn, 1996).

A key feature of Vygotskian methods was the use of dialectics. This process requires ideas and concepts to be compared and contrasted against alternate perspectives. It also requires that a given concept be looked at holistically, not reduced to isolated components. Social, historical, and political factors combine to produce a holistic perspective that influence the development of an individual (Wink & Putney, 2002). If we also accept Plato’s assertion that by challenging and responding two people can come closer to the truth than an individual, then from the systems perspective the twosome constitutes another example of an irreducible whole (Laszlo, 1996). In Vygotsky’s own words development is “a complex dialectical process, characterized by periodicity, unevenness in the development of different functions, metamorphosis or qualitative transformation of one form into another, intertwining of external and internal factors, and adaptive processes” (Vygotsky, 1978, p. 73).
The complexity of these adaptive processes is supported by a well-known Vygotskian concept, the zone of proximal development. This is important from a systems view as within this zone, the individual and community coconstruct meaning through the use of cultural tools. These tools include not only physical objects, but more abstract concepts like language and social institutions. Change or development occurs as the individual internalizes, transforms and adapts through multiple interactions (Bruning, Schraw, Norby, & Ronning, 2004). Besides supporting a systems perspective the zone of proximal development also supports the view that creativity results from a culture that contains symbolic rules and the individual that brings novelty must negotiate a society to recognize and validate the innovation (Csikszentmihalyi, 1996).

With the zone of proximal development it is through reiterations of the tasks that development or transformation takes place and those tasks that at one time had required guidance can be accomplished independently (Vygotsky, 1978). This transformation or developmental process is not considered even and universal as described by Piaget, but can be likened to a tidal wave as proposed by Zebroski, involving both progressive and regressive steps, with development being the cumulative effect of all that is learned (Wink & Putney, 2002). Best defined, the zone of proximal development is “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving
under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86).

While Vygotsky focused on children, one could extract this basic premise and apply the concept of a zone of proximal development to an adult novice trying to develop solutions to a real world problem. As noted by John-Steiner & Mahn (1996), over time individuals take on increasing responsibility for their own learning. Thus, learners participate in a variety of community activities that provide the opportunity for synthesis. While the adult may take on additional responsibility, there is still a requirement to acquire useful strategies and gain knowledge through joint activity.

An alternate social cognitive theory of knowledge acquisition was proposed by Albert Bandura (1986). The major difference between the two theories is the emphasis placed on internalized personal factors, including cognitive, affective, and biological events. While Vgotsky used the dialectic approach of functional systems to argue internal and external systems transform continuously to unify physiological and psychological processes (John-Steiner & Mahn, 1996), Bandura’s social cognitive theory utilized an introspective approach as a means to explain internalized personal factors. The social cognitive perspective attributes a central role to cognitive factors and views individuals as largely self-governing rather than reactive to social forces or unknown inner impulses. While the theory is less dependent on societal influences, it
does recognize the impacts of both societal and environmental factors. Social cognitive theory challenges evolutionary and behaviorist proponents reliance on adaptation or stimulus response, without giving consideration for the influence of social and technological innovations (Pajares, 2002).

A key concept developed from social cognitive theory is that of self-efficacy. Defined, self-efficacy refers to “The belief's in one’s capabilities to organize and execute the courses of action required to manage prospective situations” (Bandura, 1995, p.2). One study of self-efficacy involved young East German migrants and refugees during a stressful time of relocation. The study found that migrants with high levels of self-efficacy perceived new demands as a challenge instead of a threat and were more successful in dealing and adapting to their new environments (Jerusalem & Mittag, 1995).

As self-governing agents, when confronted with a novel situation the concept of self-efficacy becomes increasingly important. An individual with extensive training or background knowledge should in theory have high self-efficacy, allowing for adequate management of any prospective situation within a given domain. Applied to a systems perspective there is a concept of collective efficacy in lieu of individual efficacy. Families, schools, and other institutions have a collective level of efficacy working in social systems that have far greater impacts than the efficacy of a single individual (Bandura, 1995). Within the research the concepts of
personal verses group efficacy and the impact on creative tension within the system was supported by the literature on creativity and naturalistic decision-making.

Strong self-efficacy beliefs are generally the product of time and experience (Pajares, 2002). However, a novel situation should by definition be one in which the individual has had little time or experience, therefore lacking the self-efficacy to immediately develop an effective solution. This presented a potentially interesting area of discovery as literature on creativity supports the need for a level of self-efficacy in development of a creative solution (Sternberg & Lubart, 1999), but time constraints which would limit self-efficacy are a component of natural environments (Lipshitz et al., 2001).

While sociocultural and social cognitive theories have key differences, both played an important role when studying creativity in a natural environment. The Vygotskian (sociocultural) framework demonstrated through the interdependence of society and the individual, creativity is coconstructed (Vygotsky, 1978). This is a system or a community perspective; however the construction process is also influenced by individual attitudes and dispositions. For creativity to take place the individual must have a belief (self-efficacy) in one’s own ability to accomplish the task at hand (Sternberg & Lubart, 1999).
Creativity

A recent definition of creativity outlined by Sternberg (2007) is that “Creativity refers to the skills and dispositions needed for generating ideas and products that are (a) relatively novel, (b) high quality, and (c) appropriate for the task at hand, p. 3.” How the researcher came to utilize this most recent definition was placed in the context of previous research.

From 1975 until 1994 creativity was referenced only 0.5% of the time in various psychological abstracts. In comparison, reading was referenced 1.5% of the time within this same sample (Sternberg & Lubart, 1999). Having been historically neglected, the modern study of creativity first emerged around 1950 based on the efforts of J.P. Guilford. During this time period, Guilford developed the Structure of Intellect (SOI) battery consisting of a number of divergent production tests. The tests were psychometric in nature, asking participants questions that would require them to display divergent thinking, i.e. creativity, in various areas such as semantic units, figural classes, and figural units (Plucker & Renzulli, 1999). As opposed to giving a specific correct answer, divergent thinking problems asked participants to generate multiple alternatives that are then rated for fluency, originality, and importance (Mayer, 1987). Those considered successful or “creative” were considered to have an aptitude for generating alternative perspectives on problems rather than following predefined, standardized answers or...
formats. Creative individuals were considered to recognize problems as having multiple solutions and contexts (Brookfield, 1987).

After the development of SOI, the field was furthered by E. Paul Torrance in the 60’s and early 70’s. To this day the 1974 Torrance Tests of Creative Thinking (TTCT) remains the most widely used assessment of creativity (Sternberg, 2006b). The TTCT is based on the SOI battery and is also psychometric in nature. The TTCT requires participants provide multiple responses to figural or verbal prompts that are scored for (1) fluency: the total number of meaningful ideas, (2) flexibility: the number of different categories, (3) originality: the statistical rarity of the response, and (4) elaboration: the amount of detail in the response (Plucker & Renzulli, 1999).

While the psychometric approaches of Guilford and Torrance have been predominant in understanding and defining creativity, Robert J. Sternberg introduced a confluence approach that has pushed the field to where it is today. This approach maintains that creativity requires the convergence of six interrelated resources: (1) intellectual abilities, (2) knowledge, (3) styles of thinking, (4) personality, (5) motivation, and (6) environment (Sternberg & Lubart, 1999).

A review of each of the above resources was provided based on aspects of Robert Sternberg’s investment theory of creativity as outlined in the Creativity Research Journal, 2006. Intellectual abilities consist of three components including, (1) the synthetic skill to see problems in
new ways, (2) analytic ability to determine which idea is worth pursuit, and (3) the practical skill to know how to convince others the value of adopting one’s ideas. *Knowledge* can help or hinder creativity. An individual must have enough knowledge to grasp the basic concepts of a problem, but in some instances a person with extensive knowledge can become entrenched, not allowing exploration of alternatives. *Thinking skills* are decisions about how to deploy available skills with a legislative style being preferred. A creative thinker is able to think both globally and locally, determining those questions that are important. *Personality* is a function of a number of attributes including, but not limited to, the willingness to overcome obstacles, willingness to take sensible risks, a willingness to tolerate ambiguity, and high self-efficacy. *Motivation* as an element of creativity is best approached by individuals with intrinsic, task-focused motivation. For the most part, without motivation, creativity will not take place. Last, *environments* must provide support for creativity to flourish. Few environments are fully supportive and most will consist of a lesser or greater number of obstacles that restrict creativity.

The overall hypothesis of Sternberg’s confluence approach is that creativity is more than the simple sum of each component. Limitations or minimums may exist for certain components. Other circumstances may require partial compensation, using the strength of one component to offset the weakness of another. Last, interactions between two highly
rated components may suffice to enhance creativity without the necessity of the other four (Sternberg & Lubart, 1999).

In support of the confluence approach, Sternberg administered a battery of tests in 2001 involving 793 college students. The tests were based on the Sternberg Triarchic Abilities Test (STAT), which used multiple-choice questions to determine the analytical, practical, and creative skills of participants. Within the creative sub-tests were (1) Creative-verbal questions that tested an individual’s ability to deal with counterfactual premises (e.g. money falls of trees) as if they were true, (2) Creative-quantitative questions that dealt with novel number operations, and (3) Creative-figural questions that asked the participant to take a figural series that involves transformations that must then be applied to a new series. Results from the battery of tests indicated that creative students do not profit as much as other students from standard teaching methods and therefore a confluence approach could make an impact outside the laboratory in schools and could include the everyday life of adults (Sternberg, 2006a).

Based on all of his previous research, Sternberg has most recently proposed creativity as only one part of an overall system of “successful intelligence” presented as the WICS model. WICS is an acronym for wisdom, intelligence, and creativity, synthesized. Within this model creativity is considered as much a decision and attitude toward life than a matter of ability. Creative work requires the application of creative,
analytical, and practical skills that can be developed within the individual (Sternberg, 2005; Sternberg, 2006b).

The success of the WICS model relied on the earlier confluence approach, but translated and expanded the six original components into a number of elements and skills not previously addressed. Research by Sternberg (1999) suggests it requires not only skills, but proper dispositions in order for creativity to go from thought to execution. The researcher submitted that many of the elements proposed by Sternberg requires acceptance of a systems view of creativity. Elements or attributes for creative success included;

1. Problem redefinition: a willingness to define the problem in ways others do not.
2. Problem and idea analysis: is the solution the best possible.
3. Selling their solution: deciding to persuade others of the value of their idea.
4. Recognizing how knowledge can both help and hinder creative thinking: a realization of how knowledge facilitates creative thinking.
5. Willingness to take sensible risks: the realization with success there is the risk of failure.
6. Willingness to surmount obstacles: the realization that obstacles will be presented to anyone who goes against the crowd.
(7) Belief in one’s ability to accomplish the task at hand: a measure of self-efficacy required to succeed.

(8) Willingness to tolerate ambiguity: a realization that there may be periods of uncertainty.

(9) Willingness to find extrinsic rewards for things one is intrinsically motivated to do: it is preferred the environment provides a reward for something the person wants to intrinsically do anyway.

(10) Continuing to grow intellectually rather than stagnate: learning from experience and not getting stuck in a pattern.

Additionally, three important skills in creativity were identified, (1) selective encoding, (2) selective comparison, and (3) selective combination. Selective encoding involves distinguishing irrelevant from relevant information, selective comparison involves relating new knowledge to old knowledge, and selective combination requires the encoded information be combined in a novel form that is productive (Sternberg, 2007).

One concern noted by the researcher was Sternberg’s assertion that through the use of the Sternberg Triarchic Abilities Test (STAT) that a synthesis of wisdom, intelligence, and creativity (WICS) can be accurately modeled. The battery of multiple choice questions is used to determine not only creative, but analytical and practical skills. While the study
focused on the use of creativity, analytical or practical skills were not addressed and therefore noted as a limitation. Within the methods section the WICS model was presented for comparison, specifically as it related to the ten elements or attributes for creative success as listed in research conducted by Sternberg in 1999. Given a dialectic research method was used, comparisons of findings against the WICS model were able to help support, refute, or modify some of the elements presented.

For future research on creativity Richard Mayer proposes several potential directions. First, is creativity a process, a product, or something unique within the individual? Second, to what extent is creativity a personal or social phenomenon? Third, how common is creativity? Fourth, is creativity domain-general or domain-specific? And fifth, is creativity something people possess in measurable amounts or is it more abstract, manifesting itself differently between individuals (Mayer, 1999)?

In combining the work of Sternberg and the projected directions for creativity as outlined by Mayer, the researcher was able to provide insight into some of the above questions and further justify the need to explore the confluence approach relative to aspects of creativity, specifically how creativity is expressed when decisions are made in real world environments.
Naturalistic Decision-Making

A number of decision-making models are available, but Classical-Decision-Making (CDM) can be considered the logical forerunner of Naturalistic Decision-Making (NDM). The CDM model consists of four main components requiring the individual to (1) make a choice between competing alternatives, (2) focus on which alternatives are preferred, (3) utilize a pragmatic process to search for all available information, and (4) make a formal decision based on rational choice. This is quite different than NDM which contends when presented with a real world crisis, individuals often find themselves lacking the time to examine every possible alternative, which in turn prohibits the consistent use of the most pragmatic and rational choice (Lipshitz et al., 2001).

As a theoretical foundation for CDM, the four main components are consistent with the computer metaphor that gained favor during the cognitive revolution. A direct result of the metaphor was Cognitive Information Processing (CIP), which draws a number of comparisons between the way humans and computers process information. With CIP, the processing of information or data is likened to a series of inputs and outputs with the brain functioning much the same as a computer hard drive (Driscoll, 1994). This pragmatic, computer like approach resulted in most decision-making models being seen as utilitarian in nature with little regard for human limitations (Neal et al., 2006).
In contrast to CDM, the concept of Naturalistic Decision-Making (NDM) took into account certain limitations such as working memory and pattern recognition. The concept was conceived during a 1989 conference sponsored by the Army Research Institute. The conference allowed some 30 behavioral scientists to discuss issues of real-world problem solving, specifically identifying the complexities of replication of NDM concepts in a laboratory environment (Lipshitz et al., 2001). A logical conclusion as a result of the conference was the need for the military to address deficiencies in behaviorism, specifically the concept of reductionism which is a common trait of behaviorist methodology that results in phenomena being broken into component parts for study. In addition, real-world solutions as outlined in NDM were often found to involve higher-order cognitive functions (Lipshitz et al., 2006). Long before the 1989 conference, behaviorism was found ill-equipped to provide an adequate explanation for much beyond simple stimulus-response behaviors (Chomsky, 1959).

The ideas generated from the conference were later transformed into a theoretical concept in 1993 with the first volume on NDM being published by Gary Klein, Judith Orasunu, Roberta Calderwood, and Caroline Zsambok (Montgomery, Lipshitz, & Brehmer, 2005). In the original 1993 text, Decision Making in Action: Models and Methods, NDM was characterized by eight factors including:

(1) Ill-structured problems.
(2) Uncertain dynamic environments.

(3) Shifting, ill-defined, or competing goals.

(4) Action/feedback loops.

(5) Time stress.

(6) High stakes.

(7) Multiple players.

(8) Organizational goals and norms.

Since 1993 these factors have become standard descriptors when conducting NDM research (Lipshitz et al., 2001). The criteria for NDM research means studies focus on decision-making that is real-time, real-world, and have potential consequences that are meaningful to those involved.

Initial findings of NDM research reinforced the challenges presented by both behaviorism and cognitivism. A study of decisions within an organization were found to take place in the larger context of social activities as each decision did not always lead to behavior and the effects of any given decision can be other than regulation of a visible action. The study involved three interviews of 41 experienced decision makers, all in leading positions of organizations ranging from 251 to over 10,000 employees. Results showed many decisions required leaders to sell the concept to accommodate the wills, intentions, and desires both inside and outside the organization (Allwood & Hedelin, 2005).
Research on utilitarian decision-making models supported by CIP found that real-world time constraints coincide with limitations in working memory. In contrast to cognitive models of decision-making such as CDM, individuals were found to be limited in their ability to collect all information, evaluate every alternative, and therefore not all solutions are formulated based on the most rational choice available. One experiment involved 35 new recruits to the New South Wales Fire Brigades. After three weeks of manual skill training, participants were presented with tactical scenarios requiring them to decide whether a structure was safe to enter, a skill imperative to success as a fire fighter. Reaction time and confidence variables demonstrated recruits did not attempt to develop a list of solutions, but instead used general rules and examples to solve both inclusive and novel problems at better than chance rates (Neal et al., 2006).

In a search for theoretical support the field of NDM has turned to social theories of learning and methods that allow observation of phenomenon in social or natural contexts. One participant-centered study on the situational awareness of 16 anesthesiologists assisting with surgery relied on the socio-cultural theories of Vygotsky, Leontjev, and Luria. The study found through social activity anesthesiologists had determined a range of functional phases and habits of action when deciding how to treat a patient. It was social learning that won out over reviewing every alternative which was the key to success in treatment
(Norros & Klemola, 2005). As pointed out by key proponents of NDM research (Montgomery et al., 2005), “…all decisions, including those made by professionals, are made in a social context. People are never completely alone. The social perspective is especially clear when the focus is on how teams (as opposed to single individuals) make decisions, p. 5.”

Given continuing efforts to address how decisions are made in a real-world environment, NDM researchers primarily rely on field research. It is through natural constraints and affordances provided in a field setting that conditions for making decisions can be established. Researchers draw heavily on methods from anthropology, ethnography, cognitive science and discourse analysis. In one NDM study the constant comparative method developed out of grounded theory by Glasser & Strauss was used to research intuitive decision-making and shared mental models involving 22 individuals from 5 different multi-national organizations. The study found differences in dialectical reasoning, uncertainty avoidance, time orientation, hypothetical thinking, etc. The differences were attributed mainly to differences in world views between cultures and organizations (Kline, 2005).

Descriptive approaches are often used in NDM studies to examine phenomena in their natural contexts. While various experimental designs are hypothetically possible, NDM researchers have not yet reached a point where the factors making up an NDM environment can be regularly
studied in a laboratory setting (Lipshitz et al., 2001). Some NDM studies are beginning to use the ever increasing power of computer simulation, but have encountered limitations. In a study on the allocation of resources under time constraints, one NDM research team observed firefighters using a program that simulated a forest fire. Still, the simulation could not accurately replicate all factors found in a real-world NDM environment (Omodel, McLennan, Elliott, Wearing, & Clancy, 2005).

One item noted when conducting the literature review was that within NDM research most of the studies used proficient decision makers as research subjects. It was noted that there is conflict amongst researchers regarding the weight to place on the extent to which background knowledge helped participants navigate the NDM environment. In both the original model of 1989 and the one presented in Montgomery et al. (2005) the eight factors did little to promote expertise as anything more than a secondary factor. However, a review of studies indicated that researchers for the most part selected experts or individuals with a high degree of background knowledge as participants.

When it comes to problem solving there appears to be ample evidence in both NDM and problem solving literature that experts outperform novices in a given domain (Mayer, 1983; Lipshitz & Pras, 2005). However, given language precedes modern science and dichotomies such as “novice” and “expert” are derived from language, it would it can be argued that results of studies on expert performance is semantic in
nature. Researchers put into motion to prove that which by very definition is a certainty, that experts are superior to novices. This is not to lessen the value of determining how experts are superior, but to reinforce the prevalence in NDM studies to choose participants with high levels of background knowledge or expertise.

Both Pruitt et al. (1997) and Lipshitz et al. (2001) distinguished NDM in terms of the decision maker over the environment considering expertise and/or proficiency as the primary factor of success. While background knowledge has been suggested as a key factor in how an individual interprets a given situation (Reynolds et al., 1982), expertise should not be a primary factor in selection of appropriate NDM studies. An alternative was that given novices lack expertise the opposite would exist, that due to a lack of background knowledge novices might find themselves in NDM environments far more often than their expert counterparts. However, after conducting the research this alternate view was not supported. Instead, a convention environment was found to be collaborative with NDM environments involving multiple players with various levels of expertise. When a novice found them self in an NDM environment, that same environment was generally affecting more experienced others as well. Novices were never observed to be isolated and without the assistance of more experienced others.
The Service Industry: Critical Incident Research

Over the past 15 years, the Critical Incident Technique (CIT) has become a model research method used throughout the service industry (Gremier, 2004). The CIT method is considered a qualitative approach used to facilitate interviews of customers involved in significant events (Chell & Pittaway, 1998). These significant events are defined by critical incidents that make a significant contribution, either positively or negatively, to an activity (M.J. Bitner et al., 1990).

While the goal of the service industry should be to ensure no critical incidents take place, some service failures are inevitable (Tax & Brown, 1998). To resolve the inevitable failures that do take place the industry has strategies in place to appropriately respond (Hoffman, Kelley, & Rotalsky, 1995). But, while the industry has made attempts to solve problems for the customer, it was never clear what impact the customer played in solving these service failures for themselves. From 1975 to 2003 there were six seminal studies of 141 CIT studies identified, allowing for a better understanding of the cognitive, affective, and behavioral elements that contribute to the customer being part of the solution (Gremier, 2004). Key findings of the six studies included the importance of role, script, and attribution theories in a customer’s resolution of a given incident. The researcher suggests these studies do
not adequately address the role creativity may play when a critical incident is novel.

The role-theoretic approach describes people as social actors who learn behaviors appropriate for the positions they occupy in society. Any encounter is assumed to contain learned and consistent patterns of behavior. Satisfaction is therefore dependent upon the service provider and customer following scripts consistent with their perceived position (Solomon et al., 1985). If the incident is novel, the research states social actors rely on similar scripts. However, the researcher argues a novel situation should by definition be a situation where similar scripts are unavailable. This creates a gap between the current literature and the findings of this study.

The scripts the customer and service provider must follow are dependent upon background knowledge. Scripts are structures that define appropriate sequences of role behaviors based on repeated incidents of a similar nature throughout a person’s life (M.J. Bitner et al., 1990). For a successful encounter there must be to some extent a mutual understanding between the customer and the employee. Findings of CIT research indicate similarities in background, interaction frequency, script strength, number of subscripts, experience with the others role and goal compatibility all were factors in ensuring mutual understanding (Mohr & Bitner, 1991). And in addition to roles and scripts, findings of CIT studies indicate any success or failure is
influenced by attribution theory defined as the tendency for people to take credit for success and deny responsibility for failure (M.J. Bitner, Booms, & Mohr, 1994).

While CIT studies have found role, script and attribution theories to be key elements in resolving critical incidents, the influence of creativity did not appear to be addressed. In addition, the studies did not explore the systems in place to assist customers.

Similar to NDM environments, CIT studies relied heavily on background knowledge and therefore could not adequately explain what takes place when customers were presented with a novel problem. The best explanation provided in the literature was that given a critical incident where background knowledge is limited, people refer to roles and scripts that have similarities to the situation presented (M.J. Bitner et al., 1990). This once again brought into question the issue of transfer and the possibility that creativity or some other factor(s) play a role in the solution.

Based on the idea that people refer to similar roles and scripts in an unfamiliar situation, but that an unfamiliar situation should be one where background knowledge is limited, the researcher set out to determine the role creativity may play. The research questions developed were: (1) what role does creativity play in a real world (naturalistic decision-making) environment and (2) how can knowledge of creativity be applied to the service industry? The researcher believed findings of the
study could demonstrate that customers encountering novel problems do not necessarily rely on roles and scripts, but instead use creativity to navigate the situation. If adequately demonstrated, findings could be used to modify previous conceptions of how customers solve problems.
CHAPTER 3

METHODS

The methods chapter includes support for the use of the Complementary Analysis Research Matrix Application (CARMA), discusses procedures and key elements, site selection, how NDM incidents were identified, participants, and how data were analyzed.

Complementary Analysis Research Matrix Application

While historically the concept of creativity has been researched using laboratory experiments or psychometric studies (Simonton, 1999), it did not exclude qualitative approaches. One example was a study of creativity that denied establishment of causal relationships or a predictable path of development based on the concept that creativity is an evolving, non-linear process interpreted by society. The authors of the study suggested that since society interprets what is creative, things that are today considered unimaginative may several years or decades later be recognized as genius or creative, e.g. the paintings of Vincent van Gogh (Gruber & Wallace, 1999). While the purpose of the research was not to suggest such an extreme view of the creative process, it did support applied research as a method for exploring creativity that fell under the qualitative umbrella (Merriam, 1998).

Additionally, the methods used for studying decisions made in natural environments were consistent with applied research, using variations of
cognitive task analysis (CTA). With applied research the method involves three phases; observing, reflecting, and acting (Glesne, 1999). With CTA the phases are similar, involving knowledge elicitation, analysis, and representation (Crandall et al., 2006).

With the researcher attempting to determine what role creativity would have on decision-making within a dynamic system, an applied research method using a similar framework involving description followed by interpretation and ending in transformation was selected. This framework was supported by the research tool: the Complementary Analysis Research Matrix Application (CARMA). The tool was designed to help in the collection and analysis of data so results could be applied to the appropriate setting (Putney et al., 2006). The original use of CARMA was for an action research project in which a classroom teacher followed her own practice using the matrix. In that use, CARMA stood for Critical Action Research Matrix Application. Since that time, however, this research tool has been used in different types of studies that take the use beyond action research. The name since has been altered to reflect its potential use in different research designs, especially those using complementary methods, thus the term Complementary Analysis Research Matrix Application (Jezierska, 2009).

CARMA uses a three part critical praxis framework, including (1) NoteTaking, (2) NoteMaking, and (3) NoteRemaking. In the NoteTaking phase the researcher observes the situation through multiple
perspectives and describes what is taking place. The next phase, NoteMaking, involves interpretation as to why the situation exists in its current state. The last phase, NoteRemaking, is the reflection and then recommended action to modify the environment. It is NoteRemaking that is the key element of CARMA that is applied research, helping develop concepts that can transform the original setting (Wink & Putney, 2002).

The NoteMaking phase of CARMA is discussed in Chapter 4 Findings and NoteRemaking is reviewed under application of findings in Chapter 5. In the actual study, transformation took multiple forms by identifying points of leverage in systems existing within the convention industry and through recommended modification of affordances and constraints.

**Key Elements**

Given the research objectives and utilization of the CARMA method a number of key elements were put in place in an effort to ensure the validity and usefulness of findings including; site selection, research access, identification of NDM incidents, participants, and each phase of the CARMA method. A summary view of the method used is provided below:

<table>
<thead>
<tr>
<th>NoteTaking</th>
<th>Three phases:</th>
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<tbody>
<tr>
<td></td>
<td>(1) Established base expectations by interviewing CSM’s, gatekeepers of the site.</td>
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<tr>
<td></td>
<td>(2) Observed NDM incidents as they took place. Identification based on purposeful sample (CSM’s notifying the researcher) at exhibitor level.</td>
</tr>
<tr>
<td></td>
<td>(3) Researcher obtained retrospectives from a variety of participants involved in the NDM incident.</td>
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</table>
Interviews/Observations focused on the eight (8) NDM and ten (10) creative criteria as outlined in the literature review.

| NoteMaking | After 8 NDM environments were developed based on a series of NDM incidents, expectations verses evidence were analyzed to identify gaps and determine why the gaps exist. Affordances and constraints were identified/discussed with the help of participants in an effort to develop systems. |
| NoteRemaking | Recommendations were made and additional findings noted as they related to systems and the use of creativity in the service industry. |

Site Selection

While the primary focus of the research was to discover how systems influence the role of creativity in NDM environments, a second focus was to apply findings to the workforce, specifically the service industry. With this in mind, a key element of the study was the site selected for the proposed research.

The site was a large, 3.2 million square foot convention center that hosts trade shows from around the world and services over 1.7 million customers annually. The convention center operates thru the sale of convention space to individuals (the show) that want to host a tradeshow or event. The show leases space from the convention center and then resells or sub-leases the space to exhibitors. Exhibitors are companies that purchase exhibit space, floor area, or set up a booth from which they intend to sell their product to attendees. Attendees are the end users that pay a registration fee to the show in order to attend the convention.

Once the sales team at the convention center leases space to a show, there is an extensive workforce that provides a variety of services and support for the exhibitors and attendees. The services can include the
smallest of details like cleaning meeting rooms and delivering water, but may also include major services up to and including legal and/or political support. In between the small details and major services are thousands of workers that come together to make sure the show is a success.

**Research Access**

A key element of the study was the proposed level of access and subsequent involvement of the researcher when NDM incidents were identified. The researcher held a position at the site that allowed full access. To lessen the possibility of biased observation the researcher did not include any incidents that had a direct connection with his role and/or duties.

**Time Frame**

In November 2009, the researcher began the first phase of NoteTaking, interviewing eight (8) Convention Service Managers (CSM) to establish baseline expectations. CSM’s were considered gatekeepers of the research site. After the first phase, the researcher focused on time frames when NDM environments would be most likely. Feedback from the CSM’s was consistent with the proposed research, indicating observations conducted three days prior to show open and the opening day of the show would be the most productive. It was during this time frame when exhibitors were at the site, available, and were found to encounter challenges that allowed for observation. In addition, show
managers were always on site during this same time which helped in the sampling process described in the section on identification of NDM incidents. Utilizing the four day periods helped maintain consistency between issues.

Below are monthly calendars of shows at the research site during the months of December of 2009 as well as January thru March of 2010, when the second and third phases of NoteTaking took place. During these months the researcher visited the site during nine different events and collected data over the designated four day periods.
### Jan-10 (As of 1/31/10)

| N 1, N 1.1 | CBS | NAR | *** | MOC |
| N 2 | CBS | NAR | *** | MOC |
| N 3 | CBS | NAR | *** | MOC |
| N 4 | CBS | NAR | *** | MOC |
| N 213-243 | CBS | NAR | ** | MOC |
| N 245-251 | CBS | NAR | ** | MOC |
| N 252-264 | CBS | NAR | *** | MOC | MOC |
| C 1 | CBS | NAR | *** | MOC |
| C 2 | CBS | NAR | *** | MOC |
| C 3 | CBS | NAR | *** | MOC |
| C 4 | CBS | NAR | *** | MOC |
| C 5 | CBS | NAR | *** | MOC |
| C 5.1 | CBS | NAR | *** | MOC |
| N 311-120 | CBS | NAR | *** | MOC |
| N 201-230 | CBS | NAR | *** | MOC |
| S 1 | CBS | NAR | *** | MOC |
| S 2 | CBS | NAR | *** | MOC |
| S 3 | CBS | NAR | *** | MOC |
| S 4 | CBS | NAR | *** | MOC |
| S219-223 (SL) | CBS | NAR | *** | MOC |
| S101-110 (SL) | CBS | NAR | *** | MOC |
| S202-238 (SL) | CBS | NAR | *** | MOC |
| S201-210 (SL) | CBS | NAR | *** | MOC |
| SILVER LOTS | CBS | MOC | MOC |
| GOLD LOTS | CBS | *** | MOC |
| GREEN LOTS | - | - | - |
| BROWN LOTS | - | - | - |
| ORANGE LOTS | - | - | - |

### Feb-10 (As of 2/28/10)

| N 1, N 1.1 | WOC | **** | *** | MAG |
| N 2 | WOC | **** | *** | MAG |
| N 3 | WOC | **** | *** | MAG |
| N 4 | WOC | **** | *** | MAG |
| N 213-243 | WOC | *** | *** | MAG |
| N 245-251 | WOC | *** | *** | MAG |
| N 252-264 | WOC | *** | *** | MAG |
| C 1 | WOC | *** | *** | MAG |
| C 2 | WOC | *** | *** | MAG |
| C 3 | WOC | *** | *** | MAG |
| C 4 | WOC | *** | *** | MAG |
| C 5 | WOC | *** | *** | MAG |
| C 5.1 | WOC | *** | *** | MAG |
| N 311-120 | WOC | *** | *** | MAG |
| N 201-230 | WOC | *** | *** | MAG |
| S 1 | WOC | *** | *** | MAG |
| S 2 | WOC | *** | *** | MAG |
| S 3 | WOC | *** | *** | MAG |
| S 4 | WOC | *** | *** | MAG |
| S219-223 (SL) | WOC | *** | *** | MAG |
| S101-110 (SL) | WOC | *** | *** | MAG |
| S202-238 (SL) | WOC | *** | *** | MAG |
| S201-210 (SL) | WOC | *** | *** | MAG |
| SILVER LOTS | WOC | MOC | MOC |
| GOLD LOTS | WOC | *** | MOC |
| GREEN LOTS | - | - | - |
| BROWN LOTS | - | - | - |
| ORANGE LOTS | - | - | - |
Identification of NDM Incidents

The selected research site provided ample NDM incidents. Given a large convention or event any number of incidents or problems developed, but any given incident was not considered critical or met NDM criteria. One example of an incident that did not meet the research criteria was a contractor that needed to provide an area to charge electric carts. A CSM notified the researcher of the issue. For the contractor and CSM the issue was high stakes, there were multiple players, organizational goals and norms, time stress, etc., but the incident did not impact exhibitors which was of primary importance in selecting incidents appropriate for the study.

One benefit of the study conducted was that it was in a real world environment. With the majority of previous NDM studies the...
environment was either artificially created or limited in scope, for instance a study conducted using a computer simulation to test fire brigade commanders. These commanders had years of experience and expertise that helped them navigate the artificial environment (Omodel et al., 2005). An example limited in scope was the study previously discussed that was limited to 16 professional anesthesiologists (Norros & Klemola, 2005). In support of the study, the researcher argued that the artificial creation and/or identification of NDM environments most likely reinforces background knowledge as a primary factor as by design, proficient decision makers with extensive background knowledge are most often the participants of the studies. While not specific to the impact of study designs on findings, several NDM studies have noted limitations of artificial environments (Lipshitz et al., 2001; Lipshitz et al., 2006).

To avoid artificial creation of NDM scenarios the selection of incidents was based on the researcher spending time as outlined above with convention services managers (CSM’s) and exhibitors. As part of Notetaking a baseline of expectations was obtained from the CSM’s. The researcher interviewed the CSM’s and then observed them during three day periods prior to show open. The researcher asked CSM’s to be aware of exhibitors faced with challenges that were outside of their baseline expectations and inform the researcher of those events. From events identified, purposeful sampling was used based on cases that met NDM
criteria. This form of sampling fits with extreme or deviant cases, defined as those cases that are unusual or can be considered a crisis, novel, or notably different from the norm (Patton, 1990). This was also consistent with previous research in the service industry on critical incidents involving cases chosen for their significant contribution or being a significant event either positively or negatively (M.J. Bitner et al., 1990).

While looking at an overall incident from a systems perspective the base unit of analysis was the exhibitor. This ensured the sampling of incidents as identified by CSM’s was comparable across time frames and level of intensity. By focusing on the exhibitor as the key element, the systems identified were built around the exhibitor. An additional consideration for selecting the exhibitor as the base unit was the focus of the proposed research being on individuals with less background knowledge or expertise. Based on a discussion with Kathy, a show manager for a large convention, the novice exhibitor was defined as any exhibitor in their first or second year. Kathy estimated that for 20-30% of all exhibitors it was their first time. Later she determined out of a total of 1738 exhibitors that attended her show, for 461 exhibitors (26.5%) it was their first year and for 196 exhibitors (5.5%) it was their second year.

After an incident was identified by a CSM, observation and then contact was made with the exhibitors as well as any other potential participants identified as being involved with resolution of the incident. In each case the incident expanded as various data were gathered
including, but not limited to observations, interviews, informal discussions, and various artifacts such as post-show reports, show manager surveys, emails, and other documents.

The researcher continued to observe incidents and gather data to adequately describe eight (8), NDM environments from inception through resolution. A short summary of each environment is provided below:

**NDM Environments**

(1) Union Pickets: During multiple shows a carpenters union picketed in protest of non-union labor being used to set up exhibits. Based on legal implications of lease agreements the show managers had the right to restrict or allow individual companies to work on their event. In some cases the show decided that non-union labor would not be allowed. This created an NDM environment as exhibitors using non-union labor had to navigate the challenge of finding new labor to set up or take down their exhibit.

(2) Flooded Exhibits: During two events severe water damage was done to a number of exhibits. In the first case rain caused drains to back up resulting in water soaking eight exhibits. In the second case a worker was driving a cart at 1:30 a.m. when he struck a door frame and then a water pipe. The resulting leak from the pipe resulted in thousands of gallons of water flooding an area of approximately 20,000 sq. feet. At 9:00 a.m. the show was
scheduled to open. This created an NDM environment for multiple exhibits in the affected area.

(3) Location: Across all events observed were multiple NDM incidents based on exhibitor location. A big concern for most exhibitors appeared to center around what they perceived to be a prime location for driving sales to their booth. Some wanted to be next to major exhibitors called “anchor” booths, e.g. Ford or Chevy at a car show. Other exhibitors felt being on a main aisle where there is a lot of foot traffic or being away from their direct competition was of primary importance. In one case, not only the location, but the shape of the space was critical due to a pre-built exhibit that cost $80,000. The exhibitor was adamant that any location that required the exhibit to be modified was not acceptable. Regardless of preference, exhibitors used various methods to position themselves in an area where they felt they could make the most sales and minimize any negative impacts of the environment.

(4) Freight: A challenge in both getting an exhibit set up or taken down was the ability of exhibitors to get their freight and product on and off the show floor. Many exhibitors experienced NDM environments when their freight was delayed, misplaced, damaged, or in some cases lost or stolen. Another issue was with rules on
how freight could be transported. Exhibitors responded in a number of ways from using different packaging, to modification of their exhibits both in location and size, to straight violation of the rules. In one case an issue with freight resulted in a letter being written to the President/CEO of the convention center, expressing their disgust with the lack of accountability by those that manage freight.

(5) Rule Changes/Interpretation: In some cases, exhibitors that had been coming to the research site for many years found themselves faced with changes in rules based on new regulations or interpretations. One case that was identified as an NDM incident involved several exhibitors that wanted to build two story homes on a parking lot for a trade show that catered to that product line. The exhibitors felt like they had done everything they could to comply with the rules, but then ended up making modifications to the homes to satisfy new requirements. The exhibitors were frustrated as they navigated the environment and eventually spent thousands of dollars to modify the homes they built.

(6) Halogen Lights: With every event issues surfaced regarding the prohibited use of halogen lights. The lights burn very hot and have been known to burst sending shards of hot glass in various
directions. During one observation period a small fire started when an exhibitor that was told not to use the light disconnected the lamp and placed it in a cabinet while the bulb was still hot. From individual exhibitors to show managers the use of halogen lights developed into multiple NDM incidents. In one case two exhibitors that were in close proximity to each other were faced with the situation of not using the halogen lights. In another case, an oversight by a contractor resulted in an entire show facing a situation where approximately 25 exhibitors were using the illegal lights.

(7) Building Damage: Several instances took place resulting in building damage. The damage had various implications from having to relocate exhibits or routes of travel, to intentional damage to ensure functionality of an exhibit. In one case a massive piece of machinery was anchored to the floor by drilling into the concrete. In another case an entrance way was damaged in one show making it unusable for the incoming show. This created NDM environments for various exhibitors, workers, and show management. Whether intentional or an accident, it was evident that damage created a series of actions on the part of multiple players in the environment.
(8) Meeting Rooms: A few NDM environments were located as exhibitors encountered challenges when hosting a meeting. Inevitably, technology would fail, the room would not be set correctly, food had not been delivered, or in the case of one incident the key note speaker failed to arrive.

Participants

Individuals and companies from all over the world traveled to the site to put on a show, exhibit their products, and see what was new in their industry or field. A wide variety of individuals from skilled professionals to tradeshow amateurs came together to produce and attend these events, providing a unique blend of participants.

Throughout the duration of each observed event the researcher looked to identify NDM incidents as outlined in the previous section. Participants were those individuals that comprised the broader social context surrounding an NDM incident. A study in a school might for example involve students, teachers, administrators and parents as participants. In a convention environment, CSM’s, show managers, exhibitors, attendees, and workers were identified as participants.

Procedures

The researcher began the study by recording interviews with 8 Convention Services Managers (CSM) to establish baseline expectations
related to naturalistic decision-making (NDM) factors. After the initial interviews the researcher's primary tools for data collection were field notes taken during observation of incidents, informal one-on-one interviews, and artifacts such as emails or show reports. In some cases recorded interviews were also collected after an incident. In each instance the researcher intentionally focused on the identification of potential creative factors involved.

After nine shows had been observed, four days per show, the researcher was able to identify eight unique NDM environments. From the data the researcher created a matrix of 38 incidents (Exhibit 1) identifying the show, NDM environment, participants, data sources, key feature of the incident, and creative factors attributed to resolution.

**Interviews**

The researcher began by interviewing 8 Convention Services Managers (CSM) to establish baseline expectations related to NDM factors in accordance with phase on of NoteTaking in the CARMA model. The interviews took place one month prior to field observations. Each interview was recorded and then transcribed. Each CSM was asked the same line of questions:

1. Can you describe an incident that in your opinion was critical?
2. To what extent did you find the problem or incident to be ill-structured?
3. To what extent were you certain about how the situation would play out? Was there a degree of uncertainty?

4. Do you think there were competing or shifting goals?

5. What types of feedback took place from the show managers, contractors, or exhibitors?

6. To what extent was time a factor?

7. To what extent was the issue high stakes?

8. What all players were involved?

9. Can you describe the extent to which building rules, policies, or organizational goals and norms were involved?

10. Is there anything else you would like to add?

At the end of each interview the CSM was informed that the researcher would be on site during the next nine shows and would be looking to observe any critical incidents that may take place during the three day period preceding the show open and the first day of the show. The researcher asked each CSM to inform the researcher of any incidents of which they were made aware and that the researcher would be contacting them during the observation periods for informal interviews. These informal interviews were consistent with phase 2 of CARMA which makes visible what actually happened at the research site.
Field Notes

After initial interviews the researcher visited the research site and shadowed the CSM’s during show setup and the first day of the show. When the researcher was informed of a potential incident, the researcher observed what was taking place and took notes. Actions or statements by participants were recorded and later reviewed to see if factors of creativity during the incident could be extracted from the data related to that incident.

Field notes were coded to indicate elements of creativity established by the literature review. For example, statements such as, “It is what it is”, were considered an indication that no more could be done to meet the expectations of that individual, demonstrating a belief by the individual that no more could be accomplished, thus an indication of lowering of self-efficacy, which is an element of creativity. Likewise, exhibitors that presented a case to show management in an effort to offer potential solutions were noted as attempting to be creative by selling their solution. When exhibitors were heard to reference rules from other destinations or if they conceded they were unfamiliar with the current show rules the researcher noted the creative factor of recognizing knowledge limitations. If it was determined the exhibitor had knowingly violated a rule the researcher considered it a demonstration the exhibitor had creatively been willing to take a sensible risk. This same form of coding done with field notes was then accomplished with informal
interviews as a form of data triangulation (Denzin, 1989) as a way to validate results.

**Informal Interviews**

Another tool for data collection was informal one-on-one interviews conducted with various participants. The interviews were typically conducted a few days after an incident, based on those willing to discuss the issue with the researcher. Participants in informal interviews included CSM’s, exhibitors, show managers, contractors, and convention center staff, depending on their availability and willingness to discuss the incident.

During informal interviews the researcher first asked the participant for their version of events. As with field notes the researcher looked to actively extract elements of creativity used by the participant. The interviews were open with no pre-determined questions. After the participant recalled the incident, the researcher followed up with additional questions focused on clarifying NDM and creative factors.

In some cases informal interviews allowed the researcher to clarify interpretations made from coding field notes. The researcher was able to address issues such as if the participant felt they had lowered their expectations (self-efficacy), if they believed the solution was the best possible (problem and idea analysis), or if they felt they had learned from the experience (continued intellectual growth). Statements such as, “I’m always learning”, were noted as demonstrating continued intellectual
growth. Along with field notes and informal interview data the researcher examined various artifacts that were related to specific incidents.

**Artifacts**

In a few instances the researcher collected and reviewed artifacts to help gain a better understanding of the environment. Items such as show reports or logs, emails, show information, or pictures were collected. These items were used to support descriptions of what had taken place during a given incident and as another form of data triangulation. For instance, a post show report from one CSM noted:

An exhibitor (Lift Master) hired 300 Exhibits to set their booth. In turn 300 Exhibits sub contracted the service to Nationwide. 300 Exhibits has a contract with the teamsters while Nationwide has a contract with the carpenters. In protest of the carpenters working, the teamsters decided to utilize the first amendment areas and do an informational picket. There was a similar situation during CES – CES opted to remove 300 Exhibits from the floor whereas NAHB let them continue to work. During move-out, Lift Master decided to fire 300 Exhibits and hire another authorized company to tear down. The picket was only held the first three days of the show and there were no incidents.

A shift report from convention center staff stated, “Rain caused some problems during the evening with water leaks and back up drains. Misc.
Report completed on seven Booths that were damaged due to drainage problems in Central Hall 1. CSM notified.”

Taken together the filed notes, informal interviews, and artifact analysis created a way for the researcher to verify patterns across the data.

Analysis

As noted previously, the first step using the CARMA method was to collect data use NoteTaking. The process of NoteTaking involves the researcher observing a situation from multiple perspectives and determining what is expected to take place in the setting and what is evident. A potential limitation of the study was that by definition NDM environments are to some extent exploration into the unexpected. For this reason the researcher established a three-phased approach to NoteTaking. The first phase established the baseline expectations of the CSM’s through formal interview (Exhibit 2); the second phase involved observation and collection of data to determine what was evident as individual NDM environments developed and is referred to in Chapter 4; the last phase was a retrospective look at expectations as they related to resolution of the incident. The last phase was a similar approach to CIT methods used in the service industry, and resulted in construction of a system as explained in Chapter 4.
During the first phase of NoteTaking elements of creativity were not addressed in the interviews to avoid individuals drawing their own conclusions about what elements of creativity are evident against what was expected in later phases of the study. This alleviated concern that some participants might inaccurately portray the frequency or severity of NDM environments they typically encountered and might also attempt to utilize elements of creativity if they were asked to explain their expectation of creative elements in the first phase of NoteTaking. Also, attempting to discuss systems with participants was avoided in an effort to maintain focus on defining the gap between reality and expectations, (i.e. the disequilibrium within the system.)

The information gathered in each phase of NoteMaking was analyzed by going through interviews and written notes in an effort to identify items that best represented the expectations of participants against what was evident (Exhibit 3). By focusing questions and observations on NDM and creative factors, the researcher was able to establish gaps between expectations and what was evident.

An example uses the NDM factor of uncertain dynamic environments. When asked during an interview to describe to what extent uncertainty was expected one participant stated:

With MAGIC and the EAC (exhibitor appointed contractor) stuff we don’t know how upset the exhibitors will be and it will be an
emotional issue. You’re not talking only about costs but expertise that their employees may have that must be diverted to teamster labor. And they pay them twice as much. So, the emotional aspect of what these people are going to experience is an uncertainty.

There is always something that we haven’t seen. There are always one or two things you did not anticipate. That’s what makes it interesting. To be very honest with you, that’s what I enjoy.

The full interview of the above participant is available in Appendix 1, Exhibit 2.

Another participant when asked about uncertainty in the environment stated:

Correct, correct. You hit the nail on the head. Even if you walked in on the same situation before there is still a high level of uncertainty. Even though it may sound familiar there are always different variables that a different situation requires a different solution, even if it’s the same and even if it sounds like the same thing it ends up being totally different. If you have the same situation you are dealing with a different exhibitor, a different contractor, which creates a different dynamic. That person may not react the same way as the last person.
When the MAGIC event took place the researcher observed teamsters picketing. A physical altercation occurred on the show floor, and show management eventually informed all exhibitors using non-union labor were eventually informed by show management that union labor would be required. Each exhibitor who faced having to hire teamster labor responded differently, ranging from trying to hire contractors as full-time employees to circumventing the hours available to set up their exhibit the responses varied.

Based on the observations of the researcher against the expectations of those interviewed there did not appear to be a gap when it came to the factor of uncertain dynamic environments. From CSM’s to show managers to exhibitors there was an expectation that in a convention environment there is a level of uncertainty.

An example of a factor where the analysis showed a gap between expectations and what was evident was when it came to competing goals. Some exhibitors had the expectation that as the customer the convention industry was there to work together to support their needs and make sure they had a good experience. When asked about competing goals, one exhibitor stated:

It is amazing to me how they get these shows up and running. It is like a ballet. Just a few hours before the show opens and they don’t have the carpet down. I’m sure there are a few things going
on behind the scenes, but everyone has the same goal, to get the
customer up and running so we can make sales.

An interview with a CSM added support to the perception that there is
a minimum of competing goals stating:

I really don’t think they have challenges with show management
because they’re use to their rules and regulations. It is the venue
where there are some additional rules and regulations that other
venues might not have. Exhibitors competing with one
another…the only time you really see them competing with one
another is if their product lines are very similar.

While the expectation was that competing goals would not be much of
a factor, the researcher observed across multiple NDM environments that
competing goals were evident between exhibitors, the building,
contractors, show management, and other exhibitors. For example, in
one case an exhibitor violated a building policy by drilling holes into a
concrete floor to anchor his woodworking machine. In another example
an exhibitor was accused of stealing the design of a nozzle used in a
whirlpool. Competing goals were evident in each NDM incident. In the
analysis this identified difference created a gap between stated
expectations and what was evident.
The analysis also included information established retrospectively to determine how creative factors such as selling a solution or a willingness to take a sensible risk were used in lessening the gap between what was expected and what was evident. The researcher talked with a number of participants about their actions after having navigated an NDM environment. In the case of exhibitor that drilled a hole in the concrete floor he showed a willingness take a sensible risk when he stated:

Well actually I hoped I wouldn’t get caught. Not that I mind paying to repair the floor, just I was afraid they would make me shut down the machine. If the machine isn’t running I might as well pack up and go home. And when I get home, I might as well start looking for another job.

With all of the data, the researcher sorted through and placed observations and statements that best defined what was expected against what was evident as it related to each predetermined NDM or creative factor. In some cases data fit multiple criteria. A sample of the data is available in supplemental data (Exhibit 3).
CHAPTER 4

FINDINGS

The analysis provided in NoteTaking was combined with a systems perspective resulting in the discovery of a “convention system. Based on the system the researcher found that when resolving an NDM incident, environmental factors play a larger role in the use of creativity than background knowledge of the specific problem. Factors within the environment such as the presence of time stress, organizational goals and norms, or if the environment was uncertain either provided support for, or constrained creativity.

Second, the researcher found creativity is used to navigate the system in a similar manner by both experienced others and novices, but there are slight differences between the two groups. Both novices and more experienced others take creative actions to reduce creative tension as they try to close the gap between their expectations and what is evident in the system. The researcher attributes this finding more to an exhibitor’s general knowledge of the convention industry or system than specific background knowledge of a problem.

In support of the above two findings the researcher first presents the “why” based on NoteMaking and then presents the “convention system”. Example cases are used to demonstrate how the system functions and how the system was derived from the data. Behavior over time (BOT) is then presented as part of the convention system, demonstrating how the
system influences behavior. Differences between novice exhibitors and more experienced others are also discussed in support of the second finding and last, the researcher provides additional support drawn from previous literature on creativity and decision-making.

NoteMaking

After what was expected was established in the first phase of NoteTaking via formal interviews the researcher conducted observations in the field, conducted informal one-on-one interviews and collected artifacts to triangulate data and determine what was evident in the environment. Using the naturalistic decision-making (NDM) factors outlined in the literature review a total of 8 distinct NDM environments were identified. Then, using the 10 creative factors from the literature review the researcher was able to cross reference the most salient creative factors evident within each NDM environment (Exhibit 4).

Each event individually demonstrates that when resolving a single incident a few factors of creativity are used. In an incident involving freight and then another involving a change in rules only 2 creative factors were noted. However, when looking across all 9 shows, the table effectively demonstrates that creativity plays a key role in solving problems in a naturalistic decision-making environment. A minimum of 5 creative factors were evident in each environment and three; freight, rule changes, and meeting rooms demonstrated evidence of 9 creative
factors. For union pickets and flooded booths, the researcher suggests that each only had two incidents possibly limiting the range of observed creative factors over more common NDM environments such as freight or halogen lamps. Across all NDM environments the tenth creative factor of receiving extrinsic rewards for what one is intrinsically motivated to do was not observed.

In addition to demonstrating the extent to which creativity plays a role in NDM environments, the researcher was able to then establish relationships between creative factors and the NDM environments in an effort to draw reasonable conclusions as to why the conditions observed existed in a particular state. The “why” of NoteMaking aided in the identification of system components, such as the existence of creative actions being used to modify NDM environments or evidence those creative factors played a role in how expectations were modified.

Exhibit 5 displays an example of the analytic method using data from all 3 parts of the CARMA model. In this table the first column represents NDM and creative factors made visible in the interviews. One example from the analysis was a gap found to exist between the expectations of exhibitors and what was evident regarding competing goals. Exhibitors saw the convention system as a cooperative system established for the purpose of providing great customer service. The contractors also saw their responsibility to the client to provide great customer service.

However, it was evident through the observation of union strikes, delays
in freight delivery, and building rules and regulations that competing
goals were common. The researcher draws a reasonable conclusion that
this condition most likely exists because the exhibitor is only at the
facility for a single event over a period of a few days to a week. The
individual exhibitor does not perceive many of the underlying issues or
battles that take place over several years and multiple events. Using
what was found regarding competing goals the researcher is able to
demonstrate later in the findings a systemic relationship between goals
and pressures of an NDM environment.

Another finding was related to the concept of time stress. While there
was no gap between what was expected and what was evident, the
researcher was able to conclude that time stress is a factor of the system
centered on when the show opens. Based on the analysis of data in
NoteTaking, it was found that the opening of the show was the critical
moment in time for exhibitors, transitioning from setting up their booth
to making sales.

An example of a finding related to a creative factor was a willingness
to take a sensible risk. No gap was found between what was evident and
what was expected. It was evident that as it became closer to show open
exhibitors were more willing to take a risk in order to maintain their
expectations. One CSM stated:
They wouldn’t do it in their house and they wouldn’t do it with their money, but they’ll go in your house with the company’s money and basically state whatever damage is done is the cost of doing business. I think they’ve made that decision it truly is a risk and they just want to try to see if they get caught and who’s going to catch me?

Across all observations the researcher found exhibitors were willing to take sensible risks, because time stress placed pressure on the exhibitors to reduce their expectations. Instead of reducing expectations, exhibitors took actions such as taking a sensible risk in an attempt to modify the environment. These actions became another component of the convention system.

From the concepts, the “whys” identified in NoteTaking (Exhibit 5), the researcher was able to construct a system that demonstrates what takes place in a convention environment.

The Convention System

In each of the eight identified NDM environments, a system consistent with the eroding goals archetype (Figure 4) was found. This archetype demonstrates a system where there are pressures to adjust goals to meet existing conditions. At the same time, actions are taken to change
conditions to meet goals. The system found was termed the “convention system”.

Within the convention system it was found through NoteTaking that critical incidents result in a gap between an exhibitor’s expectations and what is found to be evident in the NDM environment. The system attempts to reduce the gap through the interaction of two balancing loops. One loop places pressure on the exhibitor to adjust their expectations, while the other loop consists of actions taken by the exhibitor in an attempt to modify the NDM environment. In the convention system it is the environment that creates the conditions for creativity to play a role in an effort to restore balance to the system.

Figure 4

(Senge, 2006)
Establishing the relationships between the key concepts in the system; expectations, pressures to adjust expectations, NDM environment, and actions to improve NDM environment, were based on relationships found between NDM factors and creative factors. During observations and discussions with exhibitors the researcher looked for creative **actions** taken to modify the environment or results that indicated expectations had been **adjusted**.

<table>
<thead>
<tr>
<th>NDM Factors</th>
<th>Creative Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ill-structured problems</td>
<td>Problem redefinition (adjust)</td>
</tr>
<tr>
<td>Uncertain dynamic environments</td>
<td>Problem and idea analysis (action)</td>
</tr>
<tr>
<td>Shifting, ill-defined or competing goals</td>
<td>Selling the solution (action)</td>
</tr>
<tr>
<td>Action/feedback loops</td>
<td>Recognizing knowledge limitations (adjust)</td>
</tr>
<tr>
<td>Time stress</td>
<td>Willingness to take sensible risks (action)</td>
</tr>
<tr>
<td>High stakes</td>
<td>Willingness to surmount obstacles (action)</td>
</tr>
<tr>
<td>Multiple players</td>
<td>Belief in ones ability: self-efficacy (adjust)</td>
</tr>
<tr>
<td>Organizational goals and norms</td>
<td>Willingness to tolerate ambiguity (adjust)</td>
</tr>
<tr>
<td></td>
<td>Continued intellectual growth (action)</td>
</tr>
<tr>
<td></td>
<td>Extrinsic rewards for intrinsic motivation (n/a)</td>
</tr>
</tbody>
</table>

**Example – Union Picket**

During one event a carpenters union threatened to picket if the show allowed the use of non-union labor to help set up exhibit booths. Out of several hundred exhibitors, eighteen were found to not already be contracted with union labor. With the legal right to enforce which companies were allowed to enter the leased area, it was up to management of the show to decide if they wanted to require all exhibitors to be restricted to using only union employees. This created an NDM environment for those eighteen exhibitors who over the last year had been working with a wide range of companies to design their booth.
The situation, **NDM environment**, was uncertain for exhibitors, it was high-stakes, time stress was involved, and there were multiple players as well as competing goals. The researcher was able to discuss **expectations** with several of the eighteen exhibitors. If a strike took place, each exhibitor planned to maintain current relationships and contracts already established with companies ready to build their booth. Each exhibitor expected their booth to be built and ready for show open.

When the union did begin to picket the show decided within the day the potential impacts of negative media were not worth the costs associated with requiring union labor. The show informed the exhibitors they would help them find new labor through the general contractor. This created a **gap** between established expectations and the NDM environment. There was **pressure to adjust expectations**, as the exhibitors tried to maintain the contracts with companies.

Exhibitors took **actions to improve the NDM environment**, like going to show management with the idea of using language in the lease (selling the solution) to hire the contracted company as full-time employees for the duration of the event, or in the case of an experienced exhibitor, bringing a crew in during the middle of the night when the union was not on site (taking a sensible risk) to set up the booth. A new exhibitor frustrated with the situation threatened legal action against the show (surmounting the obstacle), but when this did nothing to change
the environment he lowered his expectations (problem redefinition and recognizing knowledge limitations).

Regardless of experience, the environment influenced the role creativity played in reducing the gap and bringing resolution or balance back to the system. In the case if the more experienced exhibitor, self-efficacy was maintained and by taking a risk during the middle of the night he was able to get his booth set up using the labor he had originally signed. In the other case the exhibitor tried to take action, but was not willing to tolerate the ambiguity of the environment. In the end his expectations were adjusted with the general contractor providing union labor to get the booth up before show open.

Example – Freight

During multiple events a number of NDM incidents took place regarding the delivery, packaging, and handling of freight as it moved on and off the show floor. In one case the exhibitor approached the general contractor because his freight had not yet arrived. With only a few days before the show it was determined the freight was stuck in Canada awaiting approval from customs to go across the border into the United States. This was an NDM environment that was high stakes, had time stress, involved multiple players, and had a high level of uncertainty. The environment created a gap between the expectations of the exhibitor and what was evident in the environment.
Panicked, the exhibitor took a variety of actions to modify the NDM environment. First, the exhibitor tried to use the contractor to contact customs to speed up the approval process (surmount the obstacle). When it was apparent there was no guarantee his freight would arrive on time there was pressure to adjust expectations. The exhibitor began contacting other offices in the United States to get similar product shipped over night and looked to the general contractor to provide a pre-fabricated booth as a back-up (problem and idea analysis). Half of the freight from Canada arrived the day before the show opened. With a mix of what was shipped over night and what had arrived from Canada the exhibitor put together an exhibit to sell his product and have a successful show (problem redefinition).

As with the first example of union pickets, the environment was a key factor in the exhibitor using creativity. The convention system required the exhibitor navigate the environment to reduce the gap by taking actions to modify the environment as well as adjusting his expectations.

Behavior Over Time

Regardless if it was a union picket, issues related to freight, or any of the other identified NDM environments, behavior over time (BOT) influenced the system. For instance, with NDM factors an interesting BOT was related to action/feedback loops. The further away from show open the less feedback took place. Over time if an issue was not resolved
the frequency of action followed by feedback appeared to increase (Figure 5). In addition, if an issue was not resolved there appeared to be an increase in the number of players that became involved, both in number and authority.

The most common BOT identified was related to time stress. As the show open drew near the amount of stress increased. Exhibitors appeared to maintain their expectations and develop solutions based on what they felt could be accomplished in time for show open. The need to resolve an issue prior to show open was consistent across nearly all NDM environments and given solutions were developed with this criterion in mind, stress appeared to drop immediately after show open.
Not all factors were observed increasing over time. When an issue was considered high stakes, the stakes did not appear to increase or decrease and even after resolution exhibitors still considered the issue to have been high stakes. When dealing with uncertainty or ill-structured problems it appeared the closer to show open the less uncertain an issue became. The researcher proposes this finding may have been a result of less options being available as show open drew closer. At some point an exhibitor had to choose an option that met or minimized the need to adjust their expectations. Once the show opened certainty was established.

Behavior related to creative factors also changed over time. Again, the critical factor of show open appeared to be a major point in time which influenced how exhibitors behaved. For instance, a willingness to take a sensible risk increased the closer to show open while self-efficacy and a willingness to tolerate ambiguity appeared to go lower over time (Figure 6). An example of being willing to tolerate ambiguity being reduced involves the exhibitor dealing with union pickets. As show open drew closer he expressed frustration that show managers would not make up their minds and how his exhibit would never be up in time if show management did not make up their minds and stop “waffling”.

Combining BOT of NDM and creative factors, the overall convention system can be demonstrated (Figure 7). Expectations started at a set
point (high) and when an NDM incident takes place actions to modify the environment are also high, i.e. actions are being taken in an effort to modify the environment while maintaining expectations.
On the low end is a delay between actions taken and the modification of the environment and time stress is low so pressure to modify expectations is low. As it comes closer to show open, the pressure to modify expectations increases and as solutions are implemented the environment is modified. On the high end, expectations begin to lower and actions are reduced as no more can be done in the time available to modify the environment. The end result is an effort to reduce the gap by finding a balance between an adjustment of expectations and modifications that take place in the environment.

Novices and More Experienced Others

While both novices and more experienced others were found to use creativity in dealing with NDM incidents, the way each used certain factors differed (Exhibit 5). In turn, these differences impacted the way each interacted with the convention system.

For instance, both novices and more experienced others recognized their knowledge limitations (a creative factor), but novices appeared to recognize this limitation earlier in an incident while more experienced others initially reflected on their past experiences to review options. The time used reviewing options and making comparisons to the rules and regulations of other convention destinations, previous events, etc. appeared to detract from more experienced others understanding their knowledge limitations. Without this previous knowledge, novices
appeared to more explore creative factors sooner for solutions, but the end result within the system was the same.

Two exhibitors (one novice and one more experienced) in close proximity of one another were both using illegal halogen lamps. When informed the lights could not be used, the more experienced exhibitor immediately began referencing other destinations and how many years he had been exhibiting throughout the United States. During this same time the novice in the nearby booth admitted his knowledge limitation (a creative factor) and began the process of problem and idea analysis (another creative factor). He asked the CSM what options were available.

Similar to knowledge limitations, novices seemed more willing to tolerate ambiguity than more experienced others. Novices had little experience with the system so while they relied on their pre-conceived notions of what a convention should be like, they also were more willing to adjust over more experienced others that continuously referenced past events and competing destinations. When it came to self-efficacy and selling a solution, novices did not appear to be as confident or willing to suggest solutions. Instead, novices appeared to rely more heavily on multiple players and more experienced others to determine a course of action and then they would follow suit.

Looking at the differences between novices and more experienced others, the researcher found more experienced others were less likely to lower their expectations or allow their goals to erode. This is attributed to
the more experienced others knowledge of the convention system which during an NDM incident helps lessen the level of uncertainty and may provide support for higher self-efficacy than the novice. One experienced exhibitor stated:

New exhibitors don’t realize they can complain. They are afraid to fight an invoice and are afraid if they say anything their freight will end up in Alaska. I have been exhibiting 19 years, started when women were rare in the industry. I have seen every trick in the book. Rookies don’t know that drayage and freight mean the same thing, so it is hard for them to realize when they are getting shafted.

In summary, while there were differences between novices and more experienced others, the supposition that novices would rely on creativity to a greater extent than more experienced others was not supported. Instead it was evident both novices and more experienced others navigate the same system of eroding goals and both use the same factors of creativity.

Additional Support

While creativity does appear to play a role during NDM incidents, a convention environment cannot be considered fully supportive. It is not supportive in that conventions have a very real time constraint centered
on when a show opens. This constraint decreases certain factors of creativity, such as self-efficacy or a willingness to tolerate ambiguity. However, this same constraint appears to also be an affordance of the environment as it promotes other factors of creativity, such as selling a solution or willingness to take a sensible risk. This is consistent with the conclusion by Sternberg (2006), that environments must provide support for creativity to flourish and that few environments are fully supportive, most consisting of a lesser or greater number of obstacles that restrict creativity.

Second, experience or background knowledge appears to be defined more by exposure to the system, not exposure to a specific problem. The original hypothesis that a person’s lack of background knowledge, (i.e. a novice) would need to be more creativity in novel situations was not supported. Instead, it was evident creativity was used by both novices and more experienced others, but the role creativity played differed based upon the extent the exhibitor had knowledge of the convention system. For instance, a novice exhibitor unfamiliar with how freight was delivered recognized their knowledge limitations (a creative factor), while the more experienced other may not. This finding is supported by Kahneman & Klein (2009), that effective problem solving is dependent upon, “The individual’s opportunity to learn the regularities of the environment”. While both the novice and more experienced other may have never dealt with a novel problem, e.g. a water pipe breaking and flooding their
exhibits, the more experienced other was familiar with the regularities of the environment, i.e. they knew the convention system.
CHAPTER 5
DISCUSSION

In addition to answering the primary question of what role creativity plays in real world decision-making, the research findings bring forth a number of issues for discussion. First, the research was designed using the CARMA method so as to apply findings to the service industry. With this in mind NoteRemaking (Exhibit 6) is discussed in regards to modification or maintaining what was evident in the environment to meet expectations as well as recommendations on how to utilize the leverage available within the convention system. Second, the research adds to the existing body of literature on systems theory, social perspectives, creativity, naturalistic decision-making, and the service industry. Third, limitations of the study are discussed and last, future areas of research are proposed.

Application of Findings

The primary purpose for exploring the role of creativity in natural decision-making environments using the CARMA method was to apply findings to the service industry, specifically a convention environment. Using NoteRemaking the researcher initially made recommendations to modify or maintain based on the individual factors in the environment (Exhibit 6). Recommendations to modify any of the individual factors consisted of better communication and education of exhibitors.
The suggested modifications of NoteRemaking were then integrated into two recommendations to gain leverage within the convention system. The recommendations are based on (1) the need for exhibitors to maintain expectations when pressure from the system occurs and (2) service industry research on customer expectations.

According to Senge (2006), the point of leverage in the eroding goals archetype is to maintain goals. Actions are taken to modify the conditions that are putting pressure to adjust a goal, but a delay exists between the action and the change in the condition. If the goal is maintained, actions to improve conditions will eventually change the condition.

Figure 8

(Senge, 2006)
In the convention system exhibitors take action to modify what is evident, but a condition of NDM environments, action feedback/loops, creates a delay. Time stress places pressure on exhibitors to adjust their expectations as well as take action. Similar to the eroding goals system, the point of leverage in the convention system is to maintain expectations.

A recommendation to gain this point of leverage is to revisit customer expectations of service as they relate to each identified NDM environment. It is recommended that roles and scripts are explored as well as the nature of how exhibitors form their expectations. Perceived quality is an important factor in determining satisfaction for customers (Anderson & Sullivan, 1993). For instance, if exhibitors are allowed to use halogen lamps at other convention destinations, they may have formed the expectation halogen lamps are allowed. When they then attempt to exhibit at the research site and are told they cannot use the lamps perceived quality disconfirms their expectation which decreases satisfaction.

In an effort to maintain expectations and therefore satisfaction, other convention destinations must either adopt the same restriction on halogen lamps or the research site must offer a reasonable alternative with the same degree of perceived quality. Given halogen lamps is a known discrepancy between convention destinations the researcher
would suggest that by using alternate scripts the expectations of exhibitors at the research site may be adjusted.

The NDM environment of freight faces a similar challenge to that of halogen lamps. Customers have “derived expectations” based on a number of factors including explicit service promises (Zeithaml, Berry, & Parasuraman, 1993). Exhibitors have signed contracts for delivery of freight and if the quality of the service is lacking a gap is created lowering satisfaction. In an effort to maintain expectations, the convention system would suggest that by reviewing what promises are being made and determining how to meet those promises the chance an NDM incident takes place would be reduced.

While NDM environments such as freight and halogen lamps can be associated more with “enduring service intensifiers” and “explicit service promises”, a flood could be considered a “transitory service intensifier” that includes the situational factors of bad weather and/or catastrophe (Figure 9).

A union picket is an example where a predicted level of service would be difficult to establish as determinants such as explicit service promises or past experience would be limited. And, an additional consideration would be during an emergency customers have a heightened sensitivity to service (Zeithaml et al., 1993). Given the sensitivity and a limited ability to predict a satisfactory level of service, the researcher
recommends training employees to deal with the eight established NDM environments.

Figure 9

![Diagram](image)

(Zeithaml et al., 1993)

The recommended focus of the training is on communicating with exhibitors to help establish and then maintain expectations when the nature of a customer’s expectations may not be clear.
In maintaining expectations through training and empowerment, the researcher introduces a reinforcing loop to the convention system. This loop, “the service quality model”, is presented (Figure 10) whereby previous research has demonstrated that empowerment leads to superior service delivery. When an NDM incident occurs the superior service delivery should help maintain customer expectations.

Figure 10

By integrating the reinforcing loop provided by the service quality model with the balancing loops of the convention system, the recommendation of the researcher can be viewed as a new system.

In the new system employees are considered more experienced others familiar with the convention system. This familiarity along with customer service training should help in the superior delivery of service.
In the new system employees are considered more experienced others familiar with the convention system. This familiarity along with customer service training should help in the superior delivery of service. Leverage is gained in the recommended system when the training and empowerment focuses on supporting customer expectations. This is different than training that would focus on actions to take to modify the NDM environment for the customer. Employees should be trained to expect a delay between any actions including their own and any intended shift in the NDM environment.
Relevance

In addition to research findings being applied to the service industry, the overall study was found to add to the current body of literature in a number of areas. From literature on systems theory to the service industry, several points are discussed relevant to previous research.

Social Perspectives

Richard Mayer (1999) asked if creativity is something unique within the individual and to what extent is creativity a personal or social phenomenon. Based on the research findings a social view is supported. It would seem that outside a laboratory setting that real world creativity is foremost a social process. Regardless if it was a novice exhibitor or a more experienced other, when an NDM incident took place it was usually resolved through collaboration and the collective efforts of novices and more experienced others.

The researcher did observe a single case of individual creativity when an exhibitor found her crate damaged containing a fragile item. The item was a life size, eight foot tall, stuffed brown bear that had been with the company since it had been founded in the 1950’s. After discovering the damage the exhibitor decided to break down a wooden pallet and reinforce the crate for shipment home.

Other than this single case it was evident that people were required to navigate the various affordances and constraints as a result of a convention system, a system founded on social interaction for the
purpose of trading goods and services. This supports Putney (2006) that everything individual is primarily social, including the mind of the individual. The convention environment was identified as a system that guides how individuals interact with society, including the individual exhibitor reinforcing her crate to navigate the dangers of shipping the fragile bear. In a convention environment the rules of the show such as shipping are considered social contracts that help define expectations, supporting Norman (1988), that an individual is recognized as an integral part of society, while society is a complex system of affordances and constraints.

The research also supports literature and previous research by Vygotsky (1978) and the concept of coconstruction and the zone of proximal development. While the researcher did observe coconstruction as exhibitors interacted and collaborated within the system, the researcher questions that transformation within the zone is exclusively through reiteration of the task. It was observed that novice exhibitors would model solutions of more experienced others, but would also attempt to sell their own alternatives. NDM environments are such that both time constraints and the high stakes nature of the event make reiteration unlikely. This is not to deny the benefit of reiteration, but to question how creativity can be demonstrated by a novice or even an experienced other that has never been presented with a particular NDM environment? The research supports that it is the repeated exposure to
the overall system that aids in transformation as opposed to the specific task. Benefits of exposure to the system is further supported by Steiner & Mahn (1996), stating that continued growth is based on the sharing of useful strategies and knowledge through collaboration or joint activity. The sharing of strategies and knowledge would focus on the convention system, not necessarily the specific circumstances of the NDM event.

With the convention system identified as a social system, a living entity, the research supports Csikszentmihalyi (1996), that a creative individual must negotiate society. The researcher found that during an NDM incident creativity must not only be recognized, but that recognition can be constrained by competing goals. An idea might be creative, but the merits as to the quality are subjective based on the impacts it has to others. For instance, when faced with union pickets one exhibitor attempted to circumvent the requirement for union labor by temporarily hiring workers as full-time employees of his company. It was a creative solution, but ultimately was in direct competition with the goals of the union and failed to be recognized as an acceptable alternative. Therefore, to be considered creative it is equally important to negotiate the system.

An area of research not supported by the study is Pajares (2002) social cognitive perspective that individuals are largely self-governing rather than reactive to social forces. In NDM environments it was evident that individuals are very much influenced and react to the social forces
around them. Affordances and constraints within the system dictate that while the individual ultimately could be self-governing, failure to take into account or react to social forces are typically not successful. With multiple players and competing goals social forces play a key role in how issues are resolved.

While individuals were not necessarily seen as self-governing, the social cognitive concept of self-efficacy was found to be an important part of both creativity and working within the convention system. In the literature review the importance of background knowledge was presented. Background knowledge is considered the result of time and experience (Pajares, 2002). The researcher proposed that a novel problem is by definition a situation where background knowledge is limited, thereby negating self-efficacy as a factor. However, the research found those more experienced with the convention system did react different than novices when resolving a novel situation. While a problem may be considered novel, if the individual is a more experienced other familiar with the convention system they tend to demonstrate a higher degree of self-efficacy.

In addition to individual self-efficacy, it was apparent that during an NDM incident individual’s quickly formed groups that led to a collective efficacy in resolving the situation. As time for an event drew near, self-efficacy waned regardless of experience as did collective efficacy. For instance, when several exhibits flooded there were initially high levels of
confidence that prior to show open the exhibits could be completely repaired. As time until the event opened drew close and the scope of the repairs was realized, carpet was left wet, exhibits were left with water marks, expectations were lowered, and the collective belief that the group had the ability to repair all the exhibits was reduced.

**Creativity**

In addition to the research supporting a social view of creativity, it is reasonable to ask if the findings support the definition of creativity as outlined by Sternberg (2006). Was there any evidence of ideas or products that were (a) relatively novel, (b) high quality, and (c) appropriate for the task at hand? Take the case of a damaged plasma screen hung by an exhibitor with a sign that read, “Insert forklift here”. It was not the way they had intended to use the screen. The researcher would argue that it was novel, high quality, and appropriate. Another example was the exhibitor who, having been told halogen lamps were not allowed went out and purchased track lighting. He then violated show and union rules by getting onto the show floor before it was open to exhibitors and installed the lights without a certified union electrician. The solution may have been high quality and appropriate, but was it relatively novel? The exhibitor displayed a high degree of self-efficacy and a willingness to take sensible risks, traits of creativity, but it is still questionable if switching out one type of lighting for another can be defined as novel. Looking across the history of the observed NDM
environments, the exhibitor was the only one known to have used this solution so maybe indeed it was relatively novel. One point that can be noted is that while not every observed incident resulted in meeting the above three criteria for creativity, every incident was observed to contain some of the ten characteristics of creativity.

In observing at least some characteristics of creativity in each incident, did the research support Robert Sternberg’s confluence approach that requires the convergence of six interrelated resources: (1) intellectual abilities, (2) knowledge, (3) styles of thinking, (4) personality, (5) motivation, and (6) environment? As with the definition of creativity, the confluence approach is subjective. In the case of the damaged plasma screen the exhibitor was intellectually able to see the problem in a new way, but it did not require any practical skill to convince others. The exhibitor had the knowledge to grasp the basic problem, i.e. the plasma screen is a piece of junk now, but the problem did not seem to require a thinking style supporting both a global and local perspective. The exhibitor did demonstrate the personality of wanting to overcome the obstacle, but the exhibitor did not appear to have intrinsic motivation as the situation or environment had created external motivators for creativity to occur. Taking all factors into account, the research would not support convergence of all six resources being required for creativity to take place.
Systems Theory

In support of previous literature on systems theory the research reinforced the concept of the irreducible whole. With people coming together from all around the world to trades goods and services it is not possible to have a trade show of one, thereby confirming Laszlo (1996) that as an irreducible entity conventions are systems and more importantly the relationship between creativity and the system is inseparable. In every observed NDM incident, the individual was working within the system. If not for the system, the individual has no cause to be creative. Even in the case where the exhibitor repaired her damaged crate, it was not irreducible to the individual as she did use rules of the system to determine a course of action. In the end, the exhibitor took apart a wooden pallet provided by persons working within the system to reinforce and protect her bear.

The research also supports literature on systems as living entities. While the convention system is comprised of numerous organizations with tangible assets, the system is primarily driven by social forces. When Guess (2002) refers to an ongoing struggle to recognize organizations for more than a collection of assets and parts, the research supports the concept that organizations are living organisms.

Naturalistic Decision-Making

The study also reinforces NDM proponents that utilizing a classical decision-making (CDM) model has numerous limitations. From a creative
perspective there is no requirement to make a choice between competing alternatives or to obtain all available information, only that the decision be appropriate and novel. And from a systems perspective, pragmatic limitations exist when attempting to consider all available information. A good example is when an exhibitor decides to pick the space they would like for the next tradeshow, known as space selection. The researcher was able to observe several instances of space selection for the following year. Even with time stress eliminated as a factor, the variety of choices makes it impractical to use CDM.

The initial decision is what size and where the exhibit will be located on the tradeshow floor. If the exhibitor goes with a small to average size booth there could be hundreds of available locations. Each location may have multiple factors to consider such as proximity to a main aisle, major exhibitor, competitor, food, restrooms, if a column or other obstruction may be in the booth space, ceiling height, the ability to be an island booth or at the end of a row, etc. The resulting matrix of possible choices would require an exhibitor to sift through thousands of combinations to make sure the best decision is made. While all the information for determining the best possible exhibit location is readily available, exhibitors appear to only pursue a few pieces of information prior to making a choice. This supports previous NDM research.

In addition to using a limited number of criteria to make a decision, there were two cases where exhibitors tried to be creative in selection by
defining the regulations to be considered for a particular area of the
tradeshow floor and then deciding to sell the idea that their company met
the criteria. They were attempting to be appropriate and novel over using
a CDM model where all information available is reviewed prior to making
a formal decision.

A final point of discussion is that CARMA was able to reinforce that
research on NDM environments would be difficult to accurately replicate
with a computer simulation or in a laboratory setting. While certain
aspects like time stress, multiple players, organizational goals and norms
could be used to table top and recreate an NDM environment, high
stakes and the complexity of action feedback loops would be difficult to
simulate. After decades of psychometric testing and laboratory studies
current creative criteria discusses extrinsic rewards based on intrinsic
motivation, but not extrinsic motivation that provides an intrinsic
reward, which is supported by both literature on NDM and attribution
theory.

**Service Industry**

The research supported a view consistent with the role-theoretic
approach in the service industry where scripts define an appropriate
sequence of role behaviors (Solomon et al., 1985), but instead of a
specific incident as outlined in the service literature a systems
perspective is used. Expert others operated from a different script than
novices, not because of experience dealing with a specific NDM incident
or environment, but rather they had the background knowledge and experience operating within the system. This allowed more experienced others to incorporate different role behaviors than novices.

Attribution theory was also reinforced in the study and is a point to consider when looking at how creativity is used within systems. Previous research has shown that a person will take credit for success and deny responsibility for failure (M.J. Bitner et al., 1994), and this was demonstrated repeatedly as blame was shifted during NDM incidents. It was common for an exhibitor to blame the contractor, the contractor to say it was a building policy, and the building to say it was a show rule. Upon resolution of an issue the contractor would say they pulled some strings, the building would make a one time exception, and the exhibitor would attribute the success to selling the solution. Examples include an exhibitor that brought several cases of water for promotional purposes into their booth, the flooded booths caused by a cart striking a pipe, numerous issues with delivery of freight, and the unique policy of halogen lamps. With each instance a successful resolution was sought while at the same time avoiding any blame for failure.

Limitations

While the study helped answer what role creativity plays in real world decision-making and provided support for previous research in a number of areas, there were a number of identified limitations to the study.
One limitation was the CARMA method worked well for identification of what was evident against expected for the NDM criteria, but creative criteria presented more of a challenge. It was difficult to determine what was expected when it came to self-efficacy, intrinsic rewards, the willingness to take a sensible risk, etc. It was evident that creative characteristics were demonstrated when reacting to an NDM environment, but difficult to establish the gap because of the challenge of defining expectations. To determine findings using a systems perspective, expectations for creative criteria were established retrospectively.

A second limitation was the use of purposeful sampling and gatekeepers to establish which NDM incidents to explore. There was a wide difference in gatekeepers’ experience, motivation and the level of interaction they had with the researcher. Some gatekeepers proactively reported NDM incidents, while others provided little if any information. This resulted in a potential bias towards gatekeepers and participants that were more willing to discuss incidents, while other equally valid NDM incidents received less attention.

A third limitation was the researcher did not interview exhibitors that were non-English speaking. In one of the incidents where booths were flooded an exhibitor from Brazil was excluded. Another example was a group of Chinese exhibitors that made up a “Chinese Pavilion” with numerous electrical problems and violations of the halogen lamp policy. It would have been an appropriate incident to include, but language
barriers restricted the researcher from obtaining enough information to be useful to the study.

A fourth limitation is the ability to generalize findings outside of a convention or tradeshow environment. The system that was identified was an “eroding goals” archetype based on the pressure NDM environments place on exhibitors to lower their expectations. It is unknown to what extent similar pressures exist in other service environments. While an initial goal of the study was to apply findings to the service industry as a whole, useful application is limited to environments where NDM incidents are frequent.

**Future Research**

Based on the findings, the researcher suggests a number of future research areas. First, in trying to apply findings to improve the service industry, it is suggested future research explore the relationships between the modification of scripts and customer expectations. While previous literature supports that a customer will expect a different level of service from a fast food restaurant than a five-star restaurant, there are opportunities to determine how expectations can be modified by altering the customer’s perception of roles and scripts appropriate for the environment.

Second, an area of research to explore is the potential connection between the actions an employee does or does not take and their ability
to maintain customer expectations. When faced with an NDM environment it would seem intuitive to take action to modify the environment, but systems theory contends that the point of leverage is in maintaining expectations. Research on the efficacy of employees trained to focus on identification and maintenance of customer expectations during critical incidents would help support or refute the findings of this study.

Another area of future research would be to revisit the convention system and identify alternate heuristics used when solving problems in NDM environments. The study only looked at creative factors, but the convention system could include any number of actions used to modify the environment and help maintain expectations.

Last, as noted above, a limitation of the study was defining the expectation of creative factors. Expectations were difficult to establish prior to an NDM incident taking place because the extent or types of NDM incidents common to the convention industry were an unknown. Having conducted the research, a number of NDM environments were established outlining eight common themes. Using those themes future research should be conducted to build on this study to confirm expectations as they relate to the creative factors prior to an incident taking place. This would help support the role creativity plays when making decisions in the real world and may provide an avenue to
establish if intrinsic motivation is ever a consideration during a critical incident.

Conclusion

From previous literature on creativity, systems theory, naturalistic decision-making, social perspectives, and the service industry the researcher proposed that a lack of background knowledge may provide opportunities for creativity to flourish. The literature led to the premise of the study, suggesting that by definition a novice lacks experience and therefore should be more inclined to be creative when confronted with a novel situation. Conversely, more experienced others should rely on their background knowledge when developing possible solutions. The researcher also wanted to apply findings to the service industry.

Based on the research objectives several months were spent observing exhibitors as they set up tradeshows at a large convention center. As novel situations were identified the complementary analysis research matrix application (CARMA) was used to compare what was expected against what was evident. Using this method along with a systems perspective a number of relationships were established between creativity and factors related to naturalistic decision-making (NDM) environments. These relationships were used to establish concepts that helped define a system of eroding goals evident in the convention industry.
The system identified within the convention industry effectively demonstrates that the original premise is not supported, that regardless of experience exhibitors use creative factors when they encounter NDM environments. From this finding the conclusion is drawn that the use of creativity is more related to support from the environment and/or exposure to a system than an individual’s background knowledge regarding a specific problem. Both novices and experienced others use creativity as they attempt to close the gap between their expectations and what is evident in the environment.

With the point of leverage in the convention system suggesting exhibitors maintain expectations, the researcher recommends modifying the system through introduction of a service quality model. Through integrating the service quality model with the convention system, findings of this study can be effectively applied to the convention industry.

In conclusion, while the initial premise that background knowledge determines the extent to which creativity plays a role was not supported, the research did find the environment and an individual’s exposure to the regularities of the environment, i.e. the system is important.
### Exhibit 1

<table>
<thead>
<tr>
<th>Event</th>
<th>Participant(s)</th>
<th>Data Source(s)</th>
<th>Key Feature</th>
<th>Creative Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary Interviews</td>
<td>CSM’s</td>
<td>Interviews</td>
<td>Established baseline expectations for NDM Factors</td>
<td>n/a</td>
</tr>
<tr>
<td>Show 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Union Picket</td>
<td>CSM’s, exhibitors, show managers, contractors, union workers, convention center staff</td>
<td>Informal interviews, field notes, show report, email</td>
<td>Union wanting all carpenters to be union employees</td>
<td>Problem redefinition, selling the solution, recognizing knowledge limitations, taking a sensible risk</td>
</tr>
<tr>
<td>- Location</td>
<td>Show manager, exhibitor</td>
<td>Informal interviews, field notes</td>
<td>Exhibitor next to competitor, exhibitor puts up barrier</td>
<td>Selling the solution, problem and idea analysis, field notes not clear regarding additional factors</td>
</tr>
<tr>
<td>- Freight</td>
<td>Exhibitor, contractor</td>
<td>Informal interview</td>
<td>Exhibitor downsizes exhibit to hand carry</td>
<td>Continued intellectual growth, willingness to surmount obstacle, problem redefinition</td>
</tr>
<tr>
<td>- Halogen Lamps</td>
<td>CSM, convention</td>
<td>Informal interview,</td>
<td>Exhibitor refuses to</td>
<td>Self-efficacy,</td>
</tr>
<tr>
<td>Category</td>
<td>Subjects</td>
<td>Methods</td>
<td>Issues</td>
<td>Analysis, Ideas and Problems</td>
</tr>
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<td>---------------------------</td>
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<td>----------------------------------------------</td>
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<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Meeting Rooms</td>
<td>CSM, contractor, exhibitor</td>
<td>Informal interview, field notes</td>
<td>Water not delivered, relocated water cooler</td>
<td>Willingness to take sensible risk, willingness to surmount obstacles, selling the solution</td>
</tr>
<tr>
<td>Show 2</td>
<td></td>
<td></td>
<td>Backed up drains due to rain</td>
<td>Problem redefinition, problem and idea analysis, willingness to surmount obstacles, self-efficacy, willingness to tolerate ambiguity</td>
</tr>
<tr>
<td>Flooded Booths</td>
<td>CSM’s, exhibitors, show managers, contractors, union workers, convention center staff</td>
<td>Informal interviews, field notes, show report, email</td>
<td>Trademark infringement, whirlpool nozzle</td>
<td>Problem redefinition, self-efficacy, continued intellectual growth</td>
</tr>
<tr>
<td>Location</td>
<td>Show manager, exhibitor</td>
<td>Field notes</td>
<td>Exhibitor behind obstruction (block house)</td>
<td>Selling the solution, willingness to surmount obstacle, problem and idea analysis</td>
</tr>
<tr>
<td>Rule Changes</td>
<td>CSM, show manager, exhibitor</td>
<td>Field notes</td>
<td>Trademark infringement, whirlpool nozzle</td>
<td>Problem redefinition, self-efficacy, continued intellectual growth</td>
</tr>
<tr>
<td>Building Damage</td>
<td>CSM, show manager,</td>
<td>Interview, informal</td>
<td>Drills holes to anchor machine</td>
<td>Problem redefinition, self-efficacy, continued intellectual growth</td>
</tr>
<tr>
<td>Show 3 (two shows concurrent)</td>
<td>CSM, show managers, exhibitor</td>
<td>Field notes</td>
<td>Argument between show managers regarding leased space, exhibitor displays competing shows message</td>
<td>Problem and idea analysis, selling the solution, willingness to surmount obstacle, recognizing knowledge limitations</td>
</tr>
<tr>
<td>- Freight</td>
<td>Exhibitor, contractor</td>
<td>Field notes, informal interview</td>
<td>Smashed plasma, insert forklift here</td>
<td>Problem redefinition, willingness to surmount obstacle, continued intellectual growth</td>
</tr>
<tr>
<td>- Halogen Lamps</td>
<td>CSM, exhibitor, convention center staff</td>
<td>Informal interview, field notes</td>
<td>Goes to home depot, buys track lighting</td>
<td>Problem and idea analysis, willingness to tolerate ambiguity, self-efficacy, continued intellectual growth</td>
</tr>
<tr>
<td>- Freight Exhibitor, contractor, convention center staff</td>
<td>Informal interview, field notes</td>
<td>Storage of empties in secondary booth, unable to relocate</td>
<td>Problem redefinition, willingness to take sensible risk</td>
<td></td>
</tr>
<tr>
<td>Freight Exhibitor, contractor, convention center staff</td>
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<td></td>
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<tr>
<td>- Halogen Lamps</td>
<td>Exhibitor, convention center staff, contractor</td>
<td>Field notes, informal interview</td>
<td>Contractor to replace, exhibitor relocates product displays</td>
<td>Problem and idea analysis, recognizing knowledge limitations, self-efficacy</td>
</tr>
<tr>
<td>Show 4</td>
<td></td>
<td></td>
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<tr>
<td>- Union Picket</td>
<td>CSM’s, exhibitors, show managers, contractors, union workers, convention center staff</td>
<td>Informal interviews, field notes, show report, email</td>
<td>Physical altercation between union and non-union, sneak in contractors</td>
<td>Problem and idea analysis, selling the solution, recognizing knowledge limitations, willingness to take sensible risk, self-efficacy</td>
</tr>
<tr>
<td>- Freight</td>
<td>Exhibitor, contractor</td>
<td>Field notes, informal interview</td>
<td>Outbound, tired of waiting sells product</td>
<td>Problem redefinition, willingness to take sensible risk, willingness to tolerate ambiguity</td>
</tr>
<tr>
<td>Show 4</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Halogen Lamps</td>
<td>Exhibitor, convention center staff</td>
<td>Field notes, show report</td>
<td>Smoldering lamp in cabinet</td>
<td>Recognizing knowledge limitations, self-efficacy, continued intellectual growth</td>
</tr>
<tr>
<td>- Rule Changes</td>
<td>CSM, exhibitor, show manager</td>
<td>Field notes, informal interview</td>
<td>Compressed gas tank storage in booth</td>
<td>Willingness to take sensible risk, recognizing knowledge</td>
</tr>
<tr>
<td>Show</td>
<td>Incident</td>
<td>Contact Details</td>
<td>Notes</td>
<td>Problem Redefinition</td>
</tr>
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</tr>
<tr>
<td>- Meeting Rooms</td>
<td>CSM, exhibitor</td>
<td>Field notes</td>
<td>Key note speaker fails to arrive</td>
<td>Self-efficacy, willingness to tolerate ambiguity, problem redefinition, problem and idea analysis</td>
</tr>
<tr>
<td>Show 5</td>
<td>- Freight</td>
<td>Exhibitor, contractor</td>
<td>Field notes, informal interview</td>
<td>Freight stuck in Canadian customs</td>
</tr>
<tr>
<td>- Building Damage</td>
<td>CSM, show manager, exhibitors, convention center staff</td>
<td>Interview, informal interview, field notes, show report</td>
<td>Main entry door damaged would not go up, change of traffic pattern</td>
<td>Problem redefinition, problem and idea analysis, selling a solution, continued intellectual growth</td>
</tr>
<tr>
<td>Show 6</td>
<td>- Flooded Booths</td>
<td>CSM’s, exhibitors, show managers, contractors, union</td>
<td>Informal interviews, field notes, show report, email</td>
<td>Cart strikes pipe at 1:30 a.m. flooding 20,000 sq ft.</td>
</tr>
<tr>
<td></td>
<td>Workers, convention center staff</td>
<td>willingness to surmount obstacle, self-efficacy</td>
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<tr>
<td><strong>- Freight</strong></td>
<td>Exhibitor</td>
<td>Informal interview</td>
<td></td>
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<td></td>
<td></td>
<td>Bear preservation</td>
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<tr>
<td></td>
<td></td>
<td>Willingness to surmount obstacle, problem and idea analysis, recognizing knowledge limitations</td>
<td></td>
<td></td>
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<tr>
<td><strong>- Halogen Lamps</strong></td>
<td>CSM, exhibitor, convention center staff</td>
<td>Field notes</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Reference competing destination rules to justify</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Selling the solution, recognizing knowledge limitations</td>
<td></td>
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</tr>
<tr>
<td><strong>- Rule Changes</strong></td>
<td>CSM, exhibitor, contractor, show manager</td>
<td>Informal interviews, field notes</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Food and water in violation of exclusive with contractor</td>
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<tr>
<td></td>
<td></td>
<td>Willingness to take sensible risk, self-efficacy</td>
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</tr>
</tbody>
</table>

**Show 7**

| **- Rule Changes**       | CSM, exhibitors, show manager, convention center staff, contractors | Interview, informal interviews, field notes, show report |
|                          | Two story homes outside                                                                 |
|                          | Problem redefinition, problem and idea analysis, willingness to surmount obstacle, selling the solution, self-efficacy, recognizing knowledge limitations, continued intellectual growth |

<p>| <strong>- Freight</strong>            | Exhibitor, contractor               | Informal interview, letter                        |
|                          | Letter to CEO/President             | Problem and idea analysis,                        |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Interviewees</th>
<th>Method</th>
<th>Problem Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Halogen Lamps</td>
<td>Exhibitor, convention center staff</td>
<td>Field notes</td>
<td>Stage lighting verses demo product Selling solution, field notes not clear regarding any other creative factors</td>
</tr>
<tr>
<td>- Meeting Rooms</td>
<td>CSM, show manager, exhibitor, convention center staff</td>
<td>Field notes, informal interview</td>
<td>Heating/cooling not working, relocated w/ modification of lease Problem and idea analysis, selling the solution, willingness to surmount obstacle, recognizing knowledge limitations</td>
</tr>
<tr>
<td>Show 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Location</td>
<td>Show manager, exhibitors</td>
<td>Informal interview</td>
<td>2 exhibitors hybrid product lines to get desired location Problem redefinition, selling the solution</td>
</tr>
<tr>
<td>- Freight</td>
<td>Exhibitor, contractor</td>
<td>Informal interview</td>
<td>Pay for first in, first out service Problem and idea analysis, willingness to tolerate ambiguity, continued intellectual growth, self-efficacy</td>
</tr>
<tr>
<td>- Halogen Lamps</td>
<td>CSM, show manager, convention center staff, exhibitors</td>
<td>Interview, informal interviews, field notes</td>
<td>25 exhibitors due to oversight in show rules – lighting show Problem redefinition, selling the solution, willingness to surmount</td>
</tr>
<tr>
<td>Topic</td>
<td>Contact Person(s)</td>
<td>Notes/Interview Details</td>
<td>Equipment/Obstacle</td>
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<tr>
<td>Show 9</td>
<td>Show manager, exhibitor, convention center staff</td>
<td>Field notes, informal interview</td>
<td>Equipment blocked due to “first move”, $80,000</td>
</tr>
<tr>
<td>Freight</td>
<td>CSM, show manager, exhibitor, convention staff</td>
<td>Field notes, informal interview</td>
<td>Trailer with product inside hall</td>
</tr>
<tr>
<td>Rule Changes</td>
<td>CSM, show manager, exhibitors</td>
<td>Field notes, informal interview</td>
<td>Vehicles on display, maneuvering for selective spots</td>
</tr>
<tr>
<td>Halogen Lamps</td>
<td>CSM, exhibitor, convention center staff</td>
<td>Field notes</td>
<td>“Green” lamps</td>
</tr>
<tr>
<td>Building</td>
<td>CSM, Paint/chemicals</td>
<td>Field</td>
<td>Willingness</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Damage</th>
<th>exhibitor, show manager, convention center staff</th>
<th>notes, informal interview</th>
<th>used in set up of crane</th>
<th>to take a sensible risk, self-efficacy, recognizing knowledge limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Meeting Rooms</td>
<td>CSM, exhibitor, show manager, convention center staff</td>
<td>Field notes, informal interview</td>
<td>Room used as exhibit per other destination</td>
<td>Problem and idea analysis, willingness to take a sensible risk, willingness to surmount obstacle, continued intellectual growth, recognizing knowledge limitations</td>
</tr>
<tr>
<td>NoteTaking (phase I)</td>
<td>Convention Services Manager (Peter)</td>
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<tr>
<td>Base expectations</td>
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| Ill-structured problems | Researcher: Think about different kinds of incidents that you would consider to be critical or high stakes...can you think of any that you’ve dealt with?  
Peter: You mean like some sort of disaster, to that effect?  
Researcher: It doesn’t have to be a disaster, it can be low or high level.  
Peter: We have people that brought animals in the building...I remember a situation where the power was out at Cashman.  
Researcher: That would be a good one.  
Peter: Well, we had to relocate to the main convention center. We had to scramble to get meeting rooms setup, we had to get food and beverage. We had to completely relocate because there was no power at Cashman. But that’s not really about an exhibitor. An exhibitor issue coming up deals with labor and exhibitors showing up with labor that is not authorized. They are supposed to use union labor or full-time employees. That just came down. It will be a big problem for February MAGIC. It’s going to be an issue, no question.  
Researcher: To what extent do you find a problem to be well structured?  
Peter: This one I find to be structured, but there are gray areas. It is untested with the way MAGIC has come out and defined the rules. So it’s unprecedented in that regard, but it is structured in that it is MAGIC’s rules and GES is neutral and the building is neutral. |
| Uncertain dynamic environments | Researcher: Describe to what extent you expect uncertainty.  
Peter: With MAGIC and the EAC (exhibitor appointed contractor) stuff we don't know how upset the exhibitors will be and it will be an emotional issue. You're not talking only about costs but expertise that their employees may have that must be diverted to teamster labor. And they pay them twice as much. So, the emotional aspect of what these people are going to experience is an uncertainty. I expect it to be a big issue once the show moves in. It’s a small issue now but I have gotten a few phone calls...at least two phone calls from two EAC’s. Once they get onsite the emotions will be much higher. The union people will be policing that much closer because they now have this right that they’ve never had before. So there’s going to be more tension. |
<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Researcher</strong></td>
<td>With every event are there a certain number of uncertain issues?</td>
</tr>
<tr>
<td>Peter</td>
<td>There’s always something that we haven’t seen. There are always one or two things you did not anticipate. That’s what makes it interesting. To be very honest with you, that’s what I enjoy.</td>
</tr>
<tr>
<td><strong>Shifting, ill-defined, or competing goals</strong></td>
<td>Describe to what extent there are competing goals in resolving a critical incident. So the exhibitors have one goal and labor will have another goal and you’ll have another goal and show management will have another goal.</td>
</tr>
<tr>
<td>Peter</td>
<td>My role itself will be the conflict resolution, to resolve it as quickly as possible to let the show go on. I don’t care if it will be the union side or EAC side as long as it gets resolved quickly.</td>
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<tr>
<td><strong>Action feedback loops</strong></td>
<td>When you’re attempting to resolve an incident what type of feedback do you normally encounter? How do you see it playing out with the union labor situation?</td>
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<tr>
<td>Peter</td>
<td>I can walk you basically through a situation. I would get a call from an EAC saying there is a labor issue on the floor so I would grab the service contractor, GES in this case, and maybe grab a floor manager and security. We would all go down and meet with the EAC and find out what the issue is and that we’re on the same page and then show management has to make a decision. And then our job is to backup show management. The type of feedback we get is to understand the problem so that we can let the EAC know what we’re doing and hopefully it dies down at that point. You have to first gain an understanding what the problem is and then adjust accordingly.</td>
</tr>
<tr>
<td><strong>Time stress</strong></td>
<td>Can you describe how time is a factor in resolving the incidents?</td>
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<tr>
<td>Peter</td>
<td>Time is huge because the last couple days before the show you don’t want to stop the erection of a booth. If someone has to switch labor you are potentially putting the show on hold to get a booth erected because of a labor issue. So time is a huge constraint. But you still don’t know... there is no definite answer.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>As time to the show shrinks do the pressures mount?</td>
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</table>
| Peter                      | Certainly, it’s an emotional issue again so there’s a potential...
for violence because of the emotions involved and as time is short emotions will be higher.

<table>
<thead>
<tr>
<th>High stakes</th>
<th>Researcher: Describe what is at stake in a typical incident. You're saying every show there’s a few uncertainties but how many of those would you consider to be high stakes?</th>
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<tr>
<td></td>
<td>Peter: Generally one or so per show. There is potential for explosiveness. Usually one per show maybe two. I think this will be one of the highest issues ever because of the potential with labor for violence.</td>
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<td></td>
<td>Researcher: Do you see high stakes for you personally?</td>
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<td></td>
<td>Peter: Yes because it has to be resolved and there’s potential they could be frustrated with me even though we’re kind of the third party but there still potential that they become frustrated with the answer I’m giving them.</td>
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<td></td>
<td>Researcher: To the exhibitor it could be high stakes?</td>
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<td></td>
<td>Peter: Absolutely, but this could grow into law suits it could be industry wide. This could be precedent setting going forward.</td>
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<td>Researcher: I know you just got a few shows from Chicago because of union related issues.</td>
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<td>Peter: Right, because of the union costs and now Plastics is going to Orlando so Chicago has a lot of issues union related to deal with. And Chicago is losing even more shows most of it due to labor.</td>
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<tr>
<th>Multiple Players</th>
<th>Researcher: Multiple players...when you encounter an incident who is typically involved?</th>
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<tr>
<td></td>
<td>Peter: Very few incidents involve exhibitors at my level but they always involve show management to some degree but it depends on what it is. It can be the cleaners or AV or services, the decorator, there are such a wide array of problems that multiple players are always involved.</td>
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<td></td>
<td>Researcher: How often does it get elevated to where you called Kevin or somebody at a higher level?</td>
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<td></td>
<td>Peter: Not very often, maybe a couple of times a year.</td>
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<tr>
<td></td>
<td>Researcher: What about the labor issues, will everyone be well aware?</td>
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<td></td>
<td>Peter: Mary and Larry have been involved and I assume Robert knows, GES knows.</td>
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</table>
| Organizational goals and norms | Researcher: Can you describe how organizational goals and norms help or hurt when resolving critical incidents?

Peter: I think they help because I think it keeps us as a neutral party and puts it back on the show. We're not the decision makers...its show management and our stance helps us absolves us of any sort of a liability, it puts the onus on show management.

Researcher: I've never seen that neutrality stance written down...is it a best practice?

Peter: It's always been written down in show rules that show management dictate what takes place.

Researcher: But there's no written rule that the building will stay neutral?

Peter: No not that I'm aware. It's just the norm is that show rules how exhibitors must conduct business. We lease the space so as a show you have the right to run your rules in that space. |
| Additional | Researcher: Anything else you would like to add?

Peter: I think we will have to see how this plays out and then we can follow-up because this is a pretty good problem. It's foreseeable. It's coming up. |

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**Exhibit 3**

| NoteTaking (phases II and III) |  

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<tr>
<th>Expectation vs. Evident</th>
<th><strong>Flooded Exhibits</strong></th>
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<tbody>
<tr>
<td><strong>Abstract</strong></td>
<td>A recurring theme was exhibits that suffered from water damage. The researcher observed exhibits that suffered water damage during a show after excessive rain caused an already corroded and backed-up drainage system to fail. A similar environment was created when a cart struck a water pipe at 1:30 a.m. resulting in 20,000 sqft of show floor flooding. Expectations: Exhibitors expected their booth would be repaired to its original condition and that all costs would be paid by the show. In the case of the rain, the show had expectations that the building would pay any costs associated with repair of the exhibits. In the case of a worker that struck the water pipe the show expected the general contractor to pick up the bill. Evident: In each case the exhibits were repaired prior to show open, but in one case a damaged LCD television was unable to be repaired or replaced for the duration of the event. Several exhibits were shifted and not all carpet was replaced resulting in a damp odor in some cases. A post-show report noted, “Rain, rain and more rain. There were fourteen leaks reported in the exhibit halls. One of the worst leaks was over the Whirlpool Booth in Hall C3. The first responders did an amazing job. They went up on the roof and found three leaks over the Whirlpool Booth and repaired them....” <strong>Union Pickets</strong> The researcher was contacted by a CSM regarding picketing taking place on the front plaza. The researcher went and observed the protesters, but did not have any contact. Later it was determined the protestors were members of a carpenters union protesting the use of non-union labor to set up exhibits. Not wanting any interruptions or negative press, the show decided to not allow exhibitor appointed contractors to use non-union labor. Expectations: Exhibitors that were not using union labor had the original expectation that the show would not give into union pressure. Once the show advised non-union labor could not be used the exhibitors scrambled to find new labor and adjusted their expectation to the show being responsible to help supply alternate labor at the same cost. The Union had the expectation that the shows would not want picketing to take place. Evident: It was evident that despite any preparations, there was a level of uncertainty of how the incident would be resolved by all parties involved.</td>
</tr>
</tbody>
</table>
different variables that a different situation requires a different solution, even if it’s the same and even if it sounds like the same thing it ends up being totally different. If you have the same situation you are dealing with a different exhibitor, a different contractor, which creates a different dynamic. That person may not react the same way as the last person.” - Mike

Location

Expectations: There was an expectation by exhibitors that selection of location came with a level of uncertainty. However, given the exhibitor paid for their location, there was also the expectation the location would maximize their sales.

Evident: The ultimate location for each exhibitor appeared to be very dynamic. While each show had their own process for conducting a “space draw”, the end result was the design of the show floor did not guarantee that expectations of exhibitors would be met.

A good case was presented by (Kathy) and (John) as they described an exhibitor that pulled out of the show, freeing up a prime location on the show floor. This one exhibitor created a domino effect, in that by pulling out of the show, eight exhibitors were moved in an attempt to meet exhibitor expectations. With each move, issues of the size and shape of the exhibit, whether direct competitors would be present, any additional cost, proximity to foot traffic, and a host of other items had to be resolved.

On site it was observed that an exhibitor had to shift their exhibit and another exhibitor was not happy with their location noting they were stuck behind an obstruction that they perceived to limit their visibility. A discussion was held with a Customer Service Representative for the show (Kelly) and she stated that location is of primary concern to exhibitors. She stated the expectation is they will be in a location that provides the opportunity for the most sales. It is the number one complaint that she receives.

In two events, floods resulted in the location of a few exhibitors having to be adjusted and in one case a smell of sewage required a customer service area for freight to be moved.

It was evident with every event that there are some exhibitors that are not happy with their location. The actions they took included complaints, requesting a change of location, asking for a reduction in fees, and in one case shifting/expanding their own location without approval.

Researcher: Have you ever encountered a situation where you thought the exhibitor was right and show management wasn’t right?

Mike: I guess I have. It wasn’t so much right or wrong, there was an exhibitor that had a booth where they were almost to the very
end, near the end cap. The end cap ended up not showing up so they kind of grew their space. Push came to shove push and the show manager wanted to charge them more for filling that space. I got involved, but I should not have been involved. It was not hurting anybody, but it was not a decision for me it was it was totally up to the show and exhibitor to work out. I was just there kind of to keep the peace and it turned out they had to go back into their booth or pay for that additional space. You don’t wanna sit there and tell show management your being a hard ass when you’re talking about pennies in the big scheme of things and you’re potentially going to lose an exhibitor.

Freight

Expectations: There was a wide range of expectations when it came to how exhibitors dealt with NDM environments caused by issues with freight. The initial expectation was that while freight should arrive on time, intact, and undamaged, that there is the possibility that this may not happen.

A floor manager (Mindy) said, “Exhibitors don’t read the kits, they are like deer in the headlights.” Mary went on to explain the “clean floor” policy and how it impacts exhibitors. Freight is placed in the aisles next to a booth to be set up at a certain time. The expectation is the exhibitor shows up to set up their exhibit, but when they fail to show up the clean floor policy requires the freight be packed back up and relocated out of the building. It then becomes a struggle for exhibitors to locate and then wait for their freight to be brought back into the building once they arrive.

Evident: It was evident that while actions could be taken to minimize freight issues, it was impractical for exhibitors to prepare for every possibility. A few of the actions that were evident are listed; (1) hiring an exhibitor appointed contractor perceived as reliable, (2) taking out insurance, (3) packing expensive/critical items in secure containers, (4) using small “pop-up” displays to avoid using freight services, (5) using “hand carry” to avoid using freight services, (6) paying for priority freight service (officially or on the side).

It was evident that regardless of action a percentage of exhibitors experience freight and/or product that is either lost, misplaced, damaged, stolen or that it does not arrive in a timely manner. This included after a show is over and exhibitors wait for empty freight containers to be delivered so they can begin packing up the exhibit.

An experienced exhibitor that started in the industry 19 years ago (Cindy) stated that exhibitors are “afraid to rock the boat”, for fear their freight will be intentionally lost. Cindy said she has seen shipping labels for Alaska. She also said she has tried numerous tricks including paying for priority freight service and it was a bad experience as she waited for hours to get her empty crates. However, being experienced she has no problem “fighting the bill”.

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An exhibitor from Kansas (professional products of Kansas, Inc.), had been to only a few tradeshows. After dealing with a handful of bad freight experiences he decided to use small, portable displays. This drastically cut costs as the display could be checked as luggage and his product placed in a rolling suitcase.

A floor manager, (Mindy), stated exhibitors are like “deer in the headlights...they don’t read exhibitor kits.” She said most facilities and major contractors have a clean floor policy. This means all the empty crates are removed every night, but sometimes exhibitors don’t show up to unload their crates so they end up having to track them down and end up paying an additional charge to get them brought back into the facility.

| Shifting, ill-defined, or competing goals | Expectations: Overall there was an expectation by exhibitors that goals were not shifting or ill-defined. The primary purpose for exhibiting was to drive sales and the only competing goal would be their direct competitor. As the customer, exhibitors did not appear to give much consideration to the goals of the show, the building, or contractors. One exhibitor stated, “I’m the customer, so the system should be built around my needs. I shouldn’t have to worry about anything.”

Evident: During show hours it was evident that an exhibitor’s primary goal was to drive sales, but during show set-up and move-out it appeared exhibitors were more focused on speed. Regardless, it was not evident that goals were shifting or ill-defined. The process of exhibiting appeared to support goals were to set-up, make sales, then move-out, with little variation. |

| Union Pickets | Expectations: During multiple pickets it was observed that there were competing goals between various parties. The union had the expectation that non-union labor would not be used. The CSM’s had the goal of satisfying show management. Show management had the expectation there would be no altercations, negative publicity, or issues that negatively impacted the show. Exhibitors had the goal of getting their exhibits set up without delay and non-union labor had the goal of convincing show management to resist union pressure. |

Evident: A post-show report noted, “...In protest of the carpenters working, the teamsters decided to utilize the first amendment areas and do an informational picket. During move-out, the exhibitor Lift Master decided to fire 300 Exhibits and hire another authorized company to tear down. The picket was only held the first three days of the show and there were no incidents.”

It was evident the pickets resulted in NDM environments. In one case the show allowed the union to continue to picket. It was evident this did not meet the union’s expectations as they continued to picket for the duration of the event. In another case, the show decided all labor would be union.
When confronted with having to change labor it was evident that exhibitors were concerned. There was a fear of higher costs and frustration with allowing unfamiliar workers around their exhibits. In some cases relationships with a particular company had been developed over many years and not being able to use that company resulted in mixed reactions from apologetic to anger. Exhibitors took action by confronting show management, flying in additional employees to help coordinate labor efforts, and working with the shows primary contractor to help oversee the transition to union labor.

During an interview about the pickets an individual with over 30 years in the industry, (Harry), recalled the challenges he dealt with during a major union strike. Harry relayed, “The show was moving out...MAGIC was moving out and another show was moving in. We pulled off the show with no teamster support. One of my jobs for three days was to drive to the marshalling yard so it took us having to offload trucks, put it on Freeman trucks so we could cross the line, it was brutal. I went into the Freeman yard and the picketers spit on my car. Freeman pulled in people from Atlanta...a whole group of Vietnamese laborers that do mostly carpet in Atlanta and their all nonunion, they brought those guys here to help. They brought in all the managers from every one of the other cities. (Steve) was erecting booths and Steve and I rolled carpet. What a sense of accomplishment, but it cost Freeman $5 or $6 million."

**Rule Changes/Interpretation**

Expectations: The base expectation of exhibitors when it comes to, ill-defined problems or competing goals can be summarized in two questions asked by the researcher during an interview with (Mary)

Researcher: Can you describe to what extent there are competing goals in resolving a critical incident?

Mary: I would probably say that the exhibitors have more competing goals with the process, whether it be the building, whether the general contractor, whether Aramark, they just want to get their exhibit setup, functioning and running. I really don’t think they have challenges with show management because they’re used to their rules and regulations. It is the venue where there are some additional rules and regulations that other venues might not have. Exhibitors competing with one another...the only time you really see them competing with one another is if their product lines are very similar.

Researcher: I’m not necessarily talking about exhibitor against exhibitor. Using the issue of the coming MAGIC where you have exhibitors not wanting to use labor provided by the union there would be competing goals. In the case of the lighting it sounds like everyone was try to get to the same end goal.

Mary: The labor one will be unique in itself. That will be a huge challenge because the end goal is to get their booths set up and
they are always used to using a particular EAC or what have you, but now if they're forced to use union labor they will be concerned about that.

Evident: In several cases it was evident that rules were not always clear. Multiple times it was observed that exhibitors became frustrated with what they believed to be a change in rules or at a minimum a different interpretation of the rules.

At a home show several exhibitors planned to set up large two-story structures outdoors. They thought they had followed the rules previously provided only to be told once on site that the building department had certain requirements they must meet. The expectation of exhibitors was consistency in rules not only from year to year, but across destinations. When rules changed it was evident they had to shift their priorities to take care of the issue.

During an electronics show an exhibitor asked, “Why is this facility the only place I have ever exhibited that has a ban on halogen lights?” It was evident that to the exhibitor the rule was ill-defined or possibly ill-conceived, making it difficult to establish a goal or course of action.

### Action feedback loops

<table>
<thead>
<tr>
<th>Expectation: Across groups there was the expectation that feedback would be immediate. The show has the expectation of immediate feedback from the CSM and the contractors. Based on their relationship with the show, exhibitors expect the assigned floor manager or sales representative from the show will provide whatever feedback is necessary to have a successful event. If an issue comes up they contact the show for feedback.</th>
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<tbody>
<tr>
<td>Evident: When exhibitors were faced with what they perceived to be rule changes as they tried to build multi-level structures outdoors, they were observed suggesting various solutions and wanting immediate feedback.</td>
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<td>It was also evident that experienced exhibitors would continue to solicit feedback from various sources until they received the feedback they wanted. When asked, the exhibitor would refer to the source that had provided the feedback they wanted. It was noted in a post-show report regarding the use of prohibited halogen lamps, “One of the show managers told them they were acceptable, but once I explained the policy, she made sure the lights were turned out.”</td>
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### Time stress

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<tr>
<th>Expectation: Across all NDM environments and participants it was observed that time stress was an expectation. Exhibitors, CSMs, show managers, and workers all expected some degree of time stress.</th>
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<tbody>
<tr>
<td>Meeting Rooms</td>
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<tr>
<td>Evident: In a discussion with a service worker (Richard), it was</td>
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noted that certain events are considered to be “heavy on room sets and change overs”. CSM’s and workers were under pressure as the client would request changes or set time frames that were difficult to manage. In one case a meeting room was set and then adjusted four times prior to the opening session.

It was also evident in this environment that the client was under time stress. Given a set program with guest speakers, food to be served, and various other activities, the client wanted to make sure the program was on time. In one case a key note speaker failed to show due to an issue with transportation. The client was also unable to reach the speaker by phone.

### Flooded Exhibits

Evident: At 1:30 a.m. the researcher went and observed the damage caused by the broken water pipe after being struck by a worker driving a cart. The show opened at 9 a.m. and approximately 20,000 square feet of exhibit space had to be restored. Exhibitors and show management were notified. Approximately 100 workers from various trades along with executives from a number of contractors showed up to the site to help. It was evident that time was a factor.

<table>
<thead>
<tr>
<th>High stakes</th>
<th>Expectation: Given multi-million dollar exhibits and a limited time to make sales, the expectation was any issue that impacted an exhibitor could become high stakes. The CSM wanted to make sure the show was happy, the show wanted to make sure major exhibitors were happy, and exhibitors wanted to make sure they maximized their time to make sales.</th>
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<td></td>
<td>Evident: It was evident what was considered high stakes to one person was not necessarily high stakes to another. In the case of the NDM environment with flooded exhibits it was evident that everyone considered the situation to be high stakes. When dealing with freight issues or halogen lamps, exhibitors considered it high stakes, but show managers were not as concerned. When it came to building damage the CSM’s and contractors would consider it to be high stakes, with the show manager only becoming concerned if it had a direct impact on their event.</td>
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<td>During one event a 15’ wide roll-up door was damaged and could not be opened. At the time of the damage it became a high stakes issue between the facility and the contractor as the cost of repair was estimated at $35,000. The door being out of service did not impact the immediate event, but the following week another show that had been planning over the past year to use the door as their main entrance became concerned. Not being able to use the door became high stakes for the show as they began reaching out to clients that had selected their location near that entrance.</td>
</tr>
<tr>
<td>Multiple Players</td>
<td>Expectation: Across NDM environments the expectation was that multiple players would be involved.</td>
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</table>
|              | One CSM (David) explained how every incident required different people stating, “Yeah it could vary from an exhibitor to a show manager, to the building partner to inhouse depending on the
issue. It depends on what the situation is. Sometimes I feel like I deal with a whole new department. Like in certain shows ITD or SmartCity might be a focal point. It will vary from show to show and incident to incident, from problem to problem. Because all the sudden you have a problem on the show floor, there is a leak and all the sudden I’m dealing with engineering.”

### Halogen Lamps

Evident: In most cases it was evident that the use of prohibited halogen lamps only involved the exhibitor and the facility. However, there were two cases when the show and the main contractor for the show became involved. In the first case the exhibitor refused to follow the policy and show management had the main contractor threaten to shut off the electrical. In the second case the main contractor had been responsible for developing the exhibitor kit and they failed to put the restriction on halogen lamps in the kit. This created a situation where approximately 25 exhibitors were using prohibited lights.

### Freight

Evident: In most cases it appeared exhibitors developed solutions or altered their behavior independently of any other player. In one case (Tammy) of Bair Enterprises had packed a large stuffed bear into a crate and marked the crate fragile. Upon delivery they noticed the crate had been mishandled and was damaged. Fortunately, the stuffed bear that had been with the company for decades was undamaged. Taking the initiative, Tonya had her husband overnight some tools and along with a co-worker they took pallets and reinforced the crate for the trip home.

In another case, a forklift punctured a case carrying a plasma screen that was the actual product going to be displayed by the exhibitor. The exhibitor did get multiple players involved including the main contractor and the show. The cost of the plasma screen was replaced, but the exhibitor was unable to demonstrate the clarity and features of the screen. Instead, the exhibitors hung the screen as intended and placed a small sign between the holes that said, “Insert forklift here.”

| Organizational goals and norms | Expectations: Each organization expected other organizations to understand and to some extent adapt to their goals and norms and how they operate. The CSM’s expected exhibitors to know the building rules and the norms of the convention industry. Other than setting a new attendance record, each show had their own goals and norms and they expected the building to understand their product lines, and how they set up their exhibit space. Exhibitors were the customer that expected the show and the building to understand their needs, which translated into adapting to their norms. Evident: One show wanted to paint several hundred feet of wall to create a theme and another show requested a series of trees be cut |
down so they could use the space for additional displays. In each case the building denied the request of the show.

One exhibitor that attends a variety of shows (Cindy) made the observation that corporate culture seemed to impact how exhibitors reacted to problems. She stated that exhibitors that worked for a sales organization seemed to be more aggressive and empowered to resolve problems. They appeared to be more comfortable in a tradeshow environment.

In addition, Cindy stated that the vast difference in organizational norms across the industry results in different terminology being used. In one destination what is shipped to a facility is called “drayage” and at another facility it is called “freight”.

The CEO of a major exhibitor, Samsung, was scheduled to attend a trade show. Samsung had multiple exhibits at the show. Whether it came directly from the CEO or his staff, the norm was for the CEO to have an advance team arrange for special parking allowing for a quick tour of the exhibits.

Building Damage

Expectations: CSM (Denise) was asked how organizational goals and norms impacted an incident where an exhibitor drilled into a concrete floor to set up their exhibit. Denise responded, “I think they have a big impact especially within our organization. I think when you put a bunch of policies and procedures in place that are meant to protect our building all of those are needed, but at the same token they could really have an impact on what you can do in the building as well so in that case it can be a little bit of a hindrance from an exhibitor standpoint. Certainly I think they’re necessary they have to be otherwise the wear and tear on the building would be too great, but I do think that there’s a lot of things that the building can do that maybe if they lighten up on those policies it would be a much better relationship between the exhibitor and the building, it makes us more user friendly. And do our policies really make sense? We’ve always gone down the road that we’ve always done it that way, but it could’ve been ten or twenty years. Is that still a good rule? Maybe things have changed, technology has changed that will allow us to be more flexible.”

Evident: Given multiple organizations are involved in trade shows it was evident that goals and norms had an impact on the environment. For instance, it was evident the stance of the building is to minimize damage to the facility. However, some damage is expected as evidenced by a policy that charges a small fee for repairs to the major contractor for every show. Any damage over a certain value is assessed over and above the standard fee.

Contrary to this stance, employees of the main contractor appear to intentionally damage the building. An example involved the major contractor anchoring hooks into a concrete wall to run electric cable to charge battery powered carts. This damaged the wall, but the norm for employees of the contractor is to balance the
chance of getting caught with the cost of the damage.

It was also evident that a norm of exhibitors and their appointed contractors was that a certain amount of damage to the building is an acceptable part of doing business.

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<th>Ill-structured problems</th>
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<td>“Well certainly when you’ve done enough trade shows you know what it takes. I’m always in awe of the exhibitor that shows up and they’re just so unprepared that they haven’t thought something through. Whether they have a disposal issue of a waste product, whatever it is I’m just in awe. I’m always in awe that exhibitors will show up and not be able to do business without having some last minute request. I really don’t get that because that’s key to me to run a successful event. You know your products, you know your needs and you show up unprepared?” – Denise</td>
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Expectation: Show managers and CSM’s had the expectation that at any given event there would be at least one ill-structured problem, something they had not foreseen. Novice exhibitors expected there to be support available to help define the structure of any problem they encountered while experienced exhibitors expected they would be active participants in developing solutions.

Evident: Background knowledge appeared to play a large role in determining if a problem was ill-structured. It was evident that what was ill-structured for one person was structured for another. Those with more experience had developed relationships that helped provide structure to problems while those with less experience had not yet established those same relationships.

In a number of the identified NDM environments it was evident that when a problem was ill-defined the show managers, CSM’s, and the main contractor would routinely use a concurrent process of bringing resources together and developing a solution while at the same time positioning themselves to avoid being the responsible party.

Rules/Interpretation

Expectation: All parties stated that rules helped provide structure. The expectation is that rules and policies bring clarity and solutions.

Evident: It was evident that novice exhibitors were more likely to reference rules, while experienced exhibitors referenced relationships and past experience. It was evident that rules and policies were actually tools for achieving resolution not based on what the rule stated, but by shifting responsibility to another party.

An example of an exhibitor seeking structure was an issue where the exhibitor had brought in several cases of bottled water, violating the policy against bringing in any outside food or beverage. In seeking resolution the show informed the exhibitor it was a building policy. The CSM informed the exhibitor it was a contractual obligation, that the main food vendor Aramark was the
exclusive provider of all food and beverage. The CSM, believed the exhibitor knew the rule and had intentionally violated it, but allowed the exhibitor to keep the cases of water with the understanding any additional food or beverage would be ordered through Aramark.

| Problem redefinition | Expectation: Given uncertain, dynamic environments and multiple players it was acceptable and expected that a variety of solutions would be proposed or the problem would be redefined. 

Evident: It was common that exhibitors, show managers, CSM’s, and contractors would look at a problem from various perspectives. 

In one case a government regulator informed an exhibitor they needed to provide a second exit from a two-story home. This would require a stairwell to be installed on the outside of the building. The stance of the regulator was at a tradeshow the home is no longer a home, it is an exhibit that will be full of people. The exhibitor stated the home was the product they were going to sell and adding a stairwell was impractical and expensive. The exhibitor argued that being at a tradeshow would be no different than hosting an open house in an established neighborhood. The problem was defined and re-defined as show managers, CSM, the regulator and exhibitor tried to agree on a solution. In the end the exhibitor spent $16,000 to modify the home. |

Location

Expectation: Show management had the expectation that exhibitors compete to obtain the best location on the show floor. In determining where each exhibitor will be placed, the show sets up a process for space selection based on seniority. Part of the process involves dividing the show floor into “product areas”.

Evident: At the end of an event the researcher was able to spend a day with show management as exhibitors selected exhibit space for the following year. As the show would talk with exhibitors, they discussed what space was still available. For this specific event there were a wide variety of product areas including one area for exhibitors that sold tires, another area was designated for exhibitors that sold rims, and a third was a hybrid area for a combination of rims and tires.

After hearing what was available, two exhibitors redefined the problem by asking questions about what it would take to be considered for other product areas. One exhibitor that sold tires asked if by including a percentage of rim products if he could select an area outside of the designated tire area. Another exhibitor suggested that they had been in discussions with a company that sold rims to possibly secure a single exhibit space for both companies so they could be placed in the hybrid area.

The end result of the space selected by the two exhibitors is
unknown, but it was evident the hybrid product area was considered valuable and that the exhibitors were willing to redefine the problem to get access to that area.

**Problems and idea analysis**

| Expectations: The researcher did not find agreement that solutions to a problem would be the best possible solution. In one interview, the CSM (Jenelle) stated, “At some point you just go with it,” referencing that not every solution will be ideal. Others referred to time limitations as a constraint for providing the perfect solution and made the caveat that it was the best solution given what they had to work with.

Evident: Time was an evident limitation in conducting a full analysis of a given problem and the ideas to solve the problem. The concurrent process of collaboration and gathering resources while avoiding blame support this constraint.

**Floods**

Expectation: Exhibitors had the expectation that their booth would be restored to its original condition. Given no time constraints any damaged exhibit could be removed from the flooded area, the area repaired and the exhibit rebuilt.

Evident: In one case a cart ran into a water line flooding a 20,000 square foot area of the show floor. The show was scheduled to open in only a few hours. Carpet was cut away, water literally shoveled into garbage cans until equipment arrived to help, the floor was dried and new carpet put down. It was agreed that it was not an ideal solution, but collaboratively the best solution given the circumstances.

**Selling the solution**

Expectation: More experienced exhibitors had the expectation that during an NDM environment they may need to sell a solution. CSM’s, show managers, and contractors looked at an incident as requiring a collaborative effort and mutual agreement. Novices did not realize they may need to sell a solution relying on the judgment of more experienced others. Only when novices realized they would need to lower their expectations did they try to sell a solution.

Evident: Across NDM environments it was evident that many times individuals would attempt to sell the solution they would prefer. For instance, in the case of two-story homes that were required to install stairs leading down from the outside the exhibitor tried to sell a number of solutions.

**Location**

Expectation: A show had placed a number of lounges in areas on the show floor with the expectation that since they had leased the floor and they had seen similar lounges used at other venues there would not be an issue.

Evident: The building had restrictions on what areas could be used and denied the use of a total of four lounges, telling the show they...
could not begin to move into the facility and that they would be in violation of their lease. It was evident the shows expectations were not being met and they had to sell a solution to allow the lounges to be used. Eventually, the show removed furniture, adjusted the size of the lounges, and agreed to absorb the expense of using crowd managers to control the flow of people through the areas.

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<th>Recognizing knowledge limitations</th>
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<td>“I’m very fortunate because I’ve been in the building almost 25 years so I have a very good relationship with my clients. When I get difficult clients...Coffee for instance was a very high maintenance show and he was a drama King. He wanted to walk the show floor just to let me know what doors to open and it was very simple because it’s one hall and he said he was over at the Hilton and I’ll call you when I get over there. And so I call him at 3:30...are you back yet I asked him, is it something you can do over the phone? Yes, but he wasn’t happy, he was a total drama King. I just don’t have patience...it’s not rocket science, it’s not brain surgery. I can help you over the phone and he ended up being fine. I don’t have fear or tension, it’s more of an annoyance...like really?” – (Kasey)</td>
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| “I think attitude reflects leadership. I think they have to lead by example. You have guys down there that have been here 20 to 30 years that are not going to want to change, but if you have a really strong leader down there, someone who is positive and not a whip cracker, you get more done with honey than vinegar.” – (Jenelle) |

| Evident: The more experienced a person was in the industry the more they did not recognized knowledge as a limitation to creativity. |

| Expectation: Novice exhibitors had the expectation that there would be certain knowledge limitations, such as not being familiar with a building policy, and this may hinder their success. Experienced exhibitors, CSM’s, show managers, and contractors were sources of knowledge and did not associate this knowledge with any limitations. |

| Evident: There was an evident culture of information sharing and relationship building. Novice exhibitors appeared to learn from other exhibitors. Modeling what other exhibitors did was apparent. |

| In one show a series of exhibitors had used pipe and drape to hang clothing products along dead end aisles. In another event exhibitors used bed sheets to secure their wares after show hours while at another event using orange construction fencing was noted. It was evident there was a difference in culture between events and over time exhibitors had learned from one another. |

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<th>Sensible risks</th>
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<td>“They wouldn’t do it in their house and they wouldn’t do it with their money, but they’ll go in your house with the company’s money and basically state whatever damage is done is the cost of doing business. I think they’ve made that decision it truly is a risk and they just want to try to see if they get caught and who’s going</td>
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to catch me?” – (Denise)

**Expectation:** There was the base expectation that sensible risks are part of any trade show. In various NDM environments from building damage to rule changes exhibitors, show managers, contractors and CSM's had the realization that corners were being cut, risks were being taken.

**Evident:** Given an NDM environment it was evident sensible risks were in line with expectations. When dealing with multi-million dollar exhibits and time stress exhibitors and contractors chose to take risks.

A good example was an exhibitor that had a large wood working machine. The machine was sensitive to vibration so it needed to be anchored into the ground, a requirement that could not be met sitting on a concrete floor. The exhibitor decided to drill into the concrete and was willing to risk the potential consequences.

### Willingness to surmount obstacles

“**I don’t think we have failures, we just run out of time. ConExpo is a perfect example. All those booths we had to get stamped in a timeframe. Did we fail out there? Absolutely not. I never think we fail but failures are relative so it depends on who you’re talking to.”**

– (Mike)

**Expectation:** Across all NDM environments there was one consistent expectation, that the show must go on. Regardless of obstacle, the show will open.

**Evident:** The researcher never observed an obstacle that through collaborative effort was not resolved. However, it was evident that not all parties were satisfied with the solution. In some cases expectations were lowered.

#### Halogen Lamps

**Evident:** During one event two exhibitors in close proximity were both using prohibited halogen lamps. Both were informed they could not use the lamps for the duration of the event. Union electricians advised they could replace the lamps with suitable lighting for a fee.

One exhibitor decided the expense was too much and made no other attempts to surmount the obstacle, The second exhibitor decided the best approach was to complained to a CSM, then asked permission for only the show, and eventually surmounted the obstacle by going to a hardware store after show close the first day and purchasing track lighting. The exhibitor violated union rules and saved several thousand dollars by installing the lights before show open the next day.

### Self-efficacy

**Expectation:** When discussing the belief in one's ability to accomplish the task at hand it was expected that novice exhibitors would have less self-efficacy than more experienced others.

**Evident:** During NDM incidents it was evident the less experience an exhibitor had the more reliant they were on capable others. It
was not that they had no self-efficacy, but appeared to favor modeling others and looking for others experiencing the same challenge. Individuals with experience had established relationships, knew the rules, and were more confident in resolving an issue.

One exhibitor (Cindy) said rookie exhibitors simply don’t know what they can and cannot do. They are afraid to challenge the bill or they don’t know that it is even an option. They have a fear of the workforce, because they have heard myths about retaliation if they complain about the service.

During one event the researcher sat on a bench watching exhibitors bring their product into the building. The researcher observed one exhibitor pull up with a moving van, get out, talk to other people and then drive away. Forty minutes later the van came back and the exhibitor began offloading their wares. The researcher was able to talk with the exhibitor and found out they were a small company out of California and it was their first trade show.

The exhibitor was friendly and explained that when they initially pulled up they saw that people were paying union workers to unpack and take product into the building at the freight door. Wanting to avoid the extra fees, the exhibitor drove around the building and saw people carrying in items through some glass doors. He talked with these exhibitors and was told there was such a thing as “hand carry”. This policy would allow him to bypass the union. Since his booth was closer to the area where the researcher was observing he came back to that side of the facility and began carrying in his product through the glass doors next to the freight door. It was evident the exhibitor had a belief they could accomplish the task without paying the union and they did so by modeling other exhibitors.

<table>
<thead>
<tr>
<th>Willingness to tolerate ambiguity</th>
<th>Expectation: Consistent with the NDM criteria of uncertain, dynamic environments the expectation of CSM’s, show managers, and exhibitors is in a convention environment there can be a level of ambiguity.</th>
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<td>Evident: It was evident the more experience an individual had the less willing they were to tolerate ambiguity, especially if it resulted from a change or new interpretation of rules. Less experienced exhibitors were not familiar with past practice. They did not have the background knowledge resulting in limited expectations. More experienced exhibitors and show managers had seen countless tradeshows in many venues and had set expectations not to be adjusted.</td>
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<tr>
<th>Extrinsic reward for intrinsic motivation</th>
<th>Expectation: During an NDM environment the collaborative effort to resolve the situation defined the expectation across all parties that extrinsic rewards were to be preserved, i.e. NDM environments cost money.</th>
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<td>Evident: During the time the researcher was at the site there was</td>
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no readily observable incident that adequately demonstrated an individual having intrinsic motivation to gain an extrinsic reward. While there may have been some intrinsic motivation to resolve an NDM environment, factors of an NDM environment place extrinsic motivation, such as time stress, on individuals to develop solutions.

There were several incidents and discussions that brought forth the concept of collaboration and taking action for no other reason than it being the right thing to do, but actions were always driven by external motivators in the environment.

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<tr>
<th>Continued growth</th>
<th>“And do our policies really make sense? We’ve always gone down the road that we’ve always done it that way, but it could’ve been ten or twenty years. Is that still a good rule? Maybe things have changed, technology has changed that will allow us to be more flexible.” – (Denise)</th>
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<td>Expectation: The above demonstrates the struggle between how things have always been done with the recognition that it may no longer be the best way. The expectation was to remain competitive there has to be continued growth. Exhibitors expect to come to tradeshows and not only sale their product, but to learn about best practices in their industry and see what their competitors are doing.</td>
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<td>Evident: In talking with exhibitors it was evident that continued growth is a normal part of the convention culture. The main difference noted was novice exhibitors appeared to more readily accept the need for growth while experienced exhibitors were set in their ways and had the belief that they knew what works. When discussing an NDM incident after resolution the common theme was regardless of experience there is always something to learn.</td>
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<td>One exhibitor (Julie) noted, “I’ve been coming to this convention center for 36 years. Nothing surprises me anymore, but I still learn something new every show.”</td>
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### Exhibit 4

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<tr>
<th>Event</th>
<th>Problem redefinition</th>
<th>Problem and idea analysis</th>
<th>Selling the solution</th>
<th>Recognizing knowledge limitations</th>
<th>Taking a sensible risk</th>
<th>Surmounting the obstacle</th>
<th>Self-efficacy</th>
<th>Tolerance of ambiguity</th>
<th>Continued intellectual growth</th>
<th>Extrinsic rewards for intrinsic motivation</th>
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<td><strong>Uncertain dynamic environments</strong></td>
<td>“Certainly it’s a big difference if you’re responding to a problem that already exists or if you’re trying to solve a problem for an exhibitor. I think if the exhibitor gets the building or the CSM involved there’s all sorts of ways we can help them and a lot that could be done. One that comes to mind is draining water out of spas at a spa show. If they were to solve it themselves they would take out a hose and run it out the nearest door and let the water go, but being proactive and knowing problems like that exist for that show, we can be proactive enough to get out to all those exhibitors how to get rid of the water. Then you take away a lot of that uncertainty, because you’ve been proactive. Eventually you have done enough shows that you have that experience behind you.” – (Denise)</td>
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<td>There did not appear to be a big gap between the expectations and what was evident. Regardless of experience there was an expectation that the convention industry has a degree of uncertainty. The researcher found the primary reason why this condition exists is that background knowledge is both an affordance and a constraint. As noted, a proposed solution is to be proactive and let exhibitors know up front how to solve the problem.</td>
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<td>Those experienced in the industry had the affordance of background knowledge. They had lived the experience and therefore knew what to expect. The expectation was that regardless of rules, process, etc., that any number of issues can develop resulting in an uncertain dynamic environment. For those new to the industry they had the constraint of background knowledge. Even though exhibitor kits full of rules and procedures were provided, it did not stop the novice from having the expectation that this new experience would have a degree of uncertainty.</td>
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<td>It also did not appear to matter across the eight identified NDM environments. For novices they were either brand new or had only experienced a few shows with minimal exposure to NDM environments. For experienced others they may have had the lived experience of dealing with multiple NDM environments, but the expectation was the same environment may reoccur with a new twist or they may find themselves in a new situation altogether.</td>
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<td><strong>Shifting, ill-defined, or competing goals</strong></td>
<td>It was evident that most participants did not recognize that there were competing goals. The expectation was the industry is there to support exhibitors and that everyone wants the show to be a success. From a macro perspective this was found to be true, but it was evident that at lower levels lines were drawn and battles fought to achieve goals at the expense of others.</td>
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| | Why there is a gap between what is evident and what is expected was found to be a systemic constraint. As individuals, each
participant only interacts with a small part of the overall system. While a trade show or convention may be planned for a year or more, the physical process of hosting a typical event takes only a few days to a week. During this physical process the individual exhibitor only experiences their event and the expectation is that as the customer the system must be designed to support and make sure the event is a success. It would be counterintuitive for there to be ill-defined or competing goals. The individual exhibitor is constrained by their exposure to only their event.

The workers and organizations that support the convention industry must navigate every event. This provides the affordance that with each event small battles can be fought to gain some objective (power, market share, money). The best support for this finding is the multiple union pickets that took place during observation. In addition, the researcher noted in other areas that while various entities collaborate to resolve an NDM incident they maneuver to avoid blame and conserve assets and/or resources. In one case a contractor had spilled a large quantity of paint on the floor and it had dried. They avoided paying for the clean up by arguing that the issue was ill-defined creating a delay until which time the building ended up using internal labor to clean the floor.

| Action feedback loops | Across almost all environments the expectation was consistent with what was evident. When an NDM incident took place the expectation was action would be followed by feedback and it was evident this did take place. Why there is not a gap was found to be related to the fact that time is for the most part a non-negotiable constraint. As the open to an event draws closer the ability to delay either action or feedback was not considered an option. And, after an event was over there were still time constraints as exhibitors needed to get home and the industry had to get ready for the next event.

The one exception appeared to be the "Freight" environment. The expectation by exhibitors was that freight would be delivered on time and in good condition. When delays were experienced or freight was misplaced they took action, but received little feedback. The researcher found exhibitors are constrained by both time and a non-transparent system that allows those in the industry to shift attention to the process. When an exhibitor would inquire about the status of their freight it was not uncommon for them to be questioned and then told it could be any number of places such as never having made it through customs, on a train, airplane, boat, or truck, in the marshaling yard, in a lot, etc. The chain or process of freight being delivered provided an affordance for the freight boss to avoid providing accurate or timely feedback. |

| Time stress | When it came to time stress expectations were in line with what was evident. The researcher found this was because of the general nature of a convention requires meeting various time tables for success. Given a convention will start on a specific date at a specific time exhibitors must plan based on these parameters. This means in order to be set-up and ready to make sales on opening day a sequence of time sensitive tasks must be completed. First, |
their product must arrive at the convention center before show open, prior to that their exhibit must be set up, prior to that product and materials must be designed and shipped, etc. With each step in the process there is time stress because any delay during one step will compress or delay the next step moving forward. The researcher found that time was an expected constraint across all environments.

Why time was considered important appeared to center around show open. It was at this point that an exhibitor transitioned from setup to making sales. With BOT, time stress appeared to drop off rapidly after the show opened. In addition, it appeared at show open the exhibitor had either maintained their goals or modified them.

<table>
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<tr>
<th>High stakes</th>
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<td>While all participants had the expectation that high stakes were involved at a convention or trade show, what became high stakes was dependent upon the perspective of the individual participant. Across all NDM environments it was evident that any incident that had either significant financial implications or impacted time available was considered high stakes.</td>
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<td>The researcher found exhibitors primary gauge for high stakes was how they perceived a particular issue would impact sales. One CSM stated that for some exhibitors a single convention may represent anywhere from 20% to 50% of their sales for an entire year, so any issue that impacts them being able to make those sales is high stakes.</td>
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<td>From the exhibitors perspective it was found all NDM environments had the potential to constrain sales, but from the perspective of show managers, CSM’s, and workers in the industry it was found the existence of an NDM environment did not necessarily have significant impacts, i.e. was not necessarily high stakes. The researcher found this to be a pragmatic part of the system that gave show managers and industry more flexibility in dealing with NDM environments. An issue with an individual meeting room, halogen lamps, or freight would not generally result in a large financial impact to the show or industry, therefore it was not high stakes. Examples of high stakes for a show or facility such as large strikes resulting in multi-million dollar losses or an entire show canceling due to a world event came up in discussion, but were not observed by the researcher.</td>
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<th>Multiple Players</th>
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<td>When an NDM incident took place there did not appear to be a gap between what was expected and what was evident. Regardless of experience there was the expectation that resources would be made available to resolve the situation and the researcher observed multiple players were always involved.</td>
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<td>While multiple players were always involved, there was a gap between the expectation that these players would help resolve the situation and what was evident. Exhibitors held the expectation that all players are there to meet there needs, but it was evident</td>
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that needs were not always met. On more than one occasion exhibitors would use the tactic of going from player to player until they received the answer that met their expectation. When later it was determined the answer was not correct the exhibitor or in some cases show manager would look to pit the other players involved against each other. The researcher found that the more players involved in an NDM incident the easier it was for exhibitors and show managers to use this tactic.

<p>| Organizational goals and norms | There was a gap in the expectation of how organizational goals and norms contributed to an NDM incident against what was evident. The researcher found the wide diversity of organizations and the short exposure of a trade show made it difficult for participants to accept and navigate around the organizational goals and norms of another. With a typical trade show bringing in hundreds of exhibitors and large events bringing nearly two thousand, accommodating every organizations goals and norms is not practical. Industry provides rules and processes to accommodate both the industry and the majority of customers, but does not have the resources to meet the expectations of every exhibitor. A good example is the employee that worked for Samsung that did not appear to understand why the CEO of Samsung did not dictate where he would park and for how long he would be there. |
| Ill-structured problems | The researcher was not able to identify a gap between participant expectations as to the possibility of an issue being ill-structured, but did find what was considered to be an ill-structured problem for one participant was not necessarily ill-structured for another. When asking why, the researcher found that background knowledge developed from the lived experience determined to a large extent if the problem was ill-structured. Except for the most experienced exhibitors like (Cindy), exhibitors had not dealt with the entire range of NDM environments. While an exhibitor may have had issues with freight, a flooded exhibit, or problems with a meeting room, they most likely had not experienced all three. On the other hand, those that worked in the industry at one time or another had interacted with all of the NDM environments or a derivative thereof. |
| Problem redefinition | The gap between what was expected and what was evident was found to be dependent upon experience and the particular NDM environment. Overall, there was the expectation across environments that one had to be willing to redefine a problem. However, it appeared that exhibitors with less experience were more willing to redefine a problem, while more experienced others relied on past practice and techniques they had used in previous incidents. It was not until the past techniques were found to not solve the problem that more experienced others would look to redefine the issue. The researcher found that experience was actually a constraint to creativity, causing a delay as experienced others attempted to resolve incidents based on past practice prior to redefining the problem. |
| Problem and idea analysis | The researcher found that NDM environments constrain the expectation that a creative person will look to thoroughly analyze the problem and go with with the best possible solution. However, this same environment also provides the affordance that a problem exists and therefore requires a solution. In looking to determine why, the researcher found participants regardless of experience attempt to analyze the problem and develop solutions, they are simply constrained by time to necessarily implement the best one. |
| Selling the solution | Because NDM environments involved multiple players the researcher found that participants were always trying to sell their solution. A constraint for novice exhibitors was the difficulty of making the sale to more experienced others. Having more background knowledge and in some cases having experienced a similar NDM environment was an affordance for experienced others who would use this as the selling point for their solution. The researcher found that most participants attempted to sell their particular solution to gain what was in their best interest or the best interest of their organization, not necessarily in an intentional effort to be creative. |
| Recognizing knowledge limitations | It was apparent that the more experienced in the industry, the less the person recognized that knowledge was a potential limitation to creativity. While every participant that was asked claimed they were always learning something new and were open to new ideas, an apparent constraint for experienced participants was they were bound by their experience. Much like analyzing what was taking place in an NDM incident, the experienced exhibitor relied on past practice while the novice sought out new information. Why this was an apparent affordance for the new exhibitor was they had no previous conception of how an issue was suppose to be handled. |
| Sensible risks | Exhibitors with less experience were constrained in their ability to take sensible risks. Across all NDM environments it was apparent that new exhibitors relied on experienced others to help resolve issues. It was not that new exhibitors took no risks, in fact one exhibitor used his novice label to claim ignorance to the rules. However, overall it appeared lack of experience constrained novice exhibitors because they were unable to confidently gauge the potential consequences of a given risk. Experienced others had a much better understanding of the larger convention environment surrounding an NDM incident. This provided the affordance of being able to better determine if a risk was sensible. |
| Willingness to surmount obstacles | NDM environments presented obstacles to all participants. Both novice exhibitors and more experienced others were willing to surmount obstacles. Because every incident resulted in multiple players being involved obstacles appeared to be resolved through collaboration. This made it difficult to determine any difference between novice exhibitors and more experienced others. Why participants were willing to surmount obstacles appeared to be primarily driven by time constraints and the importance placed on having a successful event. |</p>
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<th><strong>Self-efficacy</strong></th>
<th>When confronted with an NDM environment the researcher found prior experience in the industry was an affordance for experienced others and a constraint for novice exhibitors. Across environments the researcher noted that novice exhibitors were not nearly as confident in their abilities to handle a situation. Why the difference in self-efficacy appeared to be strictly related to having less experience.</th>
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<td><strong>Willingness to tolerate ambiguity</strong></td>
<td>From the aspect of creativity the researcher found more experienced others were not as willing to tolerate ambiguity. While participants of all levels of experience stated that uncertainty and ill-structured problems were to be expected in a convention environment, the more experienced others were constrained by their expectations from previous events. More experienced not only did not want to tolerate ambiguity, but expected the problem to be resolved faster and with less effort. While the novice exhibitor had the expectation that the industry would help them with problems in an effort to provide great customer service, they did not appear to have the same constraints when facing a problem. More experienced others often referred to how other convention centers would handle a problem or what the rules did or did not say.</td>
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<td><strong>Extrinsic reward for intrinsic motivation</strong></td>
<td>There were no observed examples that demonstrated an extrinsic reward for intrinsic motivation. Why this was the case is suspected to do with the nature of NDM environments including time stress and high stakes. The environment appeared to drive creativity, not the other way around.</td>
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<td><strong>Continued growth</strong></td>
<td>Both novice exhibitors and more experienced others reflected after an NDM incident and would note that there is always something new to learn in the convention industry. Why there is continued growth is that in the industry there are NDM environments which present challenges for individuals at all levels of experience. A unique observation for this creative criteria was that novice exhibitors had the affordance to learn and grow during an NDM incident by collaborating and modeling more experienced others. However, even more experienced others were found to believe in continued growth through multiple statements regarding how a given incident may look the same, but there is always a twist.</td>
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### Exhibit 6

| NoteRemaking  | (Recommendations) | Uncertain dynamic environments | Maintain: Within a convention environment there was no apparent method to eliminate all uncertainty. NDM incidents are an inevitable part of convention business.  

Looking across all NDM environments it was apparent that there are affordances already in place to notify exhibitors of potential problems, e.g. rules on halogen lamps, freight regulations, etc. However, it is difficult to be proactive and provide those same affordances for issues such as floods or strikes. A good example of the challenge is the NDM environment of rule changes/interpretation. The environment is in itself an affordance in that rules are created to be proactive in reducing uncertainty. But, interpretation and perceived changes of the rules create uncertainty. |
| Shifting, ill-defined, or competing goals | Modify: The main gap is created by exhibitors perceptions of a unified purpose to provide customer service. While the gap cannot be eliminated, recommendations to reduce the gap include (1) development of a neutral process to resolve competing goals prior to an event and (2) communication to exhibitors of potential conflicts. |
| Action feedback loops | Maintain: There is no gap and the industry is already responsive as action feedback loops are the norm. In specific environments such as halogen lamps or freight a review of types of actions or feedback is recommended. |
| Time stress | Maintain: There is no gap and no recommended actions that could effectively modify the environment. Time stress is a normal constraint within a convention environment. |
| High stakes | Maintain: There is no gap and no actionable recommendations. There is a measure of subjectivity by exhibitors as to what is considered high stakes. |
| Multiple Players | Modify: While there is no gap, it was determined novice exhibitors are not as familiar as experienced others with which players are best suited to help with resolving an NDM incident. The recommendation is to modify exhibitor kits to avoid filtering contact with appropriate players. Currently most kits use floor managers as the primary point of contact for all issues. More experienced others learn to bypass floor managers. |
| Organizational goals and norms | Maintain: While there is a gap, in that exhibitors expect accommodation of their organizational goals and norms, there are no actionable recommendations. The diversity of organizations that visit the site makes it impractical to provide affordances for every organization. |
| Ill-structured problems | Modify: As with multiple players, novice exhibitors did not have appropriate contacts for helping define the problem. The recommendation is to provide the affordances available to experienced others, i.e. the information of who to contact. |
| Problem redefinition | Maintain: Exhibitors were found to redefine issues to serve their own interests. There are no actionable recommendations to modify self-serving interests. |
| Problem and idea analysis | Maintain: While there is a gap, exhibitors expect a full and fair analysis that allows the best solution to be implemented, time constraints do not provide that affordance. There are no actionable recommendations that would provide the affordance of a full review of all solutions. |
| Selling the solution | Modify: An actionable recommendation is to educate novice exhibitors of how to sell solutions. Currently novice exhibitors do not realize they may need to sell a solution during an NDM incident. The expectation is being the customer the industry will provide the appropriate solution. |
| Recognizing knowledge limitations | Modify: A recommendation is to provide novices similar tools, i.e. contacts and resources used by expert others. |
| Willingness to take sensible risks | Modify: Experienced others are more willing to take sensible risks. The recommendation is to provide novices with information or parameters that allow them to better understand the risks. |
| Willingness to surmount obstacles | Modify: Experienced others are more willing to participate in surmounting obstacles. The recommendation is to provide novices with the tools and resources available to experienced others so they are capable of a greater degree of participation. |
| Self-efficacy | Modify: It is recommended that additional educational opportunities are made available to novices so they may build the knowledge and experience necessary to raise self-efficacy. |
| Willingness to tolerate ambiguity | Maintain: Novices already have a higher tolerance for ambiguity than more experienced others. There are no recommended actions to increase the tolerance for more experienced others. |
| Extrinsic reward for intrinsic motivation | Maintain: There were no observed examples that demonstrated an extrinsic reward for intrinsic motivation, therefore there are no actionable recommendations. |
| Continued growth | Modify: Provide education and resources so novices have the same support available as experienced others. |
APPENDIX 2
IRB APPROVALS

Social/Behavioral IRB – Exempt Review
Approved as Exempt

DATE: November 19, 2009
TO: Dr. LeAnn Putney, Educational Psychology
FROM: Office for the Protection of Research Subjects
RE: Notification of IRB Action by Dr. Paul Jones, Chair
Protocol Title: The Role of Creativity in Natural Decision-Making Environments: A Systems Approach
OPRS# 0909-3203

This memorandum is notification that the project referenced above has been reviewed by the UNLV Social/Behavioral Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed exempt from IRB review. It is not in need of further review or approval by the IRB.

PLEASE NOTE:
Attached to this approval notice is the official Informed Consent/Assent (IC/IA) Form for this study. The IC/IA contains an official approval stamp. Only copies of this official IC/IA form may be used when obtaining consent. Please keep the original for your records.

Any changes to the exempt protocol may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a Modification Form.

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at OPRSHumanSubjects@unlv.edu or call 895-2794.


VITA

Graduate College
University of Nevada, Las Vegas

Richard Hendrik Feenstra

Degrees:
  Bachelor of Science, Tourism, 1994
  Texas A&M University

  Master of Science, Education Human Resource Development, 2000
  Texas A&M University

Dissertation Title: The Role of Creativity in Naturalistic Decision-Making Environments: A Systems Approach

Dissertation Examination Committee:
  Chairperson, LeAnn Putney, Ph. D.
  Committee Member, Gwen Marchand, Ph. D.
  Committee Member, Kendall Hartley, Ph. D.
  Graduate Faculty Representative, James Crawford, Ph. D.