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Relationship Between Creative Problem Solving Profiles and Career Choice

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RELATIONSHIP BETWEEN CREATIVE PROBLEM SOLVING PROFILES AND CAREER CHOICE

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HONORS PROJECT

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Research Question

The Basadur Creative Problem Solving Profile (CPSP) is an instrument that includes four distinct profiles – Generator, Conceptualizer, Optimizer and Implementor – that are used to describes individuals' unique creative problem solving styles. Min Basadur of McMaster University, George Graen of the University of Cincinnati and Mitsuru Wakabayashi of Nagoya University introduced this instrument in 1990 in an article titled "Identifying Individual Differences In Creative Problem Solving Style" published in the Journal of Creative Behavior (Figure 1 in the Appendix). This instrument lists eight steps within the creative problem solving process and identifies the steps (Figure 2 in the Appendix) that individuals within each profile have a "relatively greater or lesser inclination" to utilize (Basadur, Graen & Wakabayashi, 1990). According to the previously mentioned article, Basadur's Creative Problem Solving Profile has four main benefits: 1) It looks at creative problem solving as more than just brainstorming but rather an entire process; 2) It helps one understand the steps involved in the process of creative problem solving; 3) It helps people understand their own creative problem solving styles; 4) It helps people appreciate others' creative problem solving styles.

Along with the creation of the Basadur Creative Problem Solving Profile came the development of a test known as Basadur's Inventory that defines one's method of creative problem solving. The test gives individuals a score within each of the four profiles, showing which categories the individuals prefer and to what degree (Figure 3 in the Appendix). This test requires participants to rank sets of words on a scale from one to four according to how well the words correspond to their unique problem solving style. The scores are tallied and each individual is identified as having a preference towards one of the four

Creative Problem Solving Profiles: a Generator, a Conceptualizer, an Optimizer or an Implementor.

The Basadur Creative Problem Solving Profile will be used as the basis for this research project. The Creative Problem Solving Inventory will be used to discover information about how undergraduate students within Bowling Green State University's College of Technology, Architecture & Applied Engineering, specifically students majoring in Visual Communication Technology, Architecture and Environmental Design, Construction Management and Aviation Studies, apply their skills when solving creative problems. Even though these majors are all within the College of Technology, Architecture & Applied Engineering, they all are intrinsically different, raising the question as to which stages of the creative problem solving process students from each major prefer and into which Creative Problem Solving Profile students from each major will be placed.

Literature Review

What is creativity? If asking several people, chances are the answers will be varied, but most likely the answers will include "words such as *new, unusual, ideas, out of the ordinary, imagination, unique, exciting, wacky, open, fuzzy,* or *something radically different*" (Isaksen, Dorval & Treffinger, 2011). It is difficult to give an exact definition to creativity because it is such an abstract concept, and according to Isaksen, Dorval and Treffinger (2011), there is "no universally accepted definition." In 1950 when people were at the forefront of studying creativity, Guilford (1950) stated, "Creativity refers to the abilities that are most characteristic of creative people." Through extended research over the past sixty-some years, the definition of creativity has become less vague. According to Isaksen,

Dorval & Treffinger (2011), "Gryskiewicz (1987) defined creativity as novel associations that are useful." Over twenty years later, Hennessey and Amabile (2010) concurred. They affirmed, "Most researchers and theorist agree that creativity involves the development of a novel product, idea, or problem solution that is of value to the individual and/or the larger social group." Hennessey and Amabile (2010) settled on a definition of creativity. They defined creativity as "the generation of products or ideas that are both novel and appropriate." Through the extensive research that has been done to date, it is safe to say that this definition is a widely held one.

With a functional definition of creativity stated, one may wonder why creativity is studied. The answer to that question really is simple. Creativity plays an important role in everyone's lives and is "one of the key factors that drive[s] civilization forward" (Hennessey & Amabile, 2010). Creativity is inherent in all people. It was once believed that creativity was a gift that only certain people were fortunate enough to have. According to Isaksen and Treffinger (2004), Pros Vanosmael, a writer and academic, asserted that Alex "Osborn broke a 2,000 year-old paradigm that assumed you were either born with creative talent, or had no chance to develop it." Alex Osborn was "a founding partner of the Batten, Barton, Durstine and Osborn advertising agency [BBDO] and founder of the Creative Education Foundation" (Isaksen & Treffinger, 2004). Osborn was also the original developer of the explanation of Creative Problem Solving and is the one credited as coming up with the term "brainstorming." Because of the work of Osborn and others, most researchers now agree that creativity is not something that only geniuses have, nor is it something that is only within artistic individuals. Creativity can be expected, "no matter how feeble or how infrequent," of all individuals (Guilford, 1950). Isaksen, Dorval and

Treffinger (2011) stated, "creativity exists in all people (at different levels and [in] various styles)." Even though creativity exists in all people, everyone has varying levels of creativity and different styles of creativity. No person's level or style of creativity is exactly alike and "understanding your personal creativity, and the creativity of those around you, will help you be more successful in deliberately using your creativity" (Isaksen, Dorval & Treffinger, 2011). Understanding the creativity of others as well as one's own creativity makes individuals more efficient at using their own creative skills and helps people work together at accomplishing creative tasks and solving creative problems. For this reason, the study of creativity proves beneficial.

In the past, the study of creativity has focused quite a bit on one's level of creativity, which is "how much creativity an individual possesses or to how well one uses ones creative capacity" (Isaksen, 2004). Many have studied the extent of creativity that individuals possess trying to answer the question "How creative am I?" (Isaksen, Dorval & Treffinger, 2011). In recent years, the study of creativity has shifted. Instead of asking the question "How creative am I?" researchers are now asking "the question, 'How am I creative?' This question deals more specifically with the form, kind, or style of creativity, rather than the level, degree, or amount" (Isaksen, Dorval & Treffinger, 2011). Creative style focuses on the ways that "people prefer to use their creativity" (Isaksen, 2004). Individuals tend to have a propensity towards specific behaviors when it comes to using creativity. Isaksen and Aerts (2011) refer to the shift in focus from individuals' creative level to individuals' creative styles as the "level-style issue." Isaksen and Aerts (2011) also believe that one's creative style "includes both divergent (generating) and convergent (focusing) kinds of problem solving aimed at gaining clarity when facing ambiguous or ill-

structured situational demands, generating new ideas and alternatives, and building and developing options and plans to implement novel insights." Divergent and convergent assessment both play a role in creativity, especially when it comes to creative problem solving, and an individual's creative style may lead him or her to have more or less of a preference towards either divergent of convergent thinking. Differences in creative style preferences such as this have become the subject of research for many over the past several years.

One researcher for which creative style preference was the subject of extended investigation is Dr. Michael J. Kirton. Kirton (2003) developed the Adaption-Innovation Theory, which "explores and describes preferred individual differences in the way humans solve problems." Kirton mentions the importance of problem solving by relating it to the survival of mankind. He argues that mankind must "manage change and diversity or perish" and believes that problem solving is the key to managing change and diversity. Kirton's Adaption-Innovation Theory ranks individuals on a scale from highly adaptive to highly innovative. A highly adaptive individual would be described as being very precise and reliable. He or she is one to conform and select solutions that are tried and true (Kirton, 1994). On the other side of the spectrum, a highly innovative individual may be described as undisciplined or impractical. He or she enjoys unstructured situations and looks for new solutions (Kirton, 1994). It is highly unlikely that any person would be classified as strictly adaptive or strictly innovative. Instead, individuals are placed on a continuum between the two distinctly different categories. Kirton's Adaption-Innovation theory is just one tool used to classify individuals based on styles of creativity and problem solving.

Another tool used to classify individuals based on styles of creativity and problem solving is VIEW: An Assessment of Problem Solving Style. Selby, Treffinger and Isaksen, all prominent people within the field of creativity research, created the VIEW model, which includes "three main dimensions of problem-solving style: explorer-developer orientation to change, internal-external manner of processing, and task-person orientation to decision making" (Isaksen & Geuens, n.d.). Within the dimension known as Orientation to Change, which relates to the ways that people deal with new challenges, parameters and structure, an individual can be classified as either an Explorer or a Developer. The second dimension is known as Manner of Processing and deals with the ways in which individuals deal with information and whether or not they prefer to share their information with others. In this dimension, individuals are classified as having either an External style or an Internal style. The third and final dimension is known as Ways of Deciding, which categorizes people based on their priorities and primary focus when making decisions. Individuals are either People focused or Task focused.

The creators of the VIEW model developed the model based on prior research including Kirton's Adaption-Innovation Theory, which was previously discussed, as well as the Myers-Briggs Type Indicator (MBTI), which is behind the External and Internal classifications within the Manner of Processing dimension. The MBTI measures personality characteristics, and research has been done that has "studied the relationship between personality characteristics and problem-solving strategies" (Huitt, 1992). Kiersey and Bates did such research. Kiersey and Bates came up with four temperaments, which are useful in "discussing individual differences related to problem solving and decision making since they are associated with fundamental differences in orientation to

problem solving and goals to be addressed" (Huitt, 1992). Kiersey and Bates's four temperaments are SP (sensing, perceiving), SJ (sensing, judging), NT (intuition, thinking) and NF (intuition, feeling). These categories are also present in the MBTI, which includes a Sensing (S) or Intuition (N) category, a Thinking (T) or Feeling (F) category, a Judging (J) or Perceiving (P) category and an Internal (I) or External (E) category ("MBTI Basics," n.d.). Even though personality has been studied in relation to creative problem solving styles, personality will not be a key factor in this research.

Another tool used to classify individuals based on styles of creativity and problem solving is FourSight. FourSight is a "valid, research-based assessment tool developed over the last 20 years by Gerard Puccio, Ph.D., director of the International Center for Studies in Creativity at the State University of New York College at Buffalo" ("Where Does FourSight," 2013). FourSight classifies individuals as having a preference towards different stages of the creative problem solving process. Those that prefer to identify and clarify the problem are known as Clarifiers. Those that like to generate ideas are known as Ideators. Those that like to develop a solution to a problem are known as Developers, and those that like to put that solution into action are known as Implementors (Puccio, Wheeler & Cassandro, 2004). One study performed by Puccio, Wheeler and Cassandro in 2004 found that participants of the study that had a preference towards one area of creative problem solving "appeared to be reaching out for elements of the CPS [Creative Problem Solving] process that complemented their process preferences" (Puccio, Wheeler & Cassandro, 2004). In other words, no one stage of creative problem solving is more important than another stage, and each stage and each individual that prefers a certain stage is a complement to the other

stages and the individuals that prefer those stages. For the creative problem solving process to be successful, individuals of all preferences are needed and must work in unison with one another.

Basadur's Creative Problem Solving Profile is similar in manner. Basadur's profile measures individuals' preferences for steps within the problem solving process and places individuals into one of four categories based on a continuum of how individuals prefer to gain knowledge and how they prefer to use knowledge (Figure 4 in the Appendix). On the continuum of ways of gaining knowledge, individuals can have a preference toward gaining knowledge through "direct, concrete experience (getting personally involved in the task at hand and 'getting one's hand dirty')" or on the other side of the continuum, individuals may prefer to gain knowledge though "detached, abstract thinking (standing back, observing, analyzing and theorizing to understand)" (Basadur, Graen & Wakabayashi, 1990). Along with measuring the ways that individuals prefer to gain knowledge, Basadur measures the ways that individuals prefer to use their knowledge. At one end of the continuum are the individuals that prefer to use their knowledge for "ideation (to proliferate ideas, options and different points of view deferring judgment" and at the other end of the continuum are the individuals that prefer to use their knowledge for "evaluation (to judge and select from those idea, options and different points of view)" (Basadur, Graen & Wakabayashi, 1990). Basadur uses a coordinate plane system to depict the results. The X-axis represents the way that individuals prefer to use knowledge and the Y-axis represents the way that individuals prefer to gain knowledge. This creates four separate quadrants. Quadrant one represents the Generators. Quadrant two represents the Conceptualizers. Quadrant three represents the Optimizers and quadrant four represents the Implementors. Individuals are

categorized based on their creative problem solving preferences as indicated by Basadur's Inventory. No individual employs solely one category, but most have a predominate category. Basadur also equates one's predominant category to the stages of the problem-solving process that individuals prefer. Basadur believes that Generators prefer problem finding and fact-finding. Conceptualizers prefer defining the problem and finding ideas. Optimizers prefer evaluating the ideas and selecting an idea, and Implementors prefer gaining acceptance of ideas and taking action.

Basadur's Creative Problem Solving Profile is the instrument that will be used in this study to measure the creative problem-solving preferences of undergraduate students majoring in Visual Communication Technology, Construction Management, Aviation Studies and Architecture and Environmental Design within the College of Technology, Architecture & Applied Engineering at Bowling Green State University. This instrument will be used because it takes a comprehensive look at the entire creative problem solving process, pairing individuals with preferences towards various steps of the process. No part of the creative problem process is omitted or forgotten. Also, the article describing Basadur's Creative Problem Solving Profile provides well-defined descriptions of the characteristics of each of the four profiles, leaving the reader with a full understanding of each of the four profiles. Another positive aspect of the Basadur Creative Problem Solving Profile is that it measures individuals based on a continuum rather than on an absolute basis. Individuals are placed in a category based on preferences, which does not mean that one does not have some of the qualities that are characteristic of the other three profiles. Individuals are not exclusively one profile and the coordinate plane system shows the degree to which individuals have a preference toward each of the four profiles. Knowing

this information helps the individual better understand their creative problem solving style, which can help their own creative problem solving approach and allow them to work better with others when solving creative problems. For these reasons, the Basadur Creative Problem Solving Profile was chosen for this research.

Proposed Activity

This study is designed to identify differences in the creative problem solving styles of undergraduate students within Bowling Green State University's College of Technology, Architecture & Applied Engineering, specifically students majoring in Visual Communication Technology, Architecture and Environmental Design, Construction Management and Aviation Studies. Although creative problem solving styles have been studied in the past, they have not been researched within the domain of technological career choice.

To evaluate these students' creative problem solving styles, a survey will be administered to students within the four majors mentioned previously. These majors were selected because they serve as the most dominant career paths within Bowling Green State University's College of Technology, Architecture & Applied Engineering. The survey will include questions about the students' backgrounds and experiences within their fields of study. The survey will also include Basadur's Creative Problem Solving Profile Inventory. Basadur's Inventory includes "eighteen sets of four words," (Basadur, Graen & Wakabayashi, 1990) of which subjects are instructed to assign a number from one to four to each of the four words within each set.

This investigation will test several formal hypotheses, which are discussed in detail in the Expected Results section. These hypotheses are based on personal and professional experience as well as information gathered via interviews with experts and past research.

This study's sample will include at least eighty students from Bowling Green State University, twenty students from each major. Students within each of these majors will be asked to voluntarily complete the survey during class time, pending the approval from the professors, instructors or lecturers of the classes. The results will be analyzed to identify which Creative Problem Solving Profiles correspond to various career choices.

Methodology

For this study, the sample is limited to undergraduate students majoring in Visual Communication Technology, Architecture and Environmental Design, Construction Management and Aviation Studies at Bowling Green State University. Before administering the survey, the questions will be approved by Bowling Green State University's Human Subject Review Board to ensure that it abides by the terms determined by the Office of Research Compliance. Once approved, students can begin completing the survey. As an incentive to complete the survey, students will be given the opportunity to win a $25.00 raffle – a gift certificate to Bowling Green State University's bookstore. The survey results will be analyzed and interpreted following the guidelines established by Basadur (1990).

To increase the validity of the Creative Problem Solving Profile, Basadur included six distracter measures. When the results of the Inventory are calculated, sets one, two, five, ten, fourteen and seventeen are not included in the final score. These distracter measures

camouflage the purpose behind the assessment, therefore offering a more valid assessment.

Expected Results

Based on my personal and professional experience plus insight from expert interviews, formal hypotheses were prepared. These hypotheses are based on the assumption that there is a relationship between creative problem solving tendencies and one's career choice due to the type of creative challenges presented by that career. The following section provides details about the reasoning behind these formal hypotheses.

Based on the career information gathered, individuals who have chosen Visual Communication Technology as their career path must be able to brainstorm and generate many ideas, which means Visual Communication Technology individuals have a preference towards Ideation, the right side of Basadur's Creative Problem Solving Profile coordinate plane. Visual Communication Technology individuals must also be able to theorize about many possible solutions to problems and be able to come up with several concepts for solving problems. These tendencies mark Visual Communication Technology individuals as Thinkers, which is the lower portion of the Creative Problem Solving Profile coordinate plane. With Visual Communication Technology individuals having a preference towards Ideation and Thinking, they are in quadrant two, the Conceptualizers.

H1: Based on the career requirements of the Visual Communication Technology profession, it is hypothesized that the majority of individuals that have chosen

Visual Communication Technology as their career path will be classified as Conceptualizers based on Basadur's Creative Problem Solving Profile.

The results of the individuals that chose Architecture and Environmental Design as their career path are quite similar to those that chose a career path in Visual Communication Technology. Architecture and Environmental Design individuals also prefer to brainstorm and generate many ideas – Ideators – as well as theorize about many possible solutions to problems and come up with several concepts for solving problems – Thinkers. With these characteristics, individuals within the Architecture and Environmental Design field are also categorized as Conceptualizers.

H2: Based on the career requirements of the Architecture and Environmental Design profession, it is hypothesized that the majority of individuals that have chosen Architecture and Environmental Design as their career path will be classified as Conceptualizers based on Basadur's Creative Problem Solving Profile.

Individuals within the field of Construction Management seem to be a little different from both Visual Communication Technology and Architecture and Environmental Design individuals. Construction Management individuals prefer Thinking, theorizing about many possible problem solutions, which is similar to Visual Communication Technology and Architecture and Environmental Design individuals; however, Construction Management individuals prefer to narrow down the many options and choose the single, best answer, which places these individuals on the left side of the Creative Problem Solving Profile

coordinate plane towards Evaluation and away from Ideation. Therefore, Construction Management individuals are grouped in quadrant three as Optimizers.

H3: Based on the career requirements of the Construction Management profession, it is hypothesized that the majority of individuals that have chosen Construction Management as their career path will be classified as Optimizers based on Basadur's Creative Problem Solving Profile.

Individuals in Aviation Studies are similar to Construction Management individuals. Those within the field of Aviation prefer Thinking, theorizing about many possible problem solutions, and Evaluation, narrowing down the many options and choosing the single, best answer. Because of these characteristics, those in an Aviation career path are also grouped in quadrant three as Optimizers.

H4: Based on the career requirements of the Aviation profession, it is hypothesized that the majority of individuals that have chosen Aviation as their career path will be classified as Optimizers based on Basadur's Creative Problem Solving Profile.

In conclusion, I believe that the individuals that have chosen Visual Communication Technology as their career path and those that have chosen Architecture and Environmental Design as their career path will be categorized as Conceptualizers. I believe that the individuals that have chosen Construction Management as their career path and those that have chosen Aviation as their career path will both be categorized as Optimizers.

Analysis of Results

In total, 128 subjects completed the survey for this study. After each survey was evaluated, the results from 13 subjects' surveys were thrown out due to the incorrect completion of the survey and 7 subject's surveys were thrown out due to inconclusive results, leaving a total of 108 valid subjects for this study. Of these 108 valid subjects, 31 were Visual Communication Technology students. 21 were Architecture and Environmental Design students. 38 were Construction Management students, and 18 were Aviation Studies students.

Of the 31 subjects majoring in Visual Communication Technology, 8 are freshman, 5 are sophomores, 4 are juniors, 13 are seniors and 1 subject is a senior in their fifth+ year at the University. Of these 31 subjects, 25.8% were measured as having the Generator profile as their dominant Creative Problem Solving profile. 19.4% were measured as Conceptualizers, 35.5% were measured as Optimizers and 19.4% were measured as Implementors. 35.5% of the 31 subjects were deemed "novices" based on a combination of the subject's perceived level of expertise, the number of career-related internships completed and the number of career-related jobs completed. 64.5% of the 31 subjects were deemed "experts" based on a combination of the same three factors (Table 1 on page 18).

Of the 21 subjects majoring in Architecture and Environmental Design, 2 are freshman, 0 are sophomores, 16 are juniors, 3 are seniors and 0 subjects are seniors in their fifth+ year at the University. Of these 21 subjects, 19% were measured as having the Generator profile as their dominant Creative Problem Solving profile. 28.6% were measured as Conceptualizers, 28.6% were measured as Optimizers and 23.8% were measured as Implementors. 47.6% of the 21 subjects were deemed "novices" based on a

combination of the subject's perceived level of expertise, the number of career-related internships completed and the number of career-related jobs completed. 52.4% of the 21 subjects were deemed "experts" based on a combination of the same three factors (Table 1 on the following page).

Of the 38 subjects majoring in Construction Management, 11 are freshman, 2 are sophomores, 10 are juniors, 11 are seniors and 4 subjects are seniors in their fifth+ year at the University. Of these 38 subjects, 26.3% were measured as having the Generator profile as their dominant Creative Problem Solving profile. 21.1% were measured as Conceptualizers, 26.3% were measured as Optimizers and 26.3% were measured as Implementors. 34.2% of the 38 subjects were deemed "novices" based on a combination of the subject's perceived level of expertise, the number of career-related internships completed and the number of career-related jobs completed. 65.8% of the 38 subjects were deemed "experts" based on a combination of the same three factors (Table 1 on the following page).

Of the 18 subjects majoring in Aviation Studies, 0 are freshman, 2 are sophomores, 6 are juniors, 6 are seniors and 4 subjects are seniors in their fifth+ year at the University. Of these 18 subjects, 27.8% were measured as having the Generator profile as their dominant Creative Problem Solving profile. 16.7% were measured as Conceptualizers, 11.1% were measured as Optimizers and 44.4% were measured as Implementors. 38.9% of the 18 subjects were deemed "novices" based on a combination of the subject's perceived level of expertise, the number of career-related internships completed and the number of career-related jobs completed. 61.1% of the 18 subjects were deemed "experts" based on a combination of the same three factors (Table 1 on the following page).

Table 1

VISUAL COMMUNICATION TECHNOLOGY Subjects = 18		ARCHITECTURE & ENVIRONMENTAL DESIGN Subjects = 21		CONSTRUCTION MANAGEMENT Subjects = 38		AVIATION STUDIES Subjects = 18	
CREATIVE PROBLEM SOLVING PROFILE							
Generator	25.8%	Generator	19.0%	Generator	26.3%	Generator	27.8%
Conceptualizer	19.4%	Conceptualizer	28.6%	Conceptualizer	18.4%	Conceptualizer	16.7%
Optimizer	35.5%	Optimizer	28.6%	Optimizer	28.9%	Optimizer	11.1%
Implementor	19.4%	Implementor	23.8%	Implementor	26.3%	Implementor	44.4%
EDUCATION LEVEL							
Freshman	8	Freshman	2	Freshman	11	Freshman	0
Sophomore	5	Sophomore	0	Sophomore	2	Sophomore	2
Junior	4	Junior	16	Junior	10	Junior	6
Senior	13	Senior	3	Senior	11	Senior	6
Senior+	1	Senior+	0	Senior+	4	Senior+	4
EXPERTISE							
Novice	35.5%	Novice	47.6%	Novice	34.2%	Novice	38.9%
Expert	64.5%	Expert	52.4%	Expert	65.8%	Expert	61.1%

With this data, three cross-tabulations were calculated using SPSS, a statistical analysis software. One cross-tabulation compared the relationship between the subjects' dominant profiles and their career choices (Table 2 on the following page). The second cross-tabulation compared the relationship between the subjects' dominant profiles and their education level (Table 3 on the following page), and the third cross-tabulation compared the relationship between the subjects' dominant profiles and their level of expertise within their career field (Table 4 on page 20).

Table 2

CROSS-TABULATION: DOMINANT PROFILE / CAREER CHOICE						
DOMINANT PROFILE		CAREER CHOICE				TOTAL
		VCT	ARCH	CONS	AERT	
1	Count	7	4	10	5	26
	% of Total	6.5%	3.7%	9.3%	4.6%	24.1%
2	Count	6	6	8	3	23
	% of Total	5.6%	5.6%	7.4%	2.8%	21.3%
3	Count	12	6	10	2	30
	% of Total	11.1%	5.6%	9.3%	1.9%	27.8%
4	Count	6	5	10	8	29
	% of Total	5.6%	4.6%	9.3%	7.4%	26.9%
TOTAL	Count	31	21	38	18	108
	% of Total	28.7%	19.4%	35.2%	16.7%	100.0%

Table 3

CROSS-TABULATION: DOMINANT PROFILE / EDUCATION							
DOMINANT PROFILE		EDUCATION LEVEL					TOTAL
		Freshman	Sophomore	Junior	Senior	Senior+	
1	Count	6	4	8	6	2	26
	% of Total	5.6%	3.7%	7.4%	5.6%	1.9%	24.1%
2	Count	4	1	10	8	0	23
	% of Total	3.7%	0.9%	9.3%	7.4%	0.0%	21.3%
3	Count	5	3	9	9	4	30
	% of Total	4.6%	2.8%	8.3%	8.3%	3.7%	27.8%
4	Count	6	1	9	10	3	29
	% of Total	5.6%	0.9%	8.3%	9.3%	2.8%	26.9%
TOTAL	Count	21	9	36	33	9	108
	% of Total	19.4%	8.3%	33.3%	30.6%	8.3%	100.0%

Table 4

CROSS-TABULATION: DOMINANT PROFILE / EXPERTISE				
DOMINANT PROFILE		EXPERTISE		TOTAL
		Novice	Expert	
1	Count	12	14	26
	% of Total	11.1%	13.0%	24.1%
2	Count	14	9	23
	% of Total	13.0%	8.3%	21.3%
3	Count	23	7	30
	% of Total	21.3%	6.5%	27.8%
4	Count	18	11	29
	% of Total	16.7%	10.2%	26.9%
TOTAL	Count	67	41	108
	% of Total	62.0%	38.0%	100.0%

After the cross-tabulations were calculated, a chi-squared test was run on all three of the cross-tabulations. The chi-squared test was used to see if there is a statistical relationship between the variables. The results of the chi-squared test showed that there was no significant relationship between the subject's dominant creative problem solving profiles and their career choice ($p < 0.774$), meaning that the subjects' career choice does little to explain the subjects' dominant creative problem solving profile. On the other hand, the results of the chi-squared test that compared the relationship between the subjects' dominant creative problem solving profile and education level does seem to have a significant relationship ($p < 0.000$). Likewise, the relationship between the subjects' dominant creative problem solving profile and their level of expertise has a significant relationship ($p < 0.012$).

Conclusions and Implications for Further Research

Hypothesis 1 predicted that the majority of individuals that have chosen Visual Communication Technology as their career path would be classified as Conceptualizers based on the career requirements of the Visual Communication Technology profession. This hypothesis was not supported by the data gathered from the subjects of this study. Optimizer was the dominant profile for the majority of the subjects who have chosen Visual Communication Technology as their career choice.

Hypothesis 2 predicted that the majority of individuals that have chosen Architecture and Environmental Design as their career path would be classified as Conceptualizers based on the career requirements of the Architecture and Environmental Design professions. This hypothesis was partially supported. Conceptualizer and Optimizer were equally dominant profiles for the subjects who have chosen Architecture and Environmental Design as their career choice.

Hypothesis 3 predicted that the majority of individuals that have chosen Construction Management as their career path would be classified as Optimizers based on the career requirements of the Construction Management profession. This hypothesis was not supported. The data showed mixed results, a three-way tie for dominant profile between Generator, Optimizer and Implementor for the subjects who have chosen Construction Management as their career choice. With such mixed results, the data cannot be interpreted.

Hypothesis 4 predicted that the majority of individuals that have chosen Aviation Studies as their career path would be classified as Optimizers based on the career requirements of the Aviation profession. This hypothesis was not supported. Implementor

was the dominant profile for the subjects who have chosen Aviation Studies as their career choice.

Overall, it appears that one's Creative Problem Solving Profile is not necessarily a determining factor when selecting one's career choice. One possible explanation as to why the data did not support the hypotheses is potentially due to the homogeneity of the test subjects. Even though the subjects are broken down into four distinctly different categories based on varying career choices, each subject is an undergraduate student at the same university and all within Bowling Green State University's College of Technology, Architecture and Applied Engineering. Perhaps if the study compared subjects with more diversified career choices, such as subjects pursuing a career in art versus subjects pursuing a career in science, the data would be less homogeneous and would have supported the original hypotheses.

Even though the data showed that one's career choice does not have a significant relationship with one's dominant creative problem solving profile, the data did show that the subjects' education level and level of expertise do have a significant relationship with one's dominant creative problem solving profile. This finding suggests that one's dominant creative problem solving profile may not be static. In fact, it appears that one's dominant profile changes as one's level of education and experience increases. A person with a certain dominant profile may not have the same dominant profile later in life due to the acquisition of new knowledge and techniques that come with increased education and experience within one's career. If one's dominant creative profile is not static throughout life as the data implies, this suggests that creativity is not a genetic predisposition. It

suggests that creativity can be taught, can evolve within people and is not a characteristic that only certain individuals possess.

Understanding that creativity evolves with increased knowledge and expertise and manifests itself differently amongst individuals within the same career field is a significant insight. Most often when going through all the steps of solving a creative problem, it is best to have input from individuals with varying characteristics. Generators, Conceptualizers, Optimizers and Implementors are all needed to successfully solve a creative problem. Because of this, it may be best that individuals within one career field do not all have the same dominant profile. It may be best to have individuals with an array of dominant profiles all within the same career field. Within each career field, those with similar dominant profiles may group together to accomplish similar parts of the creative problem solving process, while those with different dominant profiles work to accomplish the other parts of the creative problem solving process. With this type of information, managers and supervisors would know how to best create working teams that include individuals with varying levels and types of education and expertise and, therefore, varying dominant profiles, which should be the best combination to ensure success when solving creative problems. If organizations and companies use this type of information to understand their employees and team members, it should be possible to create highly successful working groups, therefore increasing job productivity and satisfaction, which is good for both the employees and the companies.

Further research in this area of study is needed to expound upon these ideas; however, this cursory knowledge raises many questions about creating the most beneficial and efficient working groups based on education, experience level and dominant creative

problem solving profiles. Are these characteristics ones that companies should be examining more closely within their current and future employees? Should one's creative problem solving profile be a determining factor when companies are evaluating and selecting individuals to hire? Is there such a thing as a perfect working team based on the combination of education level, expertise and dominant creative problem solving profile? These questions are all valid and significant questions that arose from this study and can all be explored with future research within the realm of creative problem solving.

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Appendix

Figure 1

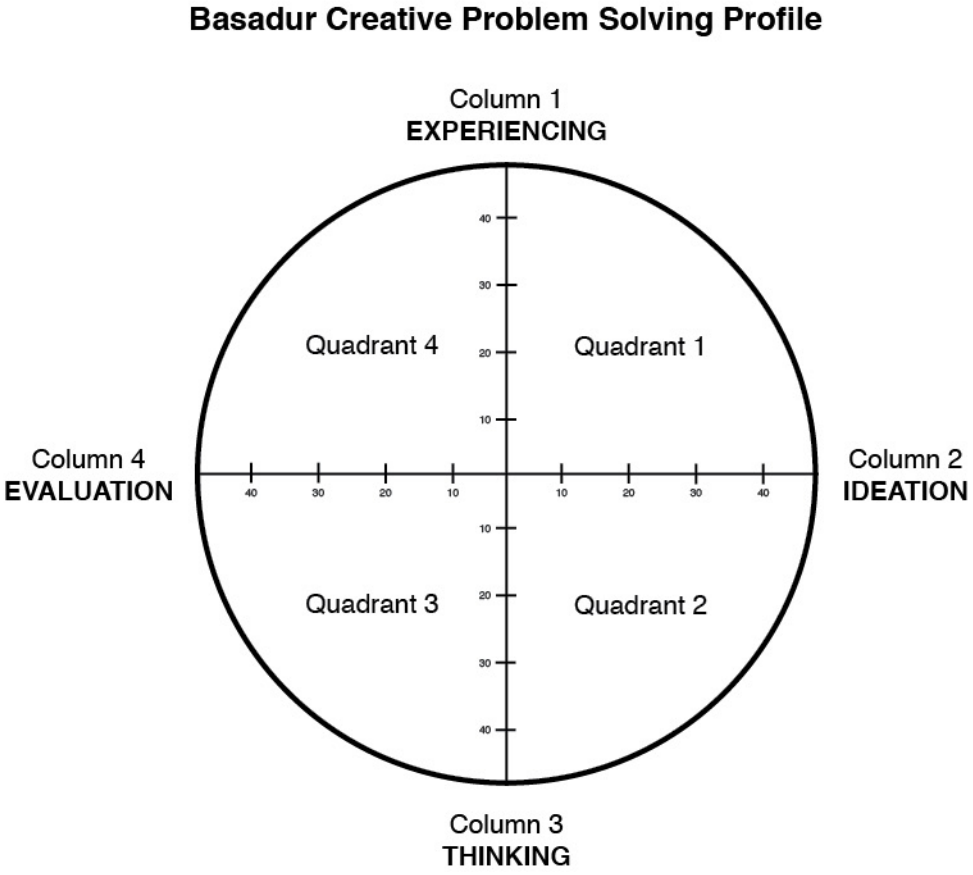


Figure 2

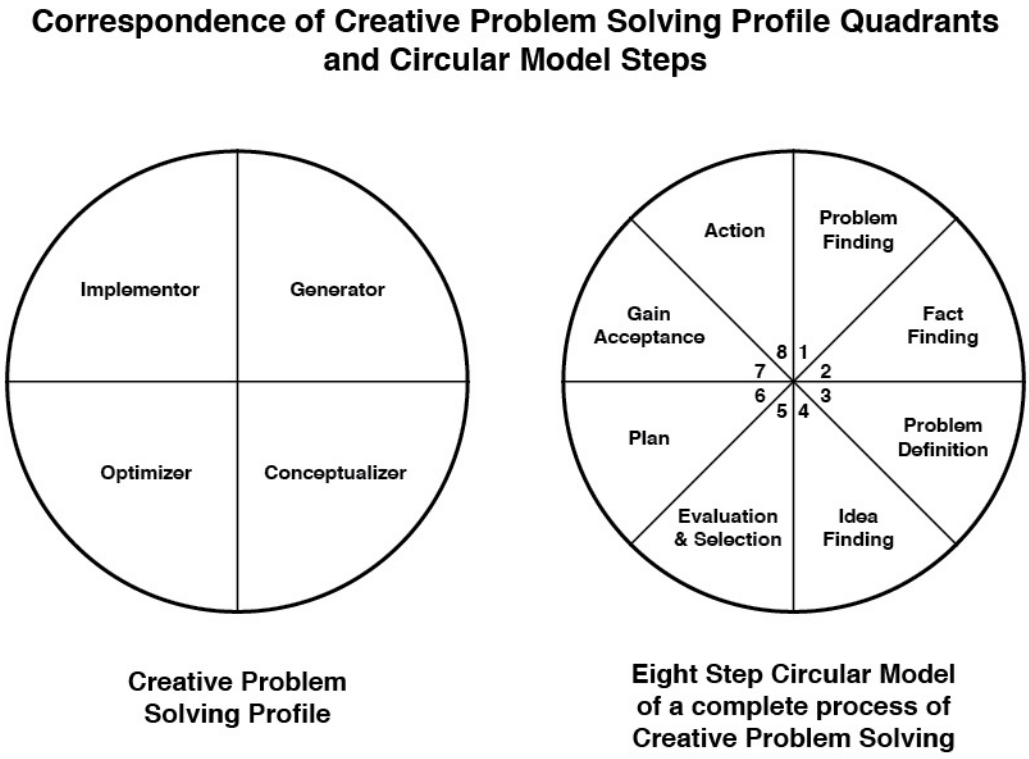

Correspondence of Creative Problem Solving Profile Quadrants and Circular Model Steps
Implementor
Generator
Optimizer
Conceptualizer
Creative Problem Solving Profile
Action
Problem Finding
Gain Acceptance
Fact Finding
8
1
7
2
6
3
5
4
Plan
Problem Definition
Evaluation & Selection
Idea Finding
Eight Step Circular Model of a complete process of Creative Problem Solving

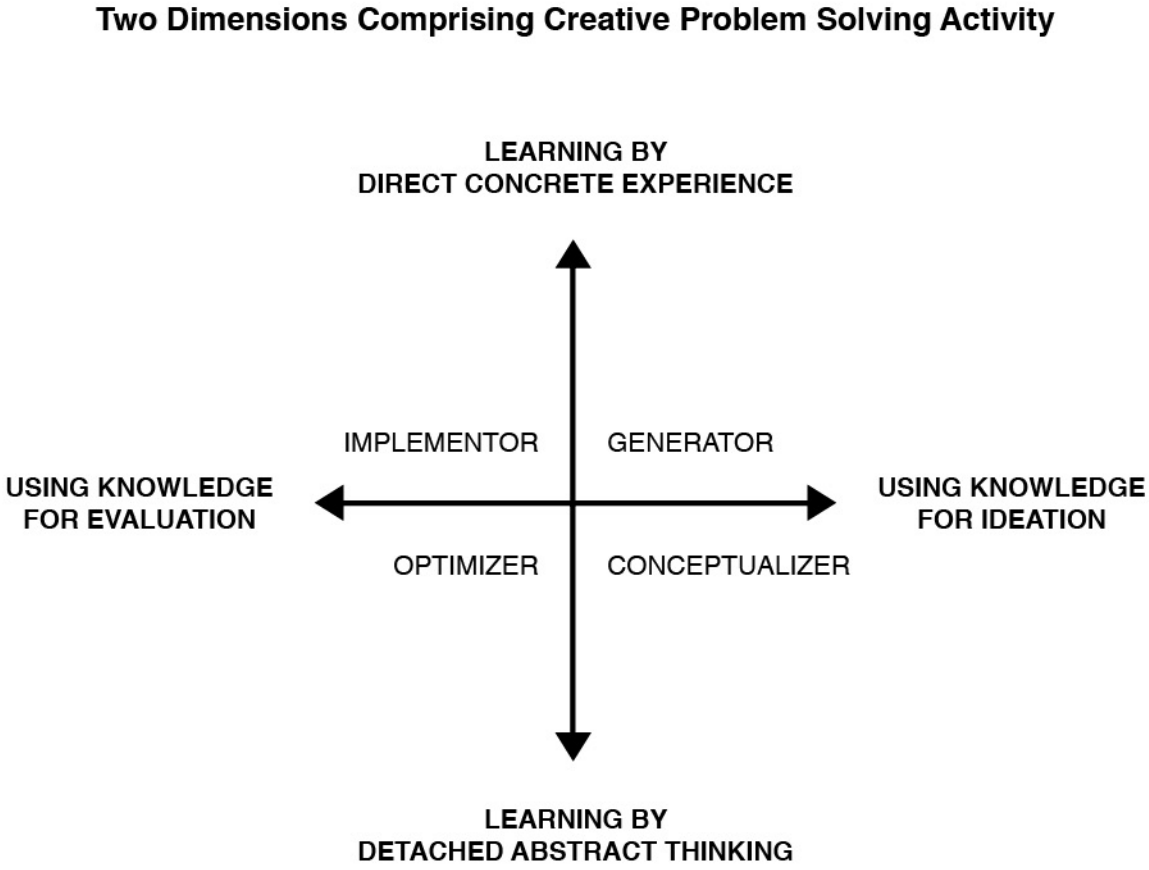
Figure 3

Basadur Creative Problem Solving Profile Inventory

Eighteen sets of four words are listed horizontally below. In each horizontal set assign a 4 to the word which best characterizes your problem solving style, a 3 to the word which next best characterizes your problem solving style, a 2 to the next most characteristic word and a 1 to the word which is least characteristic of you as a problem solver. Be sure to assign a different number to each of the four words in each horizontal set. Do not make ties.

	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
1	___ Alert	___ Poised	___ Ready	___ Eager
2	___ Patient	___ Diligent	___ Forceful	___ Prepared
3	___ Doing	___ Intuitive	___ Detached	___ Selective
4	___ Experiencing	___ Optimistic	___ Objective	___ Verifying
5	___ Reserved	___ Serious	___ Fun-Loving	___ Playful
6	___ Sensing	___ Free Thinking	___ Logical	___ Experimenting
7	___ Feeling	___ Alternatives	___ Analyzing	___ Evaluating
8	___ Action	___ Divergence	___ Abstract	___ Convergence
9	___ Direct	___ Possibilities	___ Conceptual	___ Practicalities
10	___ Quiet	___ Trustworthy	___ Irresponsible	___ Imaginative
11	___ Involved	___ Proliferating	___ Theoretical	___ Testing
12	___ Probing	___ Projecting	___ Structuring	___ Examining
13	___ Immediate	___ Gathering	___ Understanding	___ Conforming
14	___ Impersonal	___ Proud	___ Hopeful	___ Fearful
15	___ Implementing	___ Visualizing	___ Modeling	___ Decisive
16	___ Present-oriented	___ Future-Oriented	___ Rational	___ Detail-Oriented
17	___ Sympathetic	___ Pragmatic	___ Emotional	___ Procrastinating
18	___ Aware	___ Childlike	___ Orderly	___ Realistic

Figure 4


Two Dimensions Comprising Creative Problem Solving Activity
LEARNING BY
DIRECT CONCRETE EXPERIENCE
IMPLEMENTOR
GENERATOR
USING KNOWLEDGE
FOR EVALUATION
USING KNOWLEDGE
FOR IDEATION
OPTIMIZER
CONCEPTUALIZER
LEARNING BY
DETACHED ABSTRACT THINKING