STUDENTS' PERCEPTION OF COLLEGE LEVEL CREATIVITY COURSE: A CROSS DISCIPLINE COMPARISON

By

DENBIE S. NASH

Bachelor of Science

University of Oklahoma

Norman, Oklahoma

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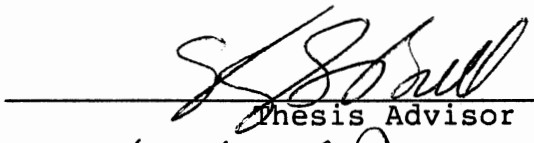

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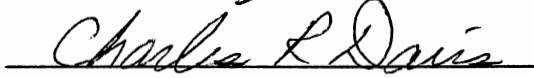

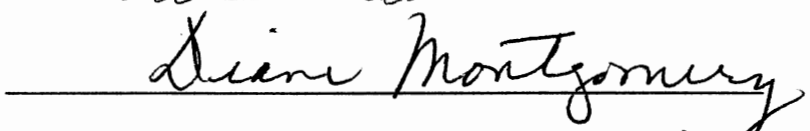

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

It has been said that creative thinking and academia are antithetical (Todd, 1987). Deutschman (1991) admits the sad fact that business education has become largely irrelevant to business practice. Corporate recruiters complain that MBA's lack creativity, people skills, aptitude for teamwork and the ability to speak and write with clarity and conciseness. Business schools are said "to have completely missed the quality revolution" (p. 68). Engineering students are reported to graduate with less likelihood of using their imaginations than when they entered the program (Basadur, 1987). Lyons (1987) insists that we are in the midst of a creativity crisis:

> The foundation of creativity in American education is presently threatened by a growing attitude of "vocationalism" that if left unchecked will allow creativity to disappear from the agenda of liberal arts and professional schools. The result of this trend will be a generation of college graduates less prepared than any previous ones for work in its future (p. 148).

And yet creativity is said to exist in varying degrees among all of us so it is a matter of getting those

abilities to the surface and making them work for us (Shallcross, 1981, p. 2). But it takes a concerted deliberate effort.

There is considerable literature to support the deliberate enhancement of creativity in the business and professional world. International attention is being given to this subject (Torrance, 1987; McCarthy, 1987) and common information abounds in the form of best-selling books and study courses on increasing one's creative abilities in the workplace. At the opposite end of society's productive continuum, the education of the young, there is a multitude of research and methodology for developing and enhancing the creativity of children. Many studies focus particularly on those students who show early indications of being gifted and talented (Fishkin, 1989; Micklus, 1984; Torrance, 1984).

But at the post-secondary level, the literature that directly deals with teaching creativity courses is scant at best. Parnes (1987) discusses the results of a longitudinal study conducted at State University College at Buffalo. This study evaluated the impact of a four semester course of study in the development of creativity on entering college freshmen. It was inferred in the conclusion of the study that "most of the incoming freshmen would profit from exposure to part or all of the program if they elected to take it" (p. 182). It was also pointed out that many more questions were raised by this study than were answered.

Other studies at the college level report the development of instruments, evaluation of specific programs of creative problem solving or review of other specific processes for creative development; for example, Creative Problem Solving Style Inventory; strategic thinking, shaping and building with advertising students; motivation in creative writing; and intuitive production (Basadur, Graen & Wakabayashi, 1990; Marra, 1989; MaHood, 1988; McCaffrey, 1988). But McCarthy (1987) laments that a great many promising studies only deal with intelligence or giftedness or personality characteristics of creative persons rather than with educational strategies that "facilitate, liberate and promote creative behavior" (p. 168).

Efforts to teach creativity in collegiate settings have typically been confined to the visual, written and performing fine arts. There is a long tradition of creative production in these activities which should, and hopefully will, continue. But as Gehlback (1987) explains:

> The problem with using only fine arts is that they are neither the exclusive domain for creative function in our society, nor are they necessarily the most important ones. It could be argued that the kind of creativity demanded and practiced in the sciences, engineering and everyday technology is much more important to the future of society and the lives of children than that required to make a sculpture or clay pot. Our world is under stress from over population,

> hunger, territoriality, pollution and other forms of unrest and conflict. However important the fine arts may be to the richness of our lives, it would seem undeniable that there is an urgent need for creative, new, effective solutions to problems in the "not-so-fine" domains of human endeavor. (p. 36)

In 1987 a survey was conducted in 1,188 colleges and universities across the United States. It was found that only 6% of the institutions surveyed (approximately 76 in all) had courses that fit the specified criteria of teaching creativity (McDonough & McDonough, 1987). When asked why more creativity courses were not taught, some deans replied with responses such as: "It is difficult for traditional colleges to deviate from standard courses and for traditional faculty to give up authoritarian control; it is difficult to give letter grades; and it is simply easier to continue what has been done in the past" (p. 280). The attitudes reflected in these responses exhibit a lack of creativity in more than just areas of instruction.

While it can be discussed that groundwork for basic educational changes across disciplines and throughout the educational strata is needed, acknowledgement of the necessity of creativity development is becoming more evident. Flinders (1987) put forth the view that creativity bridges the gap between pedagogy and methodology. So important is the college connection for the advancement and enhancement of creativity that it is the basis for this

study. Hopefully, the more that is known about the ability to foster creativity at the collegiate level, the greater the press will be to do so.

In an attempt to learn more about what is currently being taught at post-secondary institutions, syllabi from college creativity courses offered across the nation were analyzed. (Bull, Montgomery, Baloche, Pinson, Salyer, and Brown, 1991). Some interesting commonalities emerged in the goals established by instructors despite differences in major academic disciplines. These goals included establishing a safe climate for students to explore their own creativity, improving creativity through experience and participation, increasing psychological understanding of the creative process and improving creativity through direct instruction (Baloche, Bull, Montgomery, 1991). In a follow up study, instructors were asked to indicate what was important for students to learn from creativity courses regardless of discipline or major area of study (Montgomery, Bull, Baloche, Pinson, Salyer, and Brown, 1991). It was found that students typically are expected to do the following when taking a college level creativity course: (1) experience personal change; (2) learn about the creative process; (3) gain knowledge about strategies and techniques related to creativity; (4) develop attitudes toward creative production; (5) develop attitudes toward the use of effort in developing creative products; and (6) evaluate the way in

which the creativity course was taught in terms of what was learned and could be passed onto others.

Problem Statement

With the wide diversity of definitions and understanding of creativity, it is to be expected that the way in which creativity courses are taught would vary greatly across colleges and disciplines. The agreement that was discovered in Montgomery, et al., (1991) to exist across disciplines in what was expected of students is somewhat surprising given the diversity of subjects and the variability of the subject matter itself.

This led to the question of whether students from different discipline areas perceive that they had experienced the creativity course differentially. This is of interest because of the history which students in different areas bring to the learning of creativity as well as the different ways in which they are taught.

The present study explored what students perceived that they learned from taking creativity courses in various disciplines, including business, education, architecture/engineering/technology (A/E/T), arts and sciences, and multidisciplinary areas. The students evaluated what they learned and the effects of such learning in six areas--personal change, process, knowledge, production, effort, and teaching ability as they relate to creativity. These were the areas identified by instructors of

college-level creativity courses as being important and demonstrative of student achievement.

Hypothesis

It was hypothesized that there would be no differences in subscale scores across discipline areas. That is to say students from the five major academic areas (Education, Architecture/Engineering/Technology, Arts & Sciences, Business and Multidisciplinary area) would show no differences in agreement on what they perceived they had learned from different college level creativity courses. There would be no difference in agreement in the six subscale areas of Personal changes, Process, Knowledge, Production, Effort and Teaching.

Limitation and Assumptions

The primary limitation was that the author of this study utilized an existing data base and did not create the questionnaire used in the student evaluation. There were questions which were not addressed on the survey which may have been included had the author composed the instrument.

There was a study by Divosky & Rothermel (1988) that was pertinent to the discussion of the above limitation. He found that student evaluations were effected by two variables: (a)whether or not the course was within a person's major; and (b)whether or not the course was required. This may be a factor to be considered in the

current study. However, data was not collected on whether the course was taught in one's major area and no information is available on whether the creativity course taken by students in the sample was a required or nonrequired course.

It is assumed that learners more experienced in creativity training might respond differently to the course being evaluated when compared to naive learners. Additional analyses were made to consider for this variable.

It must also be assumed that paper and pencil instruments can measure perception of learning as it relates to this study.

Purpose

The purpose of this study was to add impetus to the call for college level creativity courses which have the primary goals of fostering creative ability and enhancing the likelihood of increased creative productivity in college level learners. A case was made for the importance of such courses. Different approaches to the teaching of creativity were addressed and comparisons of how students perceived learning according to their discipline were made.

CHAPTER II

REVIEW OF LITERATURE

Overview of Creativity

Historical Perspectives

It has taken man several thousand years to discover and label something which has occurred throughout history. According to Flinders (1987),

> creativity for ancient [peoples] was a continuum consisting of organizing existing elements for some purpose such as planting, harvesting, building, preserving, singing and dancing, adoring and reverencing. Before the 20th century, creating was generally perceived as 'making'; it was ordinary, natural, common, widely practiced, expected of everyone and easily understood. Creativity was an inherent aspect of Being. (p. 37)

In more modern days we have gone through a period of time when creativity was narrowly defined. It was attributed to exceptional personalities of man, the geniuses or gifted in the population, and was placed in the realm of the mythical and mysterious (Flinders, 1987; Gowan, Demos & Torrance, 1967). In the most recent decade, however, the literature has shown evidence that beliefs about creativity as a human

characteristic are once again emerging. Creativity is said to be in all of us according to some philosophies and to be that which raises humanity above the other living species. (Pickard, 1990; Shallcross, 1981). Markberry (1963) claimed that there is biological creativity in all animals and psychological creativity in humans exclusively. It is said to emanate from the human need for growth and change (Kirschenbaum, 1986).

Various authors discussed creative abilities as those existing in varying degrees among us and being manifested in different ways (Isaksen, 1987; Shallcross, 1981). Treffinger (1989) claimed that "not everyone will become creatively productive but anyone might" (p. 19).

With this more liberal view of creativity, one might expect that blocks or barriers to understanding have been removed as is demonstrated by the amount of research that has flooded the literature. The gamut is run from exploring a more global viewpoint such as "everybody has it" to the microscopic isolation of various creative traits such as "intensity" (John-Steiner, 1985, p. 220) and "passion" (Amabile, 1989, p. ix). Creativity is viewed as complex, multi-dimensional, regenerative (Gruber, 1988) and self-regulated metacognition (Pesut, 1990). Neurological research has shown the mere beginning of evidence of discernible brain activity in an actively creative mind and plasticity denotes a brain cortex that is changing all the time (Healy, 1990).

Definitions of Creativity

In reviewing the literature no widely held uniformly applied definition of creativity can be found (Barron, 1988). This adds fuel to the argument that creativity is a difficult field to study (Isaksen, 1987). Brown (1989) claimed that those who analyze creativity literature themselves "need several personality characteristics commonly attributed to creative people--resistance to frustration and high tolerance for ambiguity and chaos, in particular" (p. 10).

An early, simply put general definition of creativity was the ability to bring new knowledge and ideas into existence (Wilson, 1962). Although no umbrella terminology seems to have evolved, each definition since has broadened the scope of understanding and knowledge about the construct. The more that is learned about creativity the more there is that seems left to be known (Parnes, 1987).

Although there are exceptions, creativity is generally confined to a single domain such as art, music, or science and it "occurs within a matrix of personality traits rather than as an isolated cognitive skill" (Martindale, 1989, p. 228). Amabile (1983) conceptualized creativity as a behavior resulting from "particular constellations of personality characteristics, cognitive abilities, and social environments"(p. 328).

Creativity is a dynamic concept which can be impacted and nurtured by various means (Isaksen, 1987). The interactionist model suggests that creativity is the complex product of a person's behavior in a given situation. This comprehensive perspective explains individual differences as the avenue for understanding the illusive construct of creativity. It specifies major categories of variables which include antecedent conditions, organism (person), cognitive style/abilities, personality dimensions/traits, contextual influences and social influences (Woodman & Schoenfeldt, 1989, p. 89). This particular perspective is useful when addressing individual differences across disciplines.

Often researchers utilize one or more of Mooney's (1963) four approaches to investigating creativity: person, product, process, and environment. (Rhodes, 1987, termed environment as "press" making these the popular 4 P's of creativity, p. 218). The person approach includes the one who is creative as well as information about "personality, intellect, temperament, traits, habits, attitudes, self-concept, value systems, defense mechanisms and behavior" (p,218). Process applies to "motivation, perception, learning, thinking and communicating" (p. 220). Products of creativity include "behaviors, performances, ideas, things and all other kinds of outputs, with any of all channels and types of expressions" (Taylor, 1988,

p. 104). Press includes the relationship between human beings and their environment-- climate, situation or place. Typically this includes the "total complex situation in which the creative processes are initially stimulated and sometimes sustained through to completion" (p. 101). Taylor went on to point out that with the accumulation of research finding in these areas that predictive equations have been set up and validated. Those include: the creative process and the creative product as primarily the "criteria of creativity'; the creative person as the main basis of the "predictors"; and the environment (or press) has been used as a "modifier in the equation as well as the stimulus situation through which the inner creative processes are activated" (p. 101).

In addition to these approaches for defining creativity, one's philosophical viewpoint, be it psychoanalytic, humanistic, behavioral, cognitive, self-actualization, interactionalist, or social psychologist affects the determination of what is creative. Therefore, it is important to accept that creativity may never be reduced to a totally predictable or controllable concept. (Isaksen, 1987).

Despite this possibility, differing definitions to explain the construct of creativity are perhaps not as competitive and contradictory as they are collaborative. Barron (1988) listed numerous points of agreement that continue to show up in the literature:

1. Creativity is an ability to respond ADAPTIVELY to the needs for new approaches and new products whether through conscious, unconscious or subliminal efforts.

2. The three modes in which creativity is most easily studied are as product, process and person.

3. Defining properties are aptness, validity adequacy in meeting a need and fitness with emphasis being on the fresh, novel, unusual, ingenious, clever and apt.

4. Creative products vary considerably.

5. Many products are processes and visa versa. A person is both a product and a process with no harsh lines dividing them.

6. Creativity is not just an ability, but a characteristic of evolving systems (p. 80).

Teaching Creativity

Instructional Possibilities

In reviewing the literature, there was support found on the one hand for the teachability of creativity (Davis, 1989; Parnes, 1987; Rubin, 1990). Rose & Lin (1984) utilized a meta-analysis approach and determined that "training does affect creativity" (p. 22). However, there was also literature suggesting that the teaching of creativity has not been successful (Martindale, 1989, p. 222). Amabile (1989) stated that "In reality teachers cannot really TEACH creativity" (p. 129). Dowd (1989) claimed that creativity

cannot be taught because of the paradox in setting up a planned activity for desired spontaneity. Others claimed that allowing nurturing environments, increasing motivational-emotional variables, and/or increasing only what measurements record are not necessarily indicative of increases in creativity. (Brown, 1989).

But within the semantics of these statements there is usually clarification that although creativity cannot be created per se, the conditions can be set for its "spontaneous occurrence" (Dowd, p. 241); and its growth to be "allowed, nurtured and stimulated" (Amabile, p. 129). Lyman (1989) pointed out that creativity cannot be taught, but it can be rediscovered. Hayes and Perry (1989) claimed that "if creativity can be lost thru education then it can also be regained thru re-education" (p. 3). So in essence there is general consensus that creativity if not directly teachable can be enhanced (Basadur, 1987).

Perhaps it is equally as interesting to point out that in an extensive review of the literature, no one has argued with the human ability to stifle creativity. Schon (1987) accused western culture and public schools of stifling creativity. Lipper (1987) pointed to American entrepreneurs that succeed "inspite of, not because of, the education the received" (p. 26). Sternberg and Lubart (1991) agreed by saying that schools do "at least as much to undermine creativity as to support it" (p. 614). American culture does not breed creativity because it citizenry are not

"hungry" according to Arieti (1976). And Abra (1988) accuses the American culture of promoting "inhibitory values" (p. 75). Indeed, there is much written about the need to remove these blocks and barriers and to establish environments that are conducive to creativity. Such variables are found to have a direct effect on increasing measurable aspects of creativity (Dowd,1989; Parnes, 1988).

It is said that creativity can be learned by anyone who has:

> certain innate abilities such as ambition, perseverance, enthusiasm and high energy levels. The creative individual must also study to gain knowledge about particular subjects and be a thinker--one who explores new avenues. If an individual possesses these traits, h\she can be trained to become more creative. (International Technology Education Association, 1989).

Others conclude that most if not all people are capable of creativity and that most people's creative abilities can be enhanced (Pierson, 1983; Basadur, 1987). According to Davis (1983), "merely becoming involved in creative activities increases one's creativity consciousness, strengthens some creative abilities and increases creative productivity." (p. 56).

The research demonstrates success with deliberate methods of enhancing creativity. Parnes (1987) found "five major compilations" of literature specifically covering the area of creativity development that "overwhelmingly show

significant positive results when creative abilities are deliberately nurtured" (p. 156).

Isaksen (1987) lists a collection of beliefs that form the basic rationale for pursuing creativity courses at the collegiate level.

1. Creativity is important in real-life situations where more creative types of thinking and innovations are needed in all areas of human endeavor.

2. Creativity [has to do with] the nature of knowledge. It helps to examine the imaginative and productive applications for the increasing accumulation of factual information.

3. Creativity helps to fill educational and societal needs for the future in which transferable skills are necessary and environmental circumstance can not be predicted.

4. Creativity is a natural human phenomenon that is possessed at higher or lower levels of potential or accomplishment and that is demonstrated or manifested in different ways according to individual choice.

5. Creativity is related to the natural development of human potential and releasing it is healthy (p. 3-5).

With such a research basis for supporting deliberate development, the teachability of creativity should stand as substantiated. There should be more of it and there can be more of it. The next consideration then is the various ways in which creativity can be taught.

Creativity as a Course of Study

There is currently a wealth of information on how to teach creativity classes. Early in the development of creativity research problem-solving models were most prevalent. The major theorists proposed various ways to look at creative abilities and to foster creativity as a cognitive process in terms of increasing problem solving capability. But with increasing awareness the creative process could not be limited to just those elements. (Isaksen, 1987, p. 13). By 1984, Torrance had cited two categories of strategies emerging with high success rates. They were affective education programs and altered awareness such as meditation, fantasy, and imagery.

Affective education could no longer be divorced from the total educational process. (Klausmeier, 1985). An affective component was shown to have a positive effect on both rational and imaginative thought (Gallo, 1989). Bull and Montgomery (1990) stated that the first prerequisite to a course of creativity is that it be "primarily affective and intuitive rather than merely cognitive" (p. 2).

Catford (1987) found data to support an individualized curriculum emphasizing internalized skills to be most effective instead of specific parameters of the problem or use of particular strategies. While Treffinger (1989) warned against seeking one, all-purpose creative teaching or effective instruction paradigm, basic components to

successful multidimensional creativity courses have been delineated. Sternberg and Lubart (1991) stressed teaching the use of six resources: "intelligence, knowledge, intellectual style, personality, motivation and environmental context" (p. 609).

With regard to creativity courses being taught in the university environment specifically, the content analysis of 67 syllabi conducted by Montgomery, et al., (1991) revealed five general dimensions in the teaching of creativity courses. They are:

1. Environmental/Historical Indicators or Influences - including variables such as social/cultural influences, mentoring, creative climates and group processes, biographical study of historical examples of creative people.

2. Personality characteristics supportive of/or necessary for creative expression - discussion of various traits thought to be necessary for creativity such as independence, internal locus of control, self-confidence, reflectiveness, novelty seeking; studying creative persons in various fields; and exploring intuition as it relates to creativity.

3. General models or theories of creativity - psychological, psychoanalytic, and motivational factor approaches; theories and theorists including Torrance, Williams, Guilford (Structure of the Intellect), Taylor

(Multiple Talents Model), Parnes (Creative Problem Solving), Bloom (Taxonomy), Gestalt, and humanism.

4. Processes causing or related to the development of creativity - common techniques and strategies include synectics, problem finding, problem solving, sociodrama, idea finding or combining, and critical thinking strategies; field specific processes including bionics, autogenics and tagmenics.

5. Product variables related to production or problem solving in a specific field of study - including such characteristics as fluency, flexibility, design development and strategies, patent development and model building; and specific processes such as the Pugh Method for engineering students.

It was suggested that goals for the course to be taught should be clearly articulated and then the content of the course should be drawn from the five dimensions according to specific dictates of the goals (Montgomery, et al., 1991).

In a related study, over 300 persons were surveyed and data was collected from 101 teachers of creativity at the college level. The complete report is available elsewhere but much of it is pertinent to the current study. The majority of respondents believed creativity should be taught in a humanistic way with emphasis on psychologically secure learning environment. Numerous internal processes as well as skills, knowledge and characteristics of creative persons were thought to be important for teaching creativity. Only

a few of the training techniques presented were considered important (Bull, Montgomery, Baloche, Pinson, Salyer & Brown, 1991).

Although there were limited information sources on college creativity courses, the available data confirmed that a good number of individuals were concerned with teaching creativity and are similar in their views as to what creativity courses at the collegiate level should contain. Based on the review of literature, personal change as a result of creativity training is a goal of most college-level courses. Additionally, the literature supports affective/personality variables as an important component to a comprehensive creativity course.

Various disciplines include different approaches to the teaching of creativity. The following is a discussion of such differences that exist among the disciplines.

Specific Discipline Approaches to Teaching Creativity

Educational Approach

Education has a multidimensional role to play when it comes to teaching creativity. In the case of education majors, student teachers can be taught to be creative, to teach creatively and to teach others to be more creative. With colleges barely recognizing the need to teach creativity, these components may be missing in the student's course of study as the following study demonstrated.

Mack (1987) found that although professors of education possessed knowledge concerning the concepts of creativity, little was passed on to undergraduate students. While it was found that both student teachers and teacher educators believed that enhancing creativity in children was important (85 and 90% levels) it was believed to be included in the teacher education program at the 48% and 52% levels. In various aspects of the study both teacher educators and student teachers agreed on the importance of various components to the understanding of creativity but few felt these were addressed in the course of their education.

Other disturbing findings were that teacher educators had not received their own creativity training from undergraduate classes and did not perceive themselves as having been taught in a creative manner. Likewise they were viewed by students as not teaching in a creative manner. Students did not perceive they were being taught creativity or creatively. The cycle is obvious.

Bozik (1990) discussed two elements that are essential for schools of teacher education to prepare teachers. These elements seem appropriate for any school within the university setting:

1. Students must be taught in situations that encourage creativity. The learning atmosphere must be safe, nurturing and stimulating. Questions must be encouraged, new ideas welcomed. Alternative ways of viewing and doing must not only be presented but encouraged. ALL types of

thinking must be valued...The accepting attitude must be true of every faculty member and every experience.

2. Students must experience models of creative teaching. Innovation, variety and challenge must be apparent and faculty must exhibit creativity in different ways (p. 52).

Rhodes (1987) supported this by stating that the "techniques of getting ideas can be learned and can be taught . . .whatsoever factors of personality or of intellect, of learning process or thinking process or of environment are congruent with creativity, the same are congruent also with the educative processes in general" (p. 217). Healy (1990) agreed and added that persistence and flexibility should be incorporated into overall teaching goals, modelled and supported in education and every discipline.

While these lofty goals are desirable it is highly unlikely that pervasive changes can or will occur at the university level. But a necessary change that can take place is the awareness that courses in creativity can be instrumental in bridging the gap between need to know information and practical application in the professional world. Creativity is of value in preparing students for their personal and professional futures (McDonough & McDonough, 1987, p. 279). Education has the responsibility of developing the individual's ability to relate that which is within the person to that which comes from outside the

person, in addition to "filling up the mental bucket with knowledge" (Parnes, 1988, p. 327).

Business Approach

In an article in Fortune Magazine, Deutschman (1991) took a hard look at MBA programs. He concluded that business education has become "largely irrelevant to business practice". Turning out students who lack creativity, people skills aptitude for teamwork and the ability to clearly speak and write, business schools completely missed "the quality revolution" (p. 68).

There is much in the literature to indicate the business world focuses on viewing creativity in terms of innovation and entrepreneurship (Winslow & Solomon, 1987; and Lipper, 1987). From a workplace perspective, creative problem-solving and new ideas are the most important and valued traits (Goman, 1989). How these are incorporated at the college level is questionable although there are in existence some programs that are beginning to include non-graded courses that focus on the "soft skills--creativity, exploring diverse modes of thinking, building peer relationships" (Deutschman, 1991).

Architecture/Engineering/Technology Approach

An interesting approach to teaching creativity in this discipline area is the Failure 101 course taught by Jack

Matson at the University of Houston. Engineering students are taught how to be innovative and entrepreneurial by "celebrating intelligent failure" in an effort to recognize the role of failure in the creativity process (Blum, 1990, p. A15). Lumsdaine and Lumsdaine (1990) advocated the Pugh Method involving a team approach to idea generation which is thought to be a combination of creative and critical thinking including product development and evaluation phases. Bailey (1979) emphasized that the objective of the engineering profession is the creation and improvement of processes. He defined his view of disciplined creativity as "the totality of highly personal knowledge and art chosen to orderly and consistently create useful things for the benefit of mankind" (p. 42). Bailey included components such as creativity stimulators, recording creative work and patent information in his course of study.

Arts and Sciences Approach

Berg (1987) claimed that Arts and Science programs contribute more training toward open-mindedness, multiple points of view and theoretical flexibility than business and technological professional training which are taught in a more straightforward unquestioning manner. Hutchinson (1949) described the "great disciplines of thought (the arts and sciences) as having its roots ultimately in the intuitive faculty" (p. 150). John-Steiner (1985) concurred that arts and sciences require "profound knowledge of the

conventions of one's discipline and of the invisible tools of the mind" (p. 206).

With regard to specific arts education, art orientation is hypothesized as being a valid personality construct which correlates with five domains of artistic behavior and three cognitive skills (logic, divergent and creative thinking) for literature and art. Wakefield (1989) suggested that general curriculum arts courses develop critical thinking and expressive problem solving skills and for specialized elective courses to develop creative thinking within discipline based art education.

Much of our current understanding of creativity comes from the study of scientific thought. "Doing science" has a great deal in common with other kinds of creative activity. (Wolpert & Richards, 1988, p. 3). Taylor (1988) discussed the scientific approach as the "no holds barred" approach (p. 97) and Harbury (1966) addressed the "Do not block the path of inquiry" rule as integral to scientific creativity. Science like the arts requires learning by doing and Clement (1989) advocated the use of the "Construction model" for both internal and external construction of science in education (p. 380). Analogy is another often used approach in creative instruction and is a much-relied-upon aspect of scientific thought (Osche, 1990).

In the social sciences instruction to enhance creativeness includes the teaching of explanations and rationales of the knowledge base as well as the important

facts, concepts and principles. Students need experience in using such knowledge, and should develop skills in evaluating arguments, discussing various positions and broadening views of what the social sciences involve (Voss & Means, 1989).

Multidisciplinary Approach

Various techniques are mentioned in the literature and are typically broader based approaches. Root-Bernstein (1991) discussed abstracting as an important tool of an integrated curriculum. Mental world-making and imaging are also put forth as components of creative instruction. (King, 1989).

Domains and Creativity

The following is a discussion of various related information pertaining to the different domains and how they relate to creativity.

Group Influences

Disciplinary boundaries are often the subject of research in this field. Despite the inability to utilize one definition of creativity by which all disciplines can relate there are studies which compare two or more groups of individuals from various backgrounds. These different studies typically compare various aspects of creativity that are limited in method, technique or focus. For example,

Harpaz (1990) in a study of hemisphericity and creativity, found data demonstrating that Creative Arts students, as a group, showed a significantly higher right brain dominance compared with the left hemispheric tendency of the Economics and Accounting students. However, students of both departments who displayed right hemispheric superiority were also those who excelled on the creativity tests.

Kirton (1987) discriminated people on the basis of an innovator-adaptor continuum. In a study of business school students, innovators were found to differ significantly from adaptors in preference for financial management topics rather than accounting and auditing, industry and commerce rather than government, and a broader range of general subjects in their course of study.

While diversity is exhibited between individuals within disciplines, discipline patterns as they relate to creativity also exist. Voss and Means (1989), contributed these differences to a function of the "problem context" of a domain in which a creative act is executed (p. 408). They cited the work of Inkeles (1983) in pointing out that the social sciences expect to yield fewer creative outcomes than the natural sciences which are responsible for such things as curing diseases, developing fiber optics, and inventing television. Additionally, the social sciences attract less creative individuals and are limited to the human population as opposed to the universal options available to the other sciences.

Career Choice Theories

John Holland (1987) is well known for his delineation of work and worker personality types. He identified six categories of occupations and personalities:

1. Realistic (Technical) people like and are able to work with their hands, are often athletic and tend to enjoy working outdoors with animals, machines, or nature. They tend to be employed in skilled trades, technical areas, or a few service- related occupations.

2. Investigative (Science) people like and are able to perform activities requiring intellectual or analytical skills to observe, assess, evaluate and theorize in order to solve problems.

3. Artistic (Arts) people like and are able to perform activities requiring artistic, creative, expressive and intuitive skills to convey aesthetics, thought and feelings in words, movement, sound, color and form.

4. Social (Social Services) people like and are able to perform activities requiring work with people to inform, enlighten, help, train, develop, or cure them.

5. Enterprising (Business Contact) people like to perform activities requiring persuasive, managerial, supervisory and leadership skills to obtain an institutional, political/social, or economic gain.

6. Conventional (Business operations) people like and are able to perform activities requiring attention to

details accuracy and clerical skills to record, file and organize numerical and verbal data according to specified instructions or procedures.

According to Holland, most people reflect a combination of three types which would select for a specific group of characteristics within certain major areas of study. For example, elementary school teachers typically relate to areas C-conventional, S-social, and A-artistic whereas biological scientists are prone to relate to R-realistic, I-investigative and A-artistic areas. In this way it can be seen that certain discipline areas would naturally draw more creatively expressive people than other areas. Although there are no hard and fast rules in this delineation, domain characteristics are important variables to be considered in this study.

Choice of discipline is affected by learning styles which reflect many student characteristics such as genetic coding, personality traits, environmental adaptive abilities (Kolb, 1976). Personality variables (Holland, 1987; Roe & Siegelman, 1964) and self-concept (Super, 1957) are major determinants of a student's choice of academic major and subsequent career.

Other career choice theories include the socioeconomic ones involving geographic identifications and socioeconomic determiners, and the developmental theories in which perceived childhood experiences affect choice (Frederickson, 1982; Roe & Siegelman, 1964).

Given the amount of information available on choosing a major area of study and the research that supports "reliably identifiable" subgroup characteristics (Zytowski & Kuder, 1986) differences in perception of creativity courses may reveal various patterns according to discipline groups. These differences were a focus of the study. While creative people exist in all academic areas, different disciplines were studied as indicators for perceived agreement of change for student participants.

Evaluations to be Considered

Student Evaluations of Perceived Learning

In Bloom's taxonomy evaluation is the highest level of thinking. It is built upon the other levels and it provides the opportunity for one to make value judgements based on both internal and external criteria. (Lyons, 1987). Student ratings of college courses have become the "main source of information about the accomplishment of important educational goals" (Aleamoni, 1981, p. 111). Marsh (1987) found through meta analyses that student ratings were "multidimensional, reliable, valid, and relatively unbiased with results useful for feedback, course selection, and personnel decisions" (p. 253).

Baird (1987) demonstrated that students' perceived learning correlated .88 with course evaluations and .86 with instructor evaluation. This study strongly supported the

validity of student ratings and showed a larger portion of rating variance that can be explained by students subjective assessment of learning than by actual course grades. "These data support the superiority of subjective learning as a predictor of student ratings of university instruction" (p. 91).

While student evaluation of perceived learning is by no means conclusive proof of what was learned, it does offer important insight into general effectiveness of instruction in terms of meeting learner objectives.

Subscale Evaluations

Personal Change. Galileo was quoted as saying, "You cannot teach a man anything--you can only help him find it within himself". Creativity demands by its very nature a "personal input and involvement of considerable degree." (Bailey, 1979, p. 301). Items in the personal change subscale addressed the affective, internal, innerpersonal variables that were supported in the literature as relating to creativity. Such traits as openness, independence, confidence, and intuition were covered (Barron, 1988; Isaksen, 1987; Sternberg, 1988; Woodman & Schoenfeldt, 1989).

Knowing one's own style of creative problem solving has been said to increase "self-awareness and understanding of the complete creative process" (Basadur, Graen, & Wakabayashi, 1990, p. 128). Therefore, understanding one's

learning style was an evaluation component important in this study.

Knowledge. It has been well documented that creativity must be based in knowledge. Knowledge includes information that increases awareness and that is usable to the learner (Sternberg & Lubart, 1991). In this instance knowledge is that cognitive information that can be applied in creative production. McDonough & McDonough (1987) related this in another way to the learning of creativity when they expressed doubt that creativity can be informally taught across the curriculum. They state that it is better to have the students bring creative attitudes to the learning effort and understanding of the subjects they study while in college and this is best achieved by completing a formal course in creativity during their first or second year in school. Pesut (1990) believed that most creativity training programs are successful because they provide the participant with metacognitive experiences, knowledge, and strategies. His model links metacognition with self-regulation, man's ability to voluntarily modify his own physiological activity, behavior or processes of consciousness" (p. 107). Pesut's hypothesis is that through self-regulated creative thought it is possible for an individual to

> `be aware of being aware' or to consciously invoke the use of creativity technologies in order to guide thinking and behavior in an effort to generate creative

> associations that are useful to the development of a desired outcome. Individuals who develop metacognitive knowledge and experience are in a better position to understand and regulate their behavior in the service of a creative goal or identified outcome. (p. 106-108).

Metacreativity is another term used to view this process of thinking about being creative. Pesut probably is quite accurate in explaining the process of creativity training which in itself becomes a metacognitive activity, strategy. Numerous aspects of the final version of the student perception survey may be tapping into this metacognitive versus a mere cognitive experience.

Process. According to the questionnaire completed by 101 instructors of college level creativity courses, evaluating the understanding of creative process was one of the top three goals identified (Baloche, et al, 1991).

While some view creativity as a process existing in a single person at a particular point in time, an alternative view is a systems view (Amabile,1983; Csikszentmihalyi & Csikszentmihalyi, 1988). Tardiff & Sternberg (1988) discussed process as not precluding the individual viewpoint but creativity as existing in "a larger system of social networks, problem domains and fields of enterprise" (p. 429).

Analyzing one's own process as well as the barriers, the effect of diverse forces, and problem solving techniques

are components of this cluster (Barron, 1988; Isaksen, 1987; Wallas, 1926).

Effort. It has been found that one of the most salient characteristics of creative achievers is persistent motivation. Other characteristics of creative ability include high energy, drive, commitment and effort. With regard to actual creative problem solving training, Fishkin (1989) found that changes in creativity and affect were significantly associated with effort. Osche (1990) explained that creative ability is "no spontaneous emergence of inherent qualities; no special intellectual process; no gift-- but a hard-earned prize"(p. 260). Bailey (1979) claimed that "obstacles, difficulties and hardships" are an integral part of creative work" (p. 331). Lumsdaine & Lumsdaine (1990) supported this with the claim that "creative thinking is only the first step in innovation" (p. 60). They went on to suggest that the most common inhibition to creativity is our "reliance upon traditional problem solving routines and the fantasy that creative problem solving should be easier rather than more difficult than producing answers to routine problems" (p. 50). It was this thinking that distinguished the Effort subscale from the survey.

Production. Bull & Davis (1982) insisted that for "creative productivity there must be a desire to produce for the intrinsic satisfaction of doing something unique and

different" (p. 2). MacKinnon (1978) viewed the study of creative products as the "basis upon which all research on creativity rests" (p. 187). There is some evidence that creative products can be judged consistently across domains and the most obvious generalization of that is novelty (Tardiff & Sternberg, 1988). However, Bailin (1985) held that novelty must be judged in terms of how the product conforms to and/or departs from an established tradition. The Production subscale was used to evaluate students perceived gain in ability and follow through with bringing into existence something new--be it ideas, knowledge, action or object.

Teaching. This subscale included perceived ability to evaluate and synthesize what was learned. For those persons in education it was this cluster that was indicative of perceived gain in ability to better teach others. While this subscale should receive response particularly from those students in the education field, the questions were broad based and could be responded to regardless of discipline. The ability to teach others is indicative of a higher level of understanding. It was included in the survey as an indicator for evaluating one's understanding of the extent of what has been learned.

Summary

In this review of literature it has been discussed that creativity is a complex, diverse and multi-dimensional construct. The importance of creativity to the individual and society has been stressed. The ability to teach creativity was found to be somewhat controversial although most agreed on the ability to enhance and increase its occurrence. There were numerous theories, techniques and approaches as to how this can be accomplished. Different disciplines had different approaches to creativity although some interesting commonalities existed among them. It was expected that courses in creativity would be differentially taught and that student responses would be different depending on the discipline. There were several theories of career choice as well as influences, such as learning style, that affect how and why a person chooses to go into a certain academic major. These variables may help explain why students might differentially perceive increase in learning.

CHAPTER III

METHODS

Introduction

This expost facto study was designed to analyze student responses and describe perceived learning across disciplines. Identified instructors of creativity courses across the U. S. were invited to participate in a research study. As a result, 288 college students participated in the evaluation of creativity courses taught at the college or university level during the Fall of 1991 and Spring of 1992.

Sample

Student participants included 221 undergraduates students and 57 graduate students (educational level information on 10 students was missing). Discipline delineation was as follows: 144 students (50%) were education majors; 30 students (10%) were A/E/T majors; 15 (5%) were Arts & Sciences majors; 33 (12%) were business majors; and 42 (15%) were Multidisciplinary made up of the nonspecified graduate and undergraduate students. Of the remaining (8%), 10 students did not indicate a major at all and 14 students were the home economics, agriculture and

professional school majors whose responses were not considered as part of the study due to limited numbers.

Students ranged in ages from 18 to over 50 with 31 students indicating they were less than 20; 181 between the ages of 20-24; 28 students aged 25-29; 11 students aged 30-34; 21 aged 35-39; 7 aged 40-44; 3 aged 45-49 and 2 aged 50 and over. There were 82 men (29% of the sample) and 202 women (71% of the sample) included in the population. Various ethnic groups were represented with the dominant participant being white (90.4%). Respondents were students at schools primarily in the north central (91 or 34.2% of the sample) and north eastern sections (138 or 51.9%of the sample) in the U.S. but with representation from major directional areas across the nation. Due to missing data not all totals equal 288.

Data Base

Post course evaluation has been utilized in many settings particularly at the college level. It is a method of data collection which yields important information (Aleamoni, 1981).

The current study considered student evaluations taken from creativity courses taught across the United States. It was taken from an existing data base collected in the recent comprehensive work by Drs. Kay Bull, Diane Montgomery, Lynda Baloche, and graduate students Dena Pinson, Keith Salyer and Randall Brown(1991).

A modified Delphi poll was sent to identify instructors who had responded in the studies by Baloche et al., (1991); Bull et al., (1991); and Montgomery et al., (1991). From these instructors information was solicited on what they felt students should evaluate in terms of perceived learning from participation in a creativity course. A concept development strategy was utilized and six specific categories emerged--Person, Process, Knowledge, Production, Effort and Teaching. These were the primary areas that the experts (creativity teachers) felt were important in evaluating perceived student learning from creativity courses.

The information obtained from the instructors served as the basis for the questionnaire entitled "Creativity Course Survey" (See Appendix A). This survey was administered to students taking creativity courses during the Fall of 1991 and Spring 1992.

Instrument

The information collected from the "Creativity Course Survey" formed the data base from which the current study was taken. Students were asked to respond on the questionnaire on a Likert-like format of whether they strongly agreed (value 1) or strongly disagreed (value 7). An additional response (value 8) was possible which indicated that the student perceived that the question did not apply to the particulars of the course they had taken.

An Internal Consistency Reliability Coefficient was established for each subscale area.

Procedure

When the data were initially compiled it was determined that five college major or discipline areas were primarily represented from among the nine available responses. Those areas were (1) Education, (2) Architecture/Engineering & Technology (A/E/T), (3) Arts and Sciences, (4) Business, and (5) Multidisciplinary which included non-specified graduate and undergraduate fields. Representations in the other areas (Home Economics, Agriculture and Professional School) were too limited (5% total combined) to be considered for the purposes of this study.

Six one way analysis of variance (ANOVA) procedures were performed to determine if there were significant differences among and within the five major disciplines listed above in the six survey subscale areas (person, process, knowledge, product, effort and teaching). Significance level was established at $p<.01$ due to the number of conditions and the size of sample cases in certain areas. Additionally, post hoc analyses were conducted to discern pair-wise differences which were significant.

A SYSTAT (1992) analysis system was utilized for all procedures with the exception of internal consistency. SYSTAT program automatically controlled for missing data or

out of range values (in this case response value 8-not applicable).

CHAPTER IV

RESULTS

Summary of Means for Subscales

Table B-1 (See Appendix B) summarizes the mean ratings and standard deviations for each of the six subscale areas by major. The majors are indicated as follows:

1. Education
2. Architecture/Engineering/Technology
3. Arts & Sciences
4. Business
5. Multidisciplinary (unspecified graduate and nongraduate)

It should be noted that lower scores indicate the greater amount of agreement with questions in the subscale. For instance, if the best possible score on a subscale is 12 then a subject who scored 12 indicated the highest level of agreement to having perceived learning in the subscale area as a result of participation in the creativity class. There were 8 possible responses on the survey. Value 8 response was a "not applicable" response and was not included in the data. Since value 8 answers were not included, the worst possible score would be the BS X 7 = WS (worst score) or

lowest level of perceived learning that is agreed upon by an individual. All tables can be found in Appendix B.

ANOVA Procedures

The results of the six one-way ANOVA procedures are given in Table B-2. Again the majors are numbered 1-5 as listed above. Level of significance is $p<.01$. The differences were significant for the subscale Teaching only at the $p<.01$ level. The post hoc analysis revealed that the differences were between the business and education subscales and the multidisciplinary and education subscales with education majors indicating higher agreement to perceived learning.

Additional Analyses

Prior Training

Since a number of people indicated they had prior training in creativity (54 for college training and 75 for Other), additional analyses were done to determine the effect of these variables for each subscale area. Table B-3 is a summary of the means, standard deviations and sample size for this data.

The variable of college training had a significant effect on the Production subscale, $T=40.281$ at the $p<0.01$ level. The variable Other Training showed a significant effect in the Teaching subscale with $T=19.927$ at the $p<0.01$

level. There were no other differences that were significant for these variables.

Internal Consistency

Internal Consistency was established for this instrument using a Cronbach Alpha reliability test. The reliability for each subscale is listed in Table B-4.

Item Analysis

To further analyze the various items that comprised each subscale, an item analysis was completed. A summary of all items within the survey by subscales is listed in Table B-5. The percent of students responding to each value (1-7) in the scale is given, as well as the total number of responses and the mean and standard deviation for that question. There were five items in which 45% or more of the students responded that they strongly agreed (value 1) with the statement indicating perceived learning. There were four statements which received 20% or more responses at value level 4 (uncertain/neutral) or higher. All other items were favorably rated by the majority of students with value 1,2 or 3 ratings.

Teaching Subscale Analyses

In an effort to learn more about the differences that might have been caused by missing and out of range values, several post hoc analyses were conducted. The Teaching

subscale was found to have a high number of missing cases for various questions. Data indicated that the teaching subscale had 23 surveys which were left completely blank. This large number of complete blanks for a subscale was not found to be consistent in the other subscales.

Further descriptive analyses of the Teaching subscale were necessary based on findings from the analyses already completed. The Teaching subscale as it relates specifically to education majors is summarized in Table B-6.

Process Subscale

Additional information was analyzed in the Process subscale (See Table B-1). Due to the large number of missing and out of range values for question #15 relating to inventions a new analysis was made leaving out question #15. The ANOVA on the Process subscale excluding question #15 yielded no significant differences at the $p<.01$ level.

CHAPTER V

CONCLUSIONS

Discussion

It was hypothesized that there would be no difference in perceived learning evidenced across the different disciplines. There were significant differences in only the teaching subscale at the $p<.01$ level (See Table B-1). The differences could be accounted for in one of several ways. Education majors, making up 50% of the total sample population, responded as a group very favorably to agreement in perceived learning. Educators responded with a mean of $X=15.000$ while the overall mean for the subscale was $X=17.126$ based on a perfect score of 8.0 (strongly agree). It appears that creativity training is perceived by education majors as enhancing to their ability to assess, understand and teach their students.

There is another possible explanation for the significant differences in the Teaching subscale. The title of this subscale may have inhibited some responses from other fields. There were fewer responses-within-range for majors other than education and the remaining responses indicated less agreement with perceived learning as would be expected. The post hoc analysis indicated the areas of

difference to be significant between education and business students and also between education and multidisciplinary majors, with education majors indicating the better scores for perceived learning in both instances. Certain questions in the teaching area pertained specifically to teaching, i.e., #48-improved methods to teach; #49-understand the learning styles of my students; #50-better adapt assignments and tests; and #52-better integrate the arts into my teaching. It is believed that these questions effected the outcome of the results, as did the title of the subscale, by indicating that the subscale was specific to educators only.

In reviewing the overall results from Table B-1 it appears that all courses received high ratings. Means for each subscale consistently fell within the 2 to 3 value level (moderate agreement to slight agreement) of perceived learning across disciplines.

Descriptive analysis revealed that a number of people had prior training at the college or "other" level. Therefore, additional analyses were completed to determine the effect of prior training on perceived learning. (See Table B-3). Prior college training was significant at the $p<.01$ level for the Production subscale. This level of significance demonstrates that students who have had prior college training may perceive more learning in the area of production as a result of their experience when compared with more naive learners. Students did not however, perceive greater learning at a significant level for Other

Training in the production subscale. This is interesting in that it gives rise to new questions about the differences between college and other types of creativity training.

A similar observation can be made with regard to Other Training and the Teaching subscale. Students who indicated that they had prior creativity training varied to a significant degree from those without training in the teaching subscale. However, students who indicated prior college creativity training did not differ significantly in the teaching area. This lack of consistency between the two types of training and the effect on the perceived learning of college students suggests that college training and other types of creativity training might differ in subtle ways that exist but that are not easily discernible. These differences could be a focus of future research.

It should be pointed out that in all subscales, those students with either college training or other training were more in agreement with perceived learning than their more inexperienced counterparts even though the differences were not significant except in the two areas mentioned. Instead of the more naive learners having room for growth, so to speak, it appears that when college students have more training in creativity, they could be more able to benefit from additional training. This advantage could indicate increased sensitivity to creativity issues as well as increased ability to learn from additional training. The advantage of prior training is a recommended area for

further research with a larger sample and more quantitative analysis.

In an overview of item analysis (See Table B-5) there were numerous items that worked very well in terms of receiving high ratings for perceived learning. On item #5 pertaining to being more appreciative of the creativity of others, 52% of students responded with value 1 rating. The overall mean for this question was X=1.724 (SD=1.004) indicating a strong agreement with perceived learning in this area. Item #20 on more readily recognizing barriers to creativity received value 1 responses 50% of the time. Item #24 on seeing the value of being creative more than before received 49% value 1 responses. And item #43 on wanting to continue learning about the topic of creativity received 48% value 1 responses. Survey items (See Appendix 1.) #5, #7, #20, #24, #26, #28, #31 and #46 received mean ratings indicative of strong to moderate agreement of perceived learning by respondents.

The least amounts of agreement were indicated (See Table B-5) in the Process subscale for question #15 on patenting inventions, in the Production subscale for question #35 on reading in a variety of academic disciplines, and in the Effort subscale for question #39 on doing more in less time and question #40 on improved organizational skills. The overall mean for these questions fell between values 3 and 4 on the rating scale. These were the items in which the students perceived the least

agreement with although the perceived learning for these areas would still be considered average. Perceived learning in all areas evaluated by the respondents is considered moderate to strong which would indicate that the majority of students are in agreement concerning perceived learning from a variety of creativity courses.

Since the majority of respondents (50%) were education majors it is interesting to look at the teaching subscale in particular. Based on the observations in Table B-6, education majors responded most favorably to questions # 46 better able to create a climate that encourages creativity for others, and # 47-better able to use the creative process to teach a variety of content areas. This information should be helpful in teacher training programs. It would indicate that specific training in creativity is perceived as helping one to create better climates and to teach different content areas.

Recommendations

The current study leads the way to additional areas of research for creativity at the college level. With the high level of internal consistency found to exist in the Creativity Course Survey, it would make an excellent standardized instrument for evaluating other creativity courses. This instrument looks at creativity courses across disciplines with little variation. Its stability would indicate its usefulness as a measure of student evaluation

for other courses and studies on creativity training. When coupled with other instruments such as pre & post measures of creativity and product evaluation measurements, adequate quantitative as well as qualitative data for understanding and evaluating creativity at the college level could be documented. The Creativity Course Survey could be used to compare items or subscales across various courses. Additionally in the case of new courses, it could be used as the comparative norm. When items found to be different are excluded, the instrument could be utilized to evaluate effectiveness of new or modified courses.

Further studies of age variables, school size and type (liberal arts versus professional school), gender differences and the valuing of creativity in others are recommended areas for further study. Demographic information should include whether course is offered in the major field of study and whether or not the course is required. Other research should include more subjects in non-educational groups as well as more extensive analysis of the teaching of creativity in pre-service teacher education programs.

The results of the Creativity Course Survey should add impetus to the recognition that creativity is an essential component to college level education. The high level of agreement of perceived learning across all the disciplines indicates that creativity is commonly appreciated and is a benefit to students in various fields of study.

Colleges and universities across the United States are given the task of preparing future leaders and professionals of the world. This is a demanding task in today's world of rapid transitions, access to information, changing political scenes, and problems in economic and social structures worldwide. In addressing such issues, the importance of creativity as a resource to be developed cannot be ignored. Paul MacCready (cited in Lumsdaine & Lumsdaine, 1990) has stated it very clearly, "No single technological advance will be the key to a safe and comfortable long-term future for civilization. Rather, the key, if any exists, will lie in getting large numbers of human minds to operate creatively and from a broad, open-minded perspective, to cope with new challenges" (p. iii). The opportunity to develop creative minds is knocking at the door of higher education. The first step toward that door is to begin offering more creativity courses at the university level.

It has been demonstrated in this study that discipline specific training in creativity is primarily not perceived as significantly different. It is hopeful that courses will be offered initially to a wide number of students from any major and then with continued satisfactory results all departments may one day cater to the needs of the growing demand for creative minds.

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APPENDIXES

APPENDIX A

SAMPLE OF SURVEY ENTITLED

CREATIVITY COURSE SURVEY

Creativity Course Survey

Purpose: This instrument is being used in a number of creativity courses around the country to try to determine your perceptions about what you have learned about creativity and the effects of this learning upon you. Because this instrument is designed for use with multiple courses some of the items may not apply to your course. If you feel that an item does not apply to the course you took, please mark it not applicable.

Please mark only on the answer sheet. DO NOT write on this survey.

Directions: Please complete the following questions about the creativity course you are now taking.

Please use the following scale:

1 = strongly agree
2 = moderately agree
3 = slightly agree
4 = uncertain/neutral
5 = slightly disagree
6 = moderately disagree
7 = strongly disagree
8 = not applicable to my course.

PERSONAL CHANGES

As a result of taking this class, I. . .

1.	am more willing to take creative risks than I was before taking this class.	1 2 3 4 5 6 7 8
2.	feel greater independence.	1 2 3 4 5 6 7 8
3.	have greater confidence in myself as a potentially creative being.	1 2 3 4 5 6 7 8
4.	have more confidence in the worth of my ideas.	1 2 3 4 5 6 7 8
5.	am more appreciative of the creativity of others.	1 2 3 4 5 6 7 8
6.	am invigorated through the experience of exercising my own creativity.	1 2 3 4 5 6 7 8
7.	have less fear of new people, tasks, places or information.	1 2 3 4 5 6 7 8
8.	have a better understanding of my learning and/or teaching style.	1 2 3 4 5 6 7 8
9.	feel greater comfort in using my intuition in creative problem solving.	1 2 3 4 5 6 7 8
10.	am less satisfied with first solutions.	1 2 3 4 5 6 7 8
11.	feel better about being different.	1 2 3 4 5 6 7 8
12.	have rediscovered some of my childlike qualities.	1 2 3 4 5 6 7 8

PROCESS

As a result of taking this class, I . . .

13.	understand the artistic process more fully.	1 2 3 4 5 6 7 8
14.	understand the design process more fully.	1 2 3 4 5 6 7 8
15.	know better how to patent inventions.	1 2 3 4 5 6 7 8

Please Complete Items Inside

Please mark only on the answer sheet. DO NOT write on this survey.

Please use the following scale:

1 = strongly agree
2 = moderately agree
3 = slightly agree
4 = uncertain/neutral
5 = slightly disagree
6 = moderately disagree
7 = strongly disagree
8 = not applicable to my course.

As a result of taking this class, I . . .

16. increased my skill in solving problems utilizing creative problem solving techniques.	1	2	3	4	5	6	7	8
17. understand better the objective means to help develop subjective creative responses.	1	2	3	4	5	6	7	8
18. am better able to step back and analyze my creative process.	1	2	3	4	5	6	7	8
19. understand more fully how creativity is affected by diverse forces.	1	2	3	4	5	6	7	8
20. more readily recognize barriers to creativity.	1	2	3	4	5	6	7	8

KNOWLEDGE

As a result of taking this class, I . . .

21. know more how great creative minds developed.	1	2	3	4	5	6	7	8
22. have increased knowledge of assessment of creativity.	1	2	3	4	5	6	7	8
23. better understand theories of creativity.	1	2	3	4	5	6	7	8
24. see the value of being creative more than I did before.	1	2	3	4	5	6	7	8
25. understand the role of altered senses in creativity.	1	2	3	4	5	6	7	8
26. can more readily look at things from different perspectives.	1	2	3	4	5	6	7	8
27. better understand the place of humor in creativity.	1	2	3	4	5	6	7	8
28. better understand the need for a flexible environment for creativity.	1	2	3	4	5	6	7	8
29. better understand the relationship between creative thinking and critical thinking.	1	2	3	4	5	6	7	8
30. better understand the place of creativity within organizations.	1	2	3	4	5	6	7	8

PRODUCTION

As a result of taking this class, I . . .

31. am better able to tap my own sources of creativity.	1	2	3	4	5	6	7	8
32. am better able to create a vision for myself.	1	2	3	4	5	6	7	8
33. have a repertoire of deeds and products that demonstrate creativity.	1	2	3	4	5	6	7	8
34. look for opportunities to apply the creative process to a variety of daily tasks.	1	2	3	4	5	6	7	8
35. now read in a variety of academic disciplines.	1	2	3	4	5	6	7	8
36. understand more techniques to improve my creative production.	1	2	3	4	5	6	7	8
37. can defend my creative ideas from others.	1	2	3	4	5	6	7	8

EFFORT

As a result of taking this class, I . . .

38.	have a better understanding that failure is really composed of lesser degrees of success.	1	2	3	4	5	6	7	8
39.	do more in less time.	1	2	3	4	5	6	7	8
40.	have improved my organizational skills.	1	2	3	4	5	6	7	8
41.	realize the role hard work plays in being creative.	1	2	3	4	5	6	7	8
42.	understand the central importance of persistence.	1	2	3	4	5	6	7	8
43.	want to continue to learn about this topic.	1	2	3	4	5	6	7	8
44.	am more aware that with an increased sense of freedom comes a greater sense of responsibility for action.	1	2	3	4	5	6	7	8

TEACHING

As a result of taking this class, I

45.	can better assess others' creativity.	1	2	3	4	5	6	7	8
46.	can better create a climate that encourages creativity for others.	1	2	3	4	5	6	7	8
47.	can better use the creative process to teach a variety of content areas.	1	2	3	4	5	6	7	8
48.	have improved methods to teach for creativity.	1	2	3	4	5	6	7	8
49.	understand better the learning styles of my students.	1	2	3	4	5	6	7	8
50.	can better adapt assignments and tests to accommodate creative learners.	1	2	3	4	5	6	7	8
51.	can better encourage others to be creative in my discipline.	1	2	3	4	5	6	7	8
52.	can better integrate the arts into my teaching.	1	2	3	4	5	6	7	8

Demographics: Please answer the following questions so that we may describe you as a group. No individual information will be reported. Do not put your name on the answer sheet or on the test.

53. Gender:
____(1) male
____(2) female

54. Age:
____(1) less than 20
____(2) 20-24
____(3) 25-29
____(4) 30-34
____(5) 35-39
____(6) 40-44
____(7) 45-49
____(8) 50+

55. Ethnicity (check all that apply):
____(1) Black
____(2) Native American
____(3) White
____(4) Asian-American
____(5) Hispanic
____(6) Other

56. College Major:
____(1) Education
____(2) Engineering/Architecture/ Technology
____(3) Arts & Sciences
____(4) Home Economics
____(5) Agriculture
____(6) Business
____(7) Professional School
____(8) Graduate (not listed above)
____(9) Undergraduate (not listed above)

Please complete items on back

Please mark only on the answer sheet. DO NOT write on this survey.

57. Education (check your current level):
____(1) Freshmen ____(3) Junior ____(5) Masters degree ____(7) Second Masters
____(2) Sophomore ____(4) Senior ____(6) Post Masters (no program) ____(8) Doctorate

58. Marital status (check one):
____(1) single
____(2) married
____(3) divorced
____(4) widowed

59. How many children do you have?
____(1) none ____(3) two ____(5) four
____(2) one ____(4) three ____(6) over four

60. What other college training in creativity have you had?
____(1) none
____(2) one other college course
____(3) several college courses

61. What other training in creativity have you had?
____(1) none
____(2) less than 20 hours of workshops or seminars
____(3) 20-40 hours of workshops or seminars
____(4) more than 40 hours of workshops or seminars

62. Where did you grow up?
____(1) mostly rural areas ____(3) mostly urban areas
____(2) mostly suburban areas ____(4) mix of the above

63. How would you characterize the nature of decision-making in your family of origin?
____(1) authoritative ____(3) Laize faire
____(2) democratic

64. Current residence in the United States:
____(1) Northwest ____(3) North central ____(5) Northeast
____(2) Southwest ____(4) South central ____(6) Southeast

APPENDIX B

TABLES

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR CREATIVITY COURSE SURVEY SUBSCALES BY MAJOR

Subscale		Major					
		Educ	Archit/ Engr/Tec	Arts & Sci	Business	Disci	Multi Total
Personal Change *(BS=12)	Mean	24.856	27.370	27.857	26.296	30.432	26.609
	SD	9.012	9.065	12.857	8.999	11.396	9.919
	n=	132	27	14	27	37	258
Process *(BS=8)	Mean	18.629	21.063	18.000	19.783	20.000	19.363
	SD	6.744	7.567	3.688	8.959	8.696	7.325
	n=	70	30	15	33	42	146
Knowledge *(BS=10)	Mean	20.163	22.750	20.462	20.167	22.813	21.028
	SD	8.291	6.374	7.078	7.992	9.149	8.501
	n=	129	24	13	33	32	249
Production *(BS=7)	Mean	15.646	16.800	19.786	15.480	17.286	16.212
	SD	5.893	5.288	7.392	6.179	7.117	6.183
	n=	144	30	14	25	28	236
Effort *(BS=7)	Mean	17.092	19.655	18.929	16.148	18.265	17.602
	SD	6.835	6.773	7.011	6.125	8.136	7.105
	n=	131	29	14	27	34	251
Teaching *(BS=8)	Mean	15.000	19.467	18.571	21.684	23.824	17.126
	SD	7.023	7.230	6.779	9.153	9.901	8.005
	n=	127	15	7	19	17	198

*BS indicates Best Score possible for individual on subscale.

Note. n's are not the same as totals as listing deletion was used within subscales for the analysis.

TABLE 2

SUMMARY TABLE FOR ONE-WAY ANOVA
FOR THE SIX CREATIVITY COURSE SURVEY SUBSCALES

Subscale	Source	SS	DF	MS	F
Personal	Major	971.241	4	242.810	2.628
	Error	21438.986	232	92.409	
Process	Major	104.988	4	26.247	0.473
	Error	7041.193	127	55.442	
Knowledge	Major	286.629	4	71.657	1.081
	Error	14782.354	223	66.289	
Production	Major	273.014	4	68.254	1.808
	Error	8005.235	212	37.761	
Effort	Major	252.888	4	63.222	1.303
	Error	11156.406	230	48.506	
Teaching	Major	1824.971	4	456.243	7.975*
	Error	10298.023	180	57.211	

* $p < 0.01$

TABLE 3

MEANS AND STANDARD DEVIATIONS FOR
PRIOR TRAINING IN CREATIVITY

Subscale		Prior College Creativity Training		Prior Other Creativity Training	
		None	Some	None	Some
Personal Change	Mean	26.990	25.185	26.737	26.147
	SD	9.999	8.482	9.740	9.562
	n=	195	54	167	75
Process	Mean	19.849	17.531	19.348	18.581
	SD	7.577	5.702	7.589	6.056
	n=	106	32	92	43
Knowledge	Mean	21.235	19.811	21.138	20.187
	SD	8.543	6.898	8.582	7.355
	n=	187	53	159	75
Product	Mean	16.509	15.556	16.770	15.274
	SD	6.228	5.801	6.320	5.736
	n=	175	54	152	73
Effort	Mean	17.890	16.519	16.770	15.274
	SD	7.290	6.112	6.320	5.736
	n=	191	60	152	73
Teaching	Mean	17.871	15.000	16.945	15.456
	SD	8.631	5.680	8.081	7.234
	n=	140	50	73	73

TABLE 4

SUMMARY OF RELIABILITY ANALYSIS FOR
CREATIVITY COURSE SURVEY SUBSCALES

SubScale	Alpha Coefficients	n=
Personal Change	0.9131	282
Process	0.7483	276
Knowledge	0.8640	283
Production	0.8370	285
Effort	0.8251	283
Teaching	0.9450	281

TABLE 5

SUMMARY OF ITEM ANALYSIS OF CCS
BY PERCENT OF RESPONSE

Subscale/ Item Number/Cue	Response Value 1	2	3	4	5	6	7	n=	Mean	SD
Personal Change										
1. Willing	41	31	19	6	2	<1	<1	285	2.025	1.146
2. Feel	21	31	26	16	2	1	2	282	2.592	1.318
3. Confidence	39	34	20	4	1	1	<1	283	2.014	1.111
4. More conf	36	36	17	6	3	1	<1	283	2.078	1.152
5. Appreciate	52	33	10	4	<1	<1	<1	286	1.724	1.004
6. Invigorate	34	33	20	9	4	<1	<1	281	2.199	2.618
7. Fear	20	33	24	14	5	1	2	283	1.205	1.338
8. Understand	31	33	23	10	1	2	1	280	2.279	1.236
9. Comfort	27	39	21	9	2	1	0	280	2.250	1.105
10. Satisfied	17	34	23	16	6	<1	<1	277	2.772	1.307
11. Different	31	38	18	8	4	<1	2	284	2.250	1.268
12. Childlike	31	32	17	13	5	<1	1	277	2.347	1.292
Process										
13. Art procs	29	30	25	11	3	2	1	274	2.387	1.294
14. Design prcs	19	31	26	15	4	2	3	248	2.722	1.402
15. Invent	8	18	23	27	7	5	13	150	3.713	1.731
16. Incrs skil	28	38	21	8	3	2	<1	280	2.264	1.183
17. Objectv msr	20	39	19	15	2	1	0	288	2.510	1.431
18. Analyze	33	38	21	5	2	1	1	285	2.119	1.141
19. Diverse frc	36	37	17	7	1	2	<1	283	2.085	1.142
20. Barrier	50	37	8	3	<1	1	<1	282	1.748	1.028
Knowledge										
21. Know more	25	34	25	10	3	2	4	273	2.425	1.250
22. Incrs knwlg	28	35	26	8	1	2	<1	284	2.268	1.137
23. Theories	33	34	23	7	1	1	1	282	2.177	1.168
24. Value	49	32	11	5	2	<1	1	285	1.849	1.151
25. Role	22	31	27	16	2	2	1	271	2.561	1.263
26. Perspectiv	44	33	14	5	2	2	<1	284	1.961	1.181
27. Humor	43	29	16	7	2	2	1	283	2.057	1.262
28. Need	54	26	13	3	1	2	<1	284	1.785	1.143
29. Related	36	31	23	6	2	1	1	281	2.164	1.208
30. Place	35	33	18	8	3	2	1	278	2.212	1.298
Production										
31. Value	41	35	13	8	1	1	<1	284	1.982	1.120
32. Vision	28	33	26	8	3	1	<1	280	2.293	1.164
33. Repertoir	17	37	22	17	3	1	2	268	2.660	1.318
34. Opportunity	31	33	23	9	5	0	0	279	2.229	1.118
35. Disciplin	9	24	28	22	9	5	4	254	3.260	1.465
36. Techniq	38	35	18	4	4	2	<1	283	2.088	1.219
37. Defend	33	33	22	7	2	2	<1	284	2.215	1.224

TABLE 5 (Continued)

Subscale/ Item Number/Cue	Response Value 1	2	3	4	5	6	7	n=	Mean	SD
Effort										
38. Failure	24	32	23	14	4	1	1	278	2.525	1.291
39. Do More	14	20	26	22	9	4	5	272	3.250	1.581
40. Improve	16	20	24	21	10	4	6	268	3.224	1.627
41. Realize	40	26	16	10	4	2	2	278	2.262	1.455
42. Persist	34	28	20	12	2	1	2	276	2.322	1.360
43. Continu	48	23	13	9	3	1	2	282	2.085	1.414
44. More aware	35	30	17	12	3	1	<1	282	2.230	1.251
Teaching										
45. Assess	27	35	21	12	3	<1	3	259	2.436	1.366
46. Climate	42	33	16	6	2	0	2	263	1.977	1.156
47. Content	43	27	21	5	2	2	0	243	2.016	1.164
48. Methods	37	32	15	11	1	<1	2	241	2.195	1.338
49. Styles	34	30	18	14	1	2	1	207	2.300	1.325
50. Adapt	29	31	19	13	3	3	2	212	2.448	1.408
51. Encourage	39	28	22	8	2	2	<1	239	2.121	1.194
52. Integrate	35	32	18	12	1	2	<1	223	2.215	1.233

TABLE 6

RESPONSE TO TEACHING SUBSCALE ITEMS
BY EDUCATION MAJORS

Item #/Cue	n=	Mean	SD
#45. Assess	142	2.296	1.242
#46. Climate	143	1.664	0.964
#47. Content	142	1.648	0.916
#48. Methods	140	1.750	1.067
#49. Styles	132	1.924	1.157
#50. Adapt	135	2.096	1.202
#51. Encourage	142	1.873	1.017
#52. Integrate	142	1.859	0.957

VITA

Denbie S. Nash

Candidate for the Degree of

Master of Science

Thesis: STUDENTS PERCEPTION OF COLLEGE LEVEL CREATIVITY COURSES: A CROSS DISCIPLINE COMPARISON

Major Field: Instructional Systems Design

Biographical:

Personal Data: Happily married to Steven A. Nash and mother of three sons, Toby, Jadon and KC.

Education: Graduated from Midwest City High School, Midwest City, Oklahoma in May 1967; received Bachelor of Science Degree in Speech and Language Therapy from the University of Oklahoma in May, 1971. Attended North Texas State University in Denton, Texas and Northeastern State University in Tahlequah, Oklahoma; completed requirements for the Master of Science degree at Oklahoma State University in July, 1992.

Professional Experience: Public School Speech Pathologist in Texas and Oklahoma, Behavioral Therapist at Trinity Valley MHMR Agency, Fort Worth, Texas; Educational Consultant for Little Tyke, International, Inc., member American Society of Training and Development.