5-20-2005

An Investigation of the Relationship between the Open-Endedness of Activities and the Creativity of Young Children

Leng Yan
University of New Orleans

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN THE OPEN-ENDEDNESS OF ACTIVITIES AND THE CREATIVITY OF YOUNG CHILDREN

A Dissertation

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy
in
Curriculum and Instruction

by

Leng Yan

B.A. Shenzhen University, P.R.C., 1998
M.Ed. University of New Orleans, 2003

May 2005

For my family

Acknowledgements

First, I would like to acknowledge Dr. Judith Kieff, the chairwoman of my supervisory committee, for her guidance and support in every step of the development of my dissertation. During the time I was writing the proposal, we met with each other on a regular basis every Saturday morning at her house. Each time I visited her, we made progress toward my dissertation. I will never forget the pleasure of being in her cozy reading room and discussing with her in the company of her two lovely cats. Doing research with young children is not an easy task for a lot of doctorate students. Without Dr. Kieff's encouragement and support, accomplishing this task might have been impossible for me.

Dr. Charles Gifford, the methodologist of my supervisory committee, deserves a special degree of appreciation for his unforgettable patience, diligence and faith, even under very difficult circumstance. Without the many hours of help and advice that he gave me, this project could not have become a reality.

Grateful appreciation is extended to the other members of my committee: Dr. Renee Casbergue, Dr. Richard Speaker, and Dr. Patricia S. McHugh. Their encouragement and insights challenged me to conduct a better study and create a better document.

Special thanks are extended to my friends, Mrs. Darilyn Butler and Mrs. Jo Ann LoRusso. Mrs. Butler helped me recruit subjects and Mrs. LoRusso helped me collect data. Their support and help were definitely necessary for this study.

I also want to express my appreciation to the study participants for their enthusiasm and cooperation in making this study possible.

My deepest gratitude is extended to my husband, Heng, who was always caring and supportive, my “other statistics consultant.” This dissertation could not have been accomplished without the love and support of my family. I dedicate this dissertation to my parents, my son Raymon, and my husband.

Table of Contents

List of Tables

List of Figures

Abstract

This study examined the relationship between the open-endedness of activities and the creativity of young children. Eleven pre-kindergarten classes were observed and rated twice using a researcher-developed instrument, the Open-endedness of Activities Rating Scale (OARS). Three classes were selected from the 11 based on their cumulative ratings in the first observation (CROBS1): the class with the lowest degree of open-endedness of activities (CLSL), the class with a medium degree of open-endedness of activities (CLSM), and the class with the highest degree of open-endedness of activities (CLSH). Fifty-two "at-risk" students in these three classes (24 boys, 28 girls), who had no identified disabilities or delays, were tested utilizing Torrance's (1981) Thinking Creatively in Action and Movement (TCAM). A correlation was then drawn between the three classes' ranks of CROBS1 and their respective ranks of mean TCAM scores: fluency scores (FLUE), originality scores (ORIG), imagination scores (IMAG), and total scores (TTCAM). The 11 classes' CROBS1 was correlated and compared with their cumulative ratings in the second observation CROBS2 in order to examine the reliability of the OARS.

The results from the study indicated that: (1) the researcher-developed instrument, the OARS, is reliable for research purposes; (2) the degree of open-endedness of activities is significantly positively related to the level of creative thinking ability of the young children engaged in these activities; (3) increasing the open-endedness of activities is most beneficial for a class with a relatively low degree of open-endedness, because a moderate increase in its open-endedness can result in a noticeable improvement in the fluency, originality, and total creative thinking ability of its students; and (4) increasing the open-endedness of activities is also beneficial for a class with a relatively medium degree of open-endedness, because a moderate

increase in its open-endedness can result in a noticeable improvement in its students' imagination.

CHAPTER I: INTRODUCTION

Creativity extends our experience and knowledge by taking us from the known and the familiar to the unknown and the novel (Pickard, 1990). Csikszentmihalyi (1996) stated, "Creativity is a central source of meaning in our lives. Most of the things that are interesting, important, and human are the result of creativity" (p. 36). Without people's daily creative activities, the civilization and industrialization of human society could not be realized. From the Humanistic perspective, creativity is a feature of human thought differentiating us from other forms of life, and creative behavior makes us more fully human (Isenberg & Jalongo, 2001). Creativity not only has a remarkable significance to all of human society but also affects each individual's learning and fulfillment. Creativity involves adaptability and flexibility of thought, the skills which numerous reports on education have suggested are critical for students to have so that they may learn (Tegano et al., 1991). According to Prentice (2000), "Creativity, when developed as a multifaceted function of education, is a powerful capacity of human intelligence" (p. 156). Creativity has also been viewed as an indicator of a high degree of mental health in the individual (Cecil, Gray, Thornburg, & Ispa, 1985) or a fundamental life skill needed to "adapt and survive under challenging environmental conditions" (Rogers, 1969, p. 290) and "make sound adjustments to new as well as old conditions" (Rogers, 1969, p. 290). Creative individuals are fully functioning (Rogers, 1961) and self-actualized (Maslow, 1971). According to Calouste Gulbenkian (1982), creative experiences give us the opportunities to: (1) develop the full range of human potential; (2) improve our capacity for thought, action and communication; (3) nurture our feelings and sensibilities; (4) extend our physical and perceptual skills; (5) explore values; and (6) to understand our own and other cultures.

Because of the importance of creativity to the entire human society and each individual, promoting young children's development of creativity is one of the major tasks of early childhood education. In the United Kingdom, the School Curriculum and Assessment Authority (SCAA, 1997) identified creative development as a desirable early years learning outcome. Furthermore, the Robinson Report (1999) of the National Advisory Committee for Creative and Cultural Education of the United Kingdom made a number of detailed recommendations to support the recognition and development of creativity within the formal as well as informal education system. The Qualifications and Curriculum Authority (1999; 2000) of the United Kingdom has deemed creative development one of the six main areas of learning. Although in the United States creativity has not received primary attention as a developmental or learning goal, American society also values those who through self-actualization make creative contributions, making creativity a critical indicator of quality in American early childhood settings (Cecil et al., 1985). As a result, many American researchers and educators have advocated promoting young children's development of creativity (e.g., Edwards & Springate, 1995; Duffy, 1998; Isenberg & Jalongo, 2001).

The definition of creativity is one of the most controversial issues among creativity theories. According to Rhodes (1961), Torrance (1966), Simonton (1988), and Isaksen (1992), creativity has been defined in terms of four "Ps": creative process (the fairly discrete behavioral stages of creative production), creative product (the outcome with novelty), creative person (the particular constellation of personalities and characteristics in the creator), and creative press (the external context that promotes creative activity). This study was based on the point of view that creative process, creative person, creative product, and creative environmental condition are four

different but interrelated aspects of creativity, and they supplement each other when used to determine a person's potentiality to create.

Young children are a group whose verbal and nonverbal skills have not fully developed; therefore, they may not yet have the skill to completely communicate their original ideas (Fishkin, 1998). In addition, young children's working styles and personalities usually have not yet matured (Isenberg & Jalongo, 2001); thus, from their current personalities or traits, their creative potentiality cannot be fully predicted. According to Tegano, Moran, and Sawyer (1991), for young children, creativity is best labeled "creative potential," and creative process is the basis of it. In this study, the researcher examined young children's creativity as creative potentiality by investigating young children's creative processes. Torrance (1981) defined young children's creative process as the ways in which they use their creative thinking abilities. According to Torrance, young children's creative thinking abilities refer to fluency, originality, and imagination; the most important ways that young children use their creative thinking abilities include: (1) moving in alternative ways; (2) imagining, empathizing, fantasizing, and assuming unaccustomed roles; (3) exploring alternative and unusual solutions to problems, and (4) improvising with common objects in the environment and using them for something other than the intended purposes.

This study rejected the view that some people are creative whereas others are not and assumed that everybody can display creativity, even if to differing degrees. The researcher posited that each child possesses the potentiality to produce ideas or objects that are novel to himself/herself.

Involving flexible schedules and undetermined tasks, open-ended activities are traditionally provided in gifted education as a differentiated instructional strategy to allow

students who are identified as gifted to "work at their own level, in their own interest area, and in their preferred learning styles" (Hertzog, 1997, p. 54). According to a position statement regarding the Developmentally Appropriate Practice made by the National Association for the Education of Young Children (NAEYC), although young children's development occurs in a relatively orderly sequence, it proceeds at varying rates from child to child, as well as unevenly within different areas of each child's functioning (Bredekamp & Copple, 1997). "Each child is a unique person with an individual pattern and timing of growth, as well as individual personality, temperament, learning style, and experiential and family background" (Bredekamp & Copple, 1997, p. 10). All children have their own special strengths, needs, and interests, even children who are typically developing. Recognizing the individual variation in children's development, the NAEYC advocates individualized curriculum for young children. As a teaching strategy that reveals different patterns of students' abilities, interests, and preferences (Hertzog, 1995), open-ended activities have also been used in early childhood curriculum as a means to address young children's individual developmental needs.

In this study, the open-endedness of activities was studied as a type of process quality of early childhood environments. The process quality of early childhood environments refers to children's experiences in the school, particularly the teacher's provision of developmentally appropriate or inappropriate activities and the dynamic interactions among the teacher, the children, and the physical environment (Howes & Hamilton, 1993). In other words, process quality includes both physical environmental factors and psychological environmental factors. Therefore, to examine the open-endedness of activities in a class the study focused on the physical environment and psychological environment in which the activities take place.

Statement of the Problem

In an individual interview, Docia Zavitkovsky (2001), the past president of the NAEYC, suggested that teachers and schools should provide an environment that helps young children's creativity to manifest itself. However, some schools overemphasized recall and reproduction as learning skills, thereby neglecting productive thinking skills, such as problem solving, creative thinking, and decision-making (Torrance, 1965; Torrance & Myers, 1970, cited in Torrance, 1977). Their curriculum orientations and instructional methods might severely limit young children's development of creativity and eventually resulted in a regression of their creativity or divergent thinking. The regression of creativity or divergent thinking was noticed and verified by some researchers (e.g., Dudek, 1974; Torrance, 1981; Tegano & Moran, 1989; Tegano et al., 1991; Meador, 1992). For enhancing young children's creative development, frequent questions have been asked by teachers and researchers: How should early childhood curriculum be designed to best promote young children's creative thinking? How should the classroom be set up to increase young children's creative experiences? What is the most effective teacher-child or child-child interaction for nurturing young children's creativity? After restrictive curriculum orientations and instructional methods are noticed and the regression of young children's creativity or divergent thinking is acknowledged, research endeavors should be devoted to the reform of curriculum orientations and instructional methods in early childhood education.

Purpose of the Study

The purpose of this study was to investigate the relationship between the open-endedness of activities and the creativity of young children, specifically to determine whether and to what extent an association exists between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities.

Conceptual Framework

Hertzog (1997) defined open-ended activities as a continuum of choices provided for students in three domains of activities: content, process, and product. She suggested that the degree of open-endedness of activities is reflected in the number of choices with which children are provided. Hertzog (1995) also found that the number of choices is determined by the physical and psychological environments in which activities take place. Because they involve risk-taking and acts of negotiation, open-ended activities allow children to make free choices according to their personal interests, aspects of their lives, and preferences for learning (Hertzog, 1995). When children are allowed to pursue their own choices through open-ended activities, they have an opportunity to produce work that is special and original (Hertzog, 1997).

Open-ended activities have been historically associated with creativity training (Hertzog, 1995). The use of open-ended activities to nurture creativity has been documented in some empirical literature. On the Torrance Tests of Creative Thinking (Torrance, 1966), open-ended activities encourage the test taker to provide multiple as well as unusual answers for the same question. In the book, *Creative Ventures: Ancient Civilizations*, Stark (1987) designed 57 open-ended activities to extend students' imaginations and creativity and encourage them to examine their feelings and values about historic eras. Harlan (1993) suggested that teachers should routinely offer a variety of art materials and open-ended activities to the people with developmental disabilities in order to promote their creative abilities, because open-ended art activities can provide them the opportunity to take initiative in their work and express their preferences. Isenberg and Jalongo (2001) also suggested providing a wide variety of interesting materials and keeping activities open-ended to support children's creativity. Church (2002) proposed that teachers should facilitate children's thinking and experimentation by providing

open-ended questions that have many possible answers. She stated that open-ended activities leave the door open for children to use their own thinking to create new ways of looking at something. Why are open-ended activities associated with creativity training? To answer this question, we need to study the human motivation for creativity. Why people create can be conceptualized as humanistic, psychoanalytic, or constructivist (Isenberg & Jalongo, 2001). This study was conducted based on the humanistic view (Maslow, 1982, 1970; Rogers, 1961) of creativity. The conceptual framework of this study is presented in Figure 1.

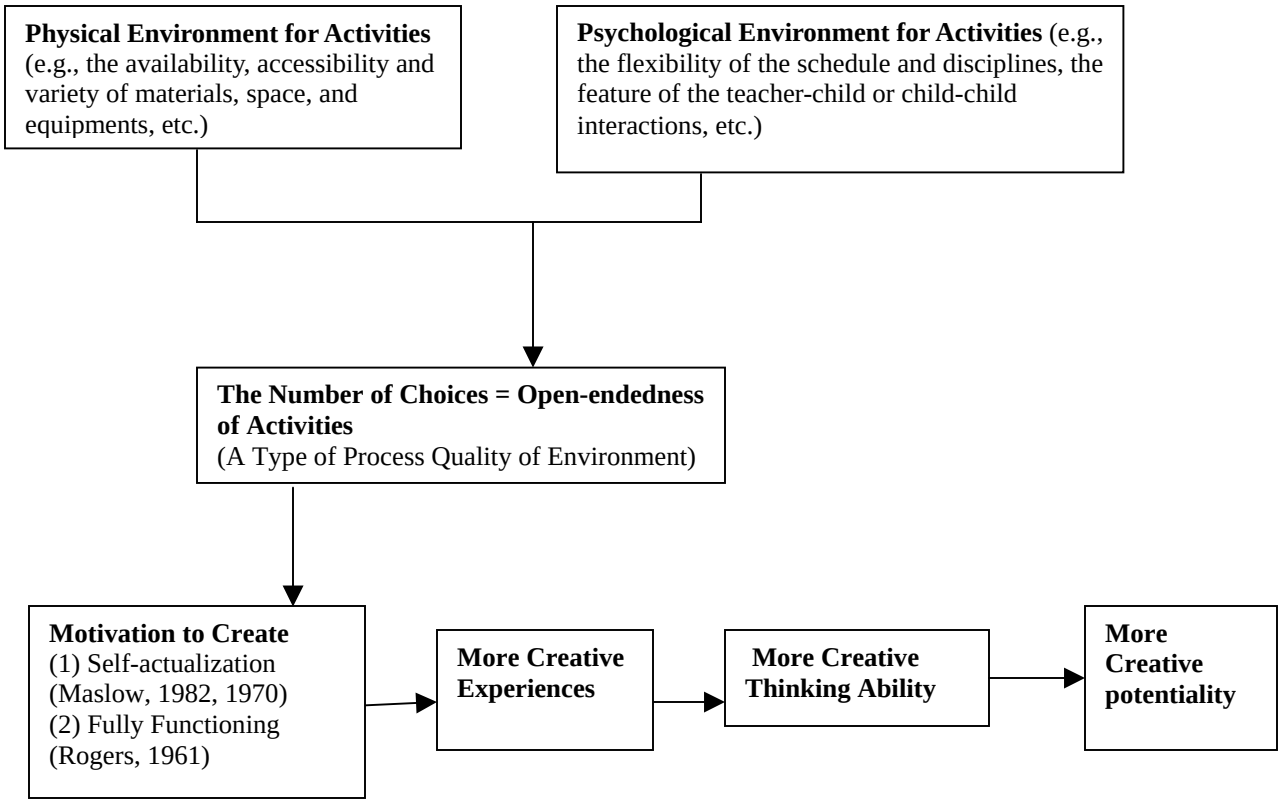


Figure 1: Conceptual Framework of the Study

Humanistic View of Creativity

Abraham Maslow is considered to be the father of Humanistic Psychology, also well known as the "Third Force." According to Maslow (1982), people create because of their need to self-actualize, and creativity is the result of a person's self-actualization. In order to be creative, a person needs some measure of freedom from stereotypes and clichés. Maslow (1970) suggested that self-actualizing individuals have the unique ability to make choices and exercise free-will. In open-ended activities, schedules are not rigid and tasks are not predetermined; children have an opportunity to make choices or solve interesting problems. By providing children with a "good environment that offers all necessary raw materials and then gets out of the way and stands aside to let the organism itself utter its wishes and demands and make its choices" (Maslow, 1970, p. 277), open-ended activities can promote children's creative self-actualization.

Carl Rogers (1961), another humanistic psychologist, believed that creativity is a healthy state within which an individual is fully functioning. In his opinion, motivation for creativity is closely associated with an individual's inner conditions: (1) openness to experience, (2) an inner locus of evaluation, and (3) the ability to toy with elements and concepts. While these inner conditions of creativity cannot be forced, they must be permitted to emerge. According to him, the internal conditions described above can be fostered and nourished by external conditions: psychological safety and psychological freedom. Isenberg and Jalongo (2001) interpreted the meaning of psychological safety and psychological freedom in the context of early childhood education. They posited that a child feels psychologically safe "when significant others accept the child as having unconditional worth, avoid external evaluation, and identify and empathize with the child" (p. 30-31). Psychological freedom emanates from children's internal world "when children feel free to play with symbols and to use these symbols for self-expression" (p.

31). In open-ended activities, young children's needs for psychological safety and psychological freedom can be met simultaneously, thereby permitting their inner conditions, closely related to the motivation for creativity, to emerge. When allowed to make free choices according to personal interest, aspects of life, and preference for learning, a child can reach a state described by Isenberg and Jalongo (2001) as playing with ideas, toying with elements and concepts, being open to experience and receptive to ideas, and relying more on self-evaluation than the evaluations of others. In this state, the child's emotions and thoughts are in harmony, and his/her opportunity of engaging in creative activities is maximized.

From the humanistic point of view, both external environmental factors and internal unconscious forces can control human behavior. The internal unconscious forces of humans are influenced by the external environmental factors. As an external environmental factor, open-ended activities can develop, encourage, enhance, and maintain children's inner motivation for creativity by increasing their opportunities to engage in creative activities. The more creative activities children experience, the more creative thinking ability they gain, and the more creative potential they have.

Research Question

This study was guided by the research question: What is the relationship between the degree of the open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities?

Hypothesis

Null Hypothesis

There is no relationship between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities.

Alternative Hypothesis

There is a positive relationship between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. The higher degree of open-endedness of activities is related to the higher level of creative thinking ability of young children.

Research Design

A correlational study was conducted to investigate the research question. The physical setting of the classrooms and the staff's interactions with the children in 11 state-funded pre-kindergarten (Pre-K) classes were observed and rated, using a researcher-developed instrument, the Open-endedness of Activities Rating Scale (OARS), to determine the classes' degree of open-endedness of activities. After the classes' cumulative ratings on the OARS were ranked, three classes were chosen for correlational analysis: the class with the lowest degree of open-endedness, the class with a medium degree of open-endedness, and the class with the highest degree of open-endedness. The students in these three classes, who were considered to be "at-risk" by the state and had no identified disabilities or delays, were tested utilizing Torrance's (1981) Thinking Creatively in Action and Movement (TCAM) to determine their level of creative thinking ability. A correlation was drawn between the three classes' cumulative ratings on the OARS and their respective mean fluency scores, originality scores, imagination scores, and total scores on the TCAM.

Need for the Study

Most literature about open-ended activities is non-empirical. Many of the studies focused on the description of open-ended activities. Others simply suggested the use of open-ended activities while providing recommendations for educational practice. Although a few papers

reported test-based studies of open-ended activities, none of them examined the relationship between open-ended activities and creativity. In order to explore the rationality of using open-ended activities as an instructional strategy to help young children develop their creativity, studies investigating the relationship between open-endedness of activities and the creativity of young children must be done.

Significance of the Study

For most young children, the first public place where they have close and frequent contact is preschool. Since the nature and quality of the environment are the major factors in how and what young children learn, preschools should assume the responsibility to assure a developmentally appropriate environment for their students to develop creativity. However, many schools actually suppress creativity. According to Dacey (1989), "most young children are naturally curious and highly imaginative. Then, after they have attended school for a while, something happens. They become more cautious and less innovative. Worst of all, they tend to change from being participators to being spectators" (p. 200). These schools should reform their restrictive curriculum orientations and instructional methods to unlock children's creativity. In an effort to contribute to the reform of curriculum orientations and instructional methods in early childhood education for enhancing young children's development of creativity, the researcher conducted the study to determine whether and to what extent a relationship exists between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. Combined with the outcomes of other studies that are related to open-ended activities and young children's creativity, the results of this study can be used by preschool administrators and teachers to determine the value of using open-ended activities as an

instructional strategy for increasing young children's creative experiences and enhancing their creative thinking.

Many theorists and researchers have suggested that classroom environments can either cultivate or stifle creativity and the likelihood to achieve innovation, especially for young children (Cobb, 1977; Olwig, 1991; Wilson, 1996). According to Saracho (2002), "Teachers can promote the children's creative thinking capacities by providing an environment that contributes to their creative thinking potentials that will or will not flourish in the children's development of creativity" (p. 436). Combined with other literature, this study can support teachers' efforts to help young children fully develop their creative capacity by providing critical insights in designing developmentally appropriate and educationally appropriate learning environments.

Based on the point of view that open-ended activities can be studied as a type of process quality of early childhood environments, the researcher developed the OARS to assess the physical environments and psychological environments where activities take place, thereby determining the degree of open-endedness in those activities. As the OARS was developed and validated, it allows researchers, teachers and monitors of early childhood education programs to assess the levels of implementation of open-ended activities.

Definitions of Terms

For the purpose of clarification, frequently used terms were defined as follows.

"Creativity" is defined as the potentiality to produce ideas or objects that are novel to the producer. Creativity consists of four different but interrelated aspects: (1) creative process, (2) creative person, (3) creative product, and (4) creative environmental condition. These four aspects supplement each other when used to predict a person's potentiality to create.

"Early childhood" refers to ages 0-8. "Young children" refers to the children who are in the early childhood age range.

"Young children's creativity" is defined as the potentiality to produce ideas or objects that are novel to the child. The best indicator of young children's creative potentiality is their creative process (Tegano et al., 1991; Isenberg & Jalongo, 2001).

"Young children's creative process" refers to the ways in which young children use their creative thinking abilities. The most important ways young children use their creative thinking abilities include: (1) moving in alternative ways; (2) imagining, empathizing, fantasizing, and assuming unaccustomed roles; (3) exploring alternative and unusual solutions to problems; and (4) improvising with common objects in the environment and using them for something other than the intended purposes (Torrance, 1981).

"Open-ended activities" are defined as the activities in which children are provided with a continuum of free choices in three domains of activities: content (the topic or area of study), process (including choices in sequence; choosing materials; working alone, with a partner, or with a group; or choosing from processes specific to a discipline), and product (children's tangible and/or intangible responses). The number of choices with which children are provided is determined by the physical environment (e.g., the availability, accessibility and variety of materials, space, and equipments, etc.) and the psychological environment (e.g., the flexibility of the schedule and disciplines, the feature of the teacher-child or child-child interactions, etc.) where the activities take place (Hertzog, 1995; 1997).

Many activities are open-ended; however, they differ in their degree of open-endedness. The term "degree of open-endedness of activities" is used to refer to the point to which a state within which free choices are provided for children in three domains of activities extends. It is

reflected in the number of choices that children are provided in the activities. Thus, it can be measured by studying the availability, accessibility and variety of materials, space, and equipments, the flexibility of the schedule and disciplines, and the feature of the teacher-child or child-child interactions, etc.

As opposed to “open-ended activities,” “close-ended activities” refer to the activities in which teachers prohibit children from making any choice in any of the three domains of activities by providing extremely limiting physical and psychological environments in which the activities take place.

Limitation

This study was conducted using an initial sample composed of 11 Pre-K classes that were available and willing to participate. Because the initial sample was a convenience sample, this study generated findings that have a limited generalizability to early childhood classes in general.

The initial sample was an extreme sample as well. The 11 classes were state-funded and targeted children from low-income families. More than 90% of the students in these eleven classes were considered to be “at-risk” by the state because they were from low-income households and eligible to receive free and reduced price meals, and approximately 95% of them were African-American. There is evidence that the effect of childcare on developmental outcomes is stronger for preschool children from less advantageous circumstances (Baydar & Brooks-Gunn, 1991; Burchinal, Ramey, Reid, & Jaccard, 1995; Caughy, Dipietro, & Strobino, 1994; Vandell & Corasaniti, 1990). By using an extreme sample consisting of young children who were from low-income families, this study generated findings that have a limited generalizability to all young children.

According to Torrance (1981), there is evidence that scores on the TCAM are positively and significantly related to measures of "Knock-Knock," Teasing/Sarcastic, and Prescribed Format humor, the socioemotional objectives of Developmental Therapy, and Self-Concepts; scores on the TCAM are also associated with the learning experiences designed to produce creative growth such as creative movement, a creative curriculum developed around farm experiences and resources, and problem-solving sociodrama. When analyzing the data, the researcher did not control variables that could affect the students' scores on the TCAM, such as students' personality, socio-emotional feature, self-concept, and previous learning experience, which jeopardized the internal validity of the findings from the study.

Organization of the Study

Chapter I is an introduction to this study. It contains a statement of the problem, the purpose of the study, and the conceptual framework of the study. It also identifies the research question, hypothesis, and research design; states a need for the study; predicts the significance of the study; defines terminology; acknowledges limitations; and describes the overall organization of the study. Chapter II reviews related literature and establishes the theoretical context for the study. Chapter III describes the study's methodology. Chapter IV presents the results of the data analysis. Chapter is a discussion of the findings, the implications, the recommendations, and the conclusion of the study.

CHAPTER II: LITERATURE REVIEW

With the increasing acknowledgement of the importance of creativity, interest in knowing how to enhance young children's development of creativity has increased. Open-ended activities are traditionally used in gifted education as a differentiated instructional strategy to allow students who are identified as gifted to work in their own interest areas, in their own learning styles, and at their own ability level. They have also been used in early childhood education as a means to address young children's different developmental needs. The purpose of this study was to investigate the relationship between the degree of the open-endedness of activities and the creative thinking ability level of the young children engaged in these activities.

This chapter presents a review of the literature relevant to this study. It is organized according to four major components: creativity, young children's creativity, open-ended activities, and the relationship between open-ended activities and young children's creativity.

Creativity: An Overview

Creativity is a complex human phenomenon. It remains enigmatic after more than 9000 published works have been done on it (Runco, Nemiro, & Walberg, 1998). What is meant by "creativity" has been argued by psychologists and educators for more than four decades; however, there is still no unambiguous and widely accepted theory about it.

Definitions of Creativity

Overall, the definitions of creativity have been formulated in terms of the four "Ps": creative process (the fairly discrete behavioral stages of creative production), creative product (the outcome with novelty), creative person (the particular constellation of personalities and characteristics in the creator), and creative press (the external context that promotes creative

activity) (Rhodes, 1961; Torrance, 1966; Simonton, 1988; Isaksen, 1992). The definitions of creativity are briefly reviewed as follows.

Creative Process

According to Davis (1992), creative process means a sequence of steps or stages in which creative people clarify a problem, work on it, and produce a novel and relevant solution. Many researchers' definitions of creativity are focused on creative process. Pickard (1990) defined creativity as a self-directed transformational process that extends the creator's experience and knowledge. Rogers (1961) defined creativity as "the emergence in action of a novel relational product, growing out of the uniqueness of the individual in the one hand, and the materials, events, people, or circumstances of his life on the other" (p. 350). Parnes (1963) defined creativity as a mental process that involves thinking of our previous experience, responding to stimuli (e.g., objects, symbols, ideas, people, and situations), and generating at least one unique combination. Creativity has also been defined as a process of divergent thinking (Guilford, 1956). Guilford (1957) suggested that divergent thinking is a prime component of creativity, and in divergent thinking the most obvious indications of creativity can be found. Sometimes creative process is specified as a process of problem-solving. Wallas (1926) defined creativity as a creative process including four logical problem-solving stages: (1) preparation (exploring and clarifying the situation, thinking about the problem or requirement for solution), (2) incubation (not thinking about the problem consciously), (3) illumination (the "Aha!" or "Eureka!" experience) and (4) verification (checking the solution for practicability, effectiveness, or appropriateness). Torrance's (1977) definition of creativity also includes four logical problem-solving stages. He defined creativity as a creative thinking process of "sensing problems or gaps

in information, forming ideas or hypotheses, testing and modifying these hypotheses, and communicating the results" (p. 6).

Researchers who define creativity as a process use divergent thinking tests or creative thinking tests to measure creative potential. Divergent thinking tests and creative thinking tests are developed based on the premise that the ability to produce a number of responses, problem solutions, or ideas increases the probability that one or more of them will be creative or original (Diakidoy & Spanoudis, 2002). These researchers believe that divergent thinking tests and creative thinking tests yield observable, quantifiable data that predicts the individual's potential to respond creatively to real life situations (Runco, 1991; Torrance, 1987).

Creative Person

Creative person refers to the individual who possesses particular personalities and biographical traits (Davis, 1992) that contribute to his/her potential to create. The personalities and biographical traits related to creativity include autonomy, introversion, openness to experience (King & Pope, 1999), independence (Feist, 1999), intelligence, motivation (Sternberg, 1988), etc. Costa and McCrae (1991) identified five factors that related to the personality of a creative person: neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness. Gough (1960) identified eighteen adjectives that are related to the traits of a creative person: capable, clever, confident, egotistical, humorous, individualistic, informal, insightful, intelligent, interests wide, inventive, original, reflective, resourceful, self confident, sexy, snobbish, and unconventional. Sternberg's (1988) three-facet definition of creativity is one that focuses on creative person. He defined creativity as the intersection between three psychological attributes: intelligence, cognitive style, and personality/motivation.

According to Kerr and Gagliardi (2003), researchers who view creativity as a set of personalities or biographical traits believe that a valid measure of creativity should consider both cognitive and personality components, and they believe that attitudes and personality are same as divergent thinking in that these traits and personality can be observed and measured. These researchers use personality inventories, self-report adjective checklists, biographical surveys, interest and attitude measures, self- and peer-nomination procedures, and interviews to study the creative person.

Creative Product

The researchers who define creativity by focusing on product assume that creative people produce creative products. Amabile (1983) defined creativity "not as a personality trait or a general ability but as a behavior resulting from particular constellations of personal characteristics, cognitive ability, and social environments" (p. 358). She suggested, "A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct, or valuable response to the task at hand and (b) the task is heuristic rather than algorithmic" (Amabile, 1983, p. 360) According to her, creativity can also be viewed as the process by which the product or response so judged is produced (Amabile, 1982).

Amabile (1982) posited that an operational definition of creativity grounded in examining the product is most likely to be useful for the empirical research of creativity; therefore, she developed the Subjective Assessment Technique to study the creative product. The Subjective Assessment Technique is based on a consensual operational definition of creativity: "A product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated" (Amabile, 1982, p. 1001).

Creative Environment

The researchers who define creativity with an emphasis on creative environment usually do not view creativity simply as a type of environment but emphasize the interaction between the creator and the external context that promotes his/her creative activity. Khatena (1982) perceived creativity as three-dimensional, consisting of the person, the environment, and the cosmos (which includes the super-rational forces that illumine creativity at the highest, or genius, levels). Feldman, Csikszentmihalyi, and Gardner (1994) suggested that creativity is a three-fold concept resulting from the interaction between a field (the social and cultural aspects of a profession, job, or craft), a domain (the formal structure and organization of a body of knowledge), and an individual. Mellou (1996) explained the nature of creativity by emphasizing the continuous and multidirectional interaction between individual and situational characteristics. She recognized that situations vary in cues, rewards, and opportunities, and individuals vary in cognitions, abilities, motivations and personalities.

The Integration and Interaction of the Four "Ps"

Many researchers recognized the complexity of creativity and believed that the definitions of creativity should be developed based on the integration and interaction of the four "Ps." Isaksen (1987) indicated that creativity should be viewed as "a multi-faceted phenomenon rather than as a single unitary construct capable of precise definition" (p. 8). Rhodes (1987) proposed that creativity is made manifest only in the intertwining of the four "Ps." Murdock and Puccio (1993) recommended that researchers enhance the generalizability of their findings by studying creative behavior in the combinations or interactions of the four "Ps." By defining or studying creativity based on the integration and interaction of the four "Ps," these researchers were suggesting that the four "Ps" are four different but interrelated aspects of creativity, and

when predicting a person's potentiality to create we must take each aspect of creativity into consideration.

Relationship of Creativity to Intelligence

Creativity has been distinguished from intelligence by some researchers. According to Moran, Milgram, Sawyers, and Fu (1983), the components of creative potential can indeed be distinguished from intelligence. Wallach (1970) also suggested that intelligence and creativity are actually independent of each other, and a highly creative child may or may not be highly intelligent. However, other researchers believe that creativity is related to intelligence, and they view creativity as a part of intelligence. For example, Beetlestone (1998) proposed that creativity can be seen as a form of intelligence because the creative aspect of the brain can help to explain and interpret abstract concepts; thus young children are enabled to have greater mastery, particularly in such subjects as mathematics and science, which are often difficult to understand. Sternberg (1991) defined intelligence in terms of its analytic, synthetic, and practical functions. His definition of intelligence is much broader than what is measured by either IQ or achievement tests. He believed that there are three types of intelligence: analytic, synthetic, and practical abilities. Of these three types of intelligence, synthetic ability is the one that is closely related to creativity because "synthetic giftedness is seen in people who are insightful, intuitive, creative, or just adept at coping with relatively novel situations" (p. 43). Clark's (1988) definition of intelligence is similar to Sternberg's. He defined intelligence as the aggregate of an individual's cognitive, affective, physical, and intuitive functions, and the intuitive function is equal to creative insight.

The relationship between creativity and intelligence is a controversial issue in literature because not only "creativity" but "intelligence" also has various meanings and referents to

different people. According to Barron and Harrington (1981), creativity investigators have used the term “intelligence” to refer to: (1) the quality that IQ tests measure; (2) the entire multi-factorial domain of human cognitive abilities, including both divergent and convergent thinking abilities; and (3) the traits that qualified observers (e.g., peers, teachers, etc.) describe as “intelligence” on the basis of repeated observations of behavior in many situations. For the people who narrowly define intelligence as the quality that IQ tests measure, it is easy to differentiate creativity from intelligence because it is difficult to find out the relationship between students’ IQ scores and creativity scores. For people who define intelligence as the entire multi-factorial domain of human cognitive abilities or human traits, creativity is viewed as a type of intelligence or one of the functions of intelligence.

Although no significant evidence has shown that there is a relationship between students’ performance in IQ tests and creativity tests, we can never deny the relationship between creativity and intelligence. The reason that people failed to find the relationship between students’ IQ scores and creativity scores is that most IQ tests narrowly define intelligence and only measure one of the functions of intelligence. According to Sternberg (1991), a person who is very adept at analytical functioning is likely to score well on standard IQ tests but is lacking insight, or more generally, in the ability to cope well with non-entrenched kinds of tasks or situations; at the same time, a person who is very insightful and particularly adept at synthetic functioning can be terribly creative but not terribly smart. The first individual was referred to by Renzulli (1986) as “schoolhouse giftedness” and the second was referred to as “creative/productive giftedness.”

Relationship of Creativity to Divergent Thinking

Divergent thinking refers to the capacity to arrive at unique and original solutions and the tendency to consider problems in terms of multiple solutions rather just one (Guilford, 1967). Divergent thinking is considered to be "lateral" because it "is concerned with digging the hole in another place" (De Bono, 1971, p. 5, cited in Isenburg & Jalongo, 2001). A good example of divergent thinking in the field of education is brainstorming. "Brainstorming combines the concepts of nonevaluative acceptance and multiple solutions. When children are encouraged to brainstorm, they come up with many ideas" (Tegano et al., 1991, p. 27). Convergent thinking, the opposite process of divergent thinking, narrows all options to one solution and corresponds closely to the types of tasks usually called for in school and on standardized multiple-choice tests (Guilford, 1957). Convergent thinking is considered to be "vertical" because it "digs the same hole deeper" (De Bono, 1971, p. 5, cited in Isenburg & Jalongo, 2001).

Divergent thinking is used sometimes as a synonym of creativity because it has been accepted as a general creative relevant skill and has been used to predict creative potential. Runco (1999) proposed that divergent thinking represents the potential for creative thinking and problem solving because some of the resulting ideas are original. Tegano et al. (1991) suggested that the cognitive characteristics of creative children include divergent thinking. Based on the premise that the ability to produce a number of responses, problem solutions, or ideas increases the probability that one or more of them will be creative or original (Diakidoy & Spanoudis, 2002), divergent thinking tests have been commonly used to measure creative potential (Davis, 1989; Hocevar, 1981; Parkhurst, 1999).

Although divergent thinking is a primary skill relevant to creativity, it is not equal to creativity because creativity is a concept much more sophisticated and broad than divergent

thinking. According to Treffinger, Renzulli, and Feldhusen (1971), divergent thinking measures do assess intellectual abilities that play an important role in creativity, but they certainly do not tell the entire story about creativity. Isenburg and Jalongo (2001) suggested that in creative process children use both divergent thinking and convergent thinking and learn to switch from one mode to another at appropriate times, for "creativity is a skillful blend of divergent and convergent modes of thought" (p. 15). By reviewing the various definitions of creativity, it can be concluded that creativity is a concept composed of four aspects: creative process, creative person, creative product, and creative environmental conditions. Divergent thinking is closely related to one of these aspects: creative process and can be viewed as a part, but not the whole, of it.

Young Children's Creativity

Most literature about young children's creativity supports the point of view that each child possesses the potentiality to create, even if to differing degrees, and the perspective that some children are creative whereas others are not should be rejected. Young children's inborn creativity is denominated by Fishkin (1998) as germinal creativity. Germinal creativity can be demonstrated in the manipulative, exploratory, and experimental activities of infants and their use of facial expressions or efforts to discover and test the meaning of facial expressions and gestures of others (Torrance, 1970). According to Vygotsky's (1966) perception of creativity, germinal creativity can be best observed in children's play, especially expressive play, because in play children create imaginary situations.

As we study the creativity of young children, it is crucial for us to understand that the creativity of young children differs from older people's creativity. When talking about adults' creative behaviors, we always focus on their domain-relevant skills, such as their factual

knowledge, technical skills, and special talents, which are the basis of whatever they produce. We also emphasize their creativity-relevant skills, such as working styles, attitudes, interest to generate new possibilities, and openness to new ideas (Amabile, 1983; Isenberg & Jalongo, 2001). Young children do not have as much experience and expertise as adults, and their working styles and personalities usually have not yet matured (Isenberg & Jalongo, 2001). Pickard (1990) also made a distinction between young children's creativity and adolescents' or adults' creativity. He indicated that although young children's activities do contribute to personal creativity, a type of creativity that involves reinterpretation or transformation of knowledge and leads to an extension of experience and a realization of new dimensions or perspectives, when compared with adolescents or adults' activities, they are much less likely to contribute to public creativity, another type of creativity that extends our frontiers of experience of knowledge.

"But whatever young children may lack in terms of expertise, experience, or style, they can compensate for them with their unique ways of thinking and approaching a task" (Isenberg & Jalongo, 2001, p. 9). Defined as "the ability to form rich and varied images or concepts of people, places, things, and situations that are not present" (Isenberg and Jalongo, 2001, p. 11), imagination is prevalent during early childhood. According to Isenberg and Jalongo (2001), imagination and fantasy are "the great creative assets of early childhood" (p. 11), and they differ from the literal, factual thinking preferred by adults. As a nonliteral mode of thinking, imagination and fantasy are valued and sought by many artists for realizing their creative potential. Gardner (1993) described how young children are free in their thinking, moving easily between and among the various modes of thought: "The young child is not bothered by inconsistencies, departures from convention, nonliteralness…which often results in unusual and appealing juxtapositions and associations" (p. 228). Holden (1987) proposed that young children

excel at three characteristics related to creative genius: (1) sensitivity to internal and external stimuli, (2) lack of inhibition, and (3) ability to become completely absorbed in an activity.

In literature, young children's creativity is widely accepted as "little c" rather than "Big C." Gardner's (1999) definition of creativity focuses on "Big Creativity" ("Big C"). After studying the works and lives of seven great creators (Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi), he suggested that the label of creativity should only be bestowed upon very few individuals whose contribution has changed a domain. Young children's creativity is very unlikely to change a domain that is dominated by more knowledgeable and experienced adults because of their limited domain-relevant skills. With the "Big C" theory, young children's creativity can never be recognized and appreciated. Craft (2001) developed a concept of "little c creativity" ("LCC"), to contrast with Gardner's "Big C" theory, focusing on "the resourcefulness and agency of ordinary people, rather than the extraordinary contributions and insights of the few" (p. 49). The "little c creativity" of ordinary people can be adapted to explain the nature of young children's creativity, since young children are the same as ordinary people, unlikely to make extraordinary contributions and insights but active and intentional in coping with everyday challenges (Craft, 2001).

Defining Young Children's Creativity

Tegano et al. (1991) suggested that for young children creativity is best labeled "creative potential." In general situations, when we examine creative potentiality, none of the four aspects of creativity (creative process, creative person, creative product, and creative environmental condition) is sufficient to indicate the potentiality (Isaksen, 1987). Creative process, creative person, creative product, and creative environmental condition are interrelated with and supplemented by each other when used in predicting a person's creative potentiality (Rhodes,

1987; Murdock & Puccio, 1993). When we examine young children's creative potentiality, however, creative process can be the best indicator. Creative process exceeds creative product and creative personality when used to predict young children's creative potentiality because young children usually do not have sufficient verbal and nonverbal abilities to communicate their original ideas (Fishkin, 1998), and their working styles and personalities are usually not matured enough to fully indicate their creative potentiality (Isenberg & Jalongo, 2001). According to Isenberg and Jalongo (2001), young children's creative process is the basis for creative potential and the precursor of adult creativity, from which young children's creative potential can be foreseen. Grounded in the "process-over-product" philosophy, they posited, "teacher's observation of the process that leads to originality (exploration and experimentation with the materials) is more valuable than any judgment of the product" (p. 17).

Creative Process of Young Children

Young children's creative process is both cognitive and affective, and it depends upon a complex interplay of biological, psychological, and social factors (Isenberg & Jalongo, 2001). Cecil et al. (1985) developed a model of the creative process during early childhood, which can guide a teacher's observation of young children's creative processes and their prediction of young children's creative potentiality. This model consists of four levels: (1) being curious (children are alert, interested and want to know more; their attention has been focused on what they are interested in), (2) exploring (children seem actively investigating objects, events, or ideas; they are gathering information with all of their senses, including just watching others), (3) playing (children initiate a period of total immersion characterized by spontaneity and often without clear final objectives), and (4) creating (a child discovers uncommon or new approaches to the materials or problem they are investigating; they take risks and make new connections).

These levels may overlap and evolve out of each other, and the creative process may last only a few hours or extend over many days.

Young children's creative process is measurable when regarded as the ways in which young children use their creative thinking abilities. Torrance (1981) developed an instrument, Thinking Creatively in Action and Movement (TCAM), to measure the most important ways in which 3- to 8-year-old children use their creative thinking abilities. According to Torrance (1981), the most important ways in which young children use their creative thinking abilities include: (1) moving in alternative ways; (2) imagining, empathizing, fantasizing, and assuming unaccustomed roles; (3) exploring alternative and unusual solutions to problems; and (4) improvising with common objects in the environment and using them for something other than the intended purposes.

Open-ended Activities

In regular education, "open-ended" is generally viewed as the dichotomy between open (divergent) and closed (convergent) thinking. While in gifted education, after open-ended activities are used as a differentiated instructional strategy to allow students who are identified as gifted to work in their own interest areas, in their own learning styles, and at their own ability levels (Hertzog, 1997), some researchers began to conceptualize "open-endedness" as something much more complex than a dichotomy between open and closed thinking.

Maker (1982a) discussed open-endedness as a part of the process modification for identified gifted students. She suggested that "open-ended" implies a particular teacher attitude towards questioning techniques, the provision of learning experiences, and the evaluation of student responses. Maker (1982b) proposed that in open-ended activities "there is no predetermined right answer and the questions or activities are provocative in that they stimulate

further thinking and investigation about the topic" (p. 5), and open-endedness "stimulates more thought, permits and encourages divergent thinking, encourages responses from more than one child, and contributes to the development of a student-centered interaction pattern" (p. 5). According to her (1982a), open-endedness is directly related to freedom of choice. "Freedom of choice" was described as another part of process modification by Maker (1982b). With the freedom of choice, students "choose topics to study (content), methods to use in the process, and the environments in which to pursue them" (Maker, 1982a, p. 57) and become interested and independent in learning (Maker, 1982b).

Hertzog (1995) used qualitative methods to investigate the nature of open-ended activities. By observing open-ended activities and interviewing teachers and identified gifted students of one third- and one fourth-grade heterogeneously grouped classroom throughout one academic year, she found that open-ended activities involve freedom of choice in domains of content (the topic or area of study), process (the processes of production, including choices in sequence and materials; working alone, with a partner, or with a group; or choosing from processes specific to a discipline, such as "working backwards in math), and product (response to the activity). This finding is completely consistent with what Maker (1982a; 1982b) assumes about open-ended activities. Hertzog's study provided empirical evidence to verify the association between open-ended activities and freedom of choice. Based on this finding, Hertzog (1997) defined open-ended activities as a continuum of choices provided for children in content, process; and product. She suggested, "The more choices students had in the domains, the more open-ended was the activity" (p. 55).

Characteristics of Open-ended Activities

Hertzog (1995) found six characteristics of open-ended activities: (1) they have boundaries in the provision of freedom of choice; (2) they are teacher-dependent in design; (3) they involve risk-taking; (4) they involve acts of negotiation; (5) they have extended time frames; and (6) they reveal patterns of students' abilities, interests, and preferences. These six characteristics are discussed respectively as follows:

Boundaries

Although the most salient finding that Hertzog's (1995) extensive observations revealed is that open-ended activities give students the "freedom of choice", it doesn't mean that children are absolutely free to make choices when engaged in open-ended activities. Hertzog also found that in open-ended activities boundaries exist in the provision of freedom of choice. Boundaries refer to the number of choices that students have within the domains of content, process, and product. According to Hertzog, the number of choices is determined by the physical environment (e.g., the availability, accessibility and variety of materials, space, and equipments, etc.) and the psychological environment (e.g., the flexibility of the schedule and disciplines, the feature of the teacher-child or child-child interactions, etc.) in which the activities take place. Because of the existence of the boundaries, in open-ended activities the number of choices varies and students may have unlimited, many, few, or no choices within each domain.

Teacher-dependent in Design

This characteristic explains why most open-ended activities are internally structured, although they may look unstructured from the exterior. According to Hertzog (1995), teachers structure open-ended activities by restricting the number and kinds of choices available to students. To restrict the number and kinds of choices, the teacher may establish restrictive rules,

alter their questioning techniques and interaction methods, or change the physical setting from outdoors to indoors.

Risk-taking

According to Hertzog (1995), in open-ended activities both teachers and students take risks by accepting unknown outcomes and unknown interactions. Students take risks because they are the center of their own learning and need to be responsible for the outcome of their own choices. Teachers take risks because, once they give students freedom of choice, student may produce responses that they have not anticipated. Usually when teachers are unwilling to take the risk, they will tightly structure activities.

Acts of Negotiation

Hertzog (1995) indicated that students negotiate how they will proceed with open-ended activities. She stated, “Their negotiation includes questions about where the boundaries were set in the content, process, or product domains” (p. 106). In addition to teachers, children also negotiate with their peers when they work on open-ended activities in groups. Hertzog indicated, “Negotiating their work gives students more control over their learning” (p. 111).

Extended Time Frames

Hertzog (1995) pointed out that open-ended activities are more time-consuming than close-ended activities because they generally involve negotiation and/or decision making. For these reasons, teachers usually offer extended time frames for children to complete these tasks.

Reveal Patterns of Students’ Abilities, Interests, and Preferences

Hertzog (1995) found that open-ended activities reveal different strengths and levels of abilities between students and provide opportunities for students to share their personal interests, aspects of their lives, or preferences for learning. She stated, “Open-ended activities provide a

vehicle for personalizing instruction because they elicit students' opinions, concerns, values, and knowledge" (p. 120).

Related Studies of Open-ended Activities

"Freedom of choice" reflects the nature of open-ended activities. The following researchers studied the effects of freedom of choice when it is provided for children while they are learning. Kohn (1993) reported powerful evidence to support that all students benefit from having choices in their learning. He indicated that choices may be as subtle as where to sit, whom to work with, when to do an assignment, or which assignment to do first. Cordell and Cannon (1985), however, found evidence to make the recommendation that teachers should avoid open-ended activities and limit choices for the population of students labeled learning disabled and gifted. Hertzog (1995) questioned their recommendation because "It is not clear from their text how their analysis led to those recommendations" (p. 17).

Hertzog (1998) suggested that, within the large framework of classroom research, open-ended activities can be described as an instructional strategy or an instructional format, the third of six components of instruction as defined by Anderson and Burns (1989). Although open-ended activities have been popularly used as a differentiated instructional strategy in teaching identified gifted students, empirical literature related to the application of open-ended activities is sparse. A limited number of empirical studies examined open-ended activities when they were used within curricular areas.

Mathematics

Cofman (1983) described her experiences of teaching mathematics to elementary and secondary school students. Because of her experiences, she advocated the use of open-ended problem solving activities in math. Boaler (1998) conducted 3-year case studies in two schools,

one using a traditional, textbook approach to teach mathematics and the other using open-ended activities at all times to teach mathematics. He found that the students in the first school developed a procedural knowledge that was of limited use to them in unfamiliar situations, while the students in the second school developed a conceptual understanding that provided them with advantages in a range of assessments and situations. Kabiri and Smith (2003) studied the use of open-ended problem solving in teaching middle school mathematics. They found that open-ended problems help teachers meet the needs of diverse learners since all students benefit.

Science

When discussing science education, Drake (1993) suggested that trial and error learning is an important way for children and adults to learn, and open-ended activities provide great opportunities for error and eventual feedback for error reduction. Colburn (2000) indicated that in open-ended activities children try using their previous knowledge to answer questions; thus, they begin to see flaws in their thinking and are more ready for alternative explanations. She added that open-ended activities give teachers greater opportunities to speak to students, ask questions, and better understand students' intuitive scientific ideas.

Critical Thinking

Pollack (1988) used prolonged observations of identified gifted students in a fourth-grade classroom to explore the type of classroom environment that contributed to the development of critical thinking. She found that open-ended questions encouraged independent thoughts as well as creativity.

Language

Woodbury (1980) and Carton (1980) developed humanities units for sixth graders for the Bucks County, Pennsylvania, Intermediate Unit. In the descriptions for teaching the units, they

describe the importance of using open-ended discussions. Bartz (1982), in a position paper advocating the instruction of foreign language for identified gifted students, linked the traits of linguistically talented students with necessary instructional strategies. He recommended the use of open-ended teaching strategies instead of rote drill in foreign-language instruction.

The Relationship between Open-ended Activities and Young Children's Creativity

Historically, open-ended activities have been associated with creativity training (Hertzog, 1995). The use of open-ended activities to nurture creativity has been documented in some empirical literature. On the Torrance Tests of Creative Thinking (Torrance, 1966), open-ended activities encourage the test taker to provide multiple as well as unusual answers for the same question. In the book, *Creative Ventures: Ancient Civilizations,* Stark (1987) designed 57 open-ended activities to extend students' imaginations and creativity and encourage them to examine their feelings and values about historic eras. Harlan (1993) suggested that teachers should routinely offer a variety of art materials and open-ended activities to the people with developmental disabilities in order to promote their creative abilities, because open-ended art activities can provide them the opportunity to take initiative in their work and express their preferences. Isenberg and Jalongo (2001) also suggested providing a wide variety of interesting materials and keeping activities open-ended to support children's creativity. Church (2002) proposed that teachers should facilitate children's thinking and experimentation by providing open-ended questions that have many possible answers. She stated that open-ended activities leave the door open for children to use their own thinking to create new ways of looking at something. Why are open-ended activities associated with creativity training? The use of open-ended activities in creativity training has a theoretical foundation. The humanistic view (Maslow,

1970, 1982; Rogers, 1961) of creativity explains the relationship between open-ended activities and creativity.

The Humanistic View of Creativity

Humanistic psychology has been considered to be a particular North American phenomenon because "it arose in protest to Anglo-American scientific psychology—opposed to the excesses and limitations of positivistic science—and flourished, somewhat parasitically, on various strains of European philosophy, notably the existentialist and phenomenological traditions" (Royce & Mos, 1981, p. xiii). It influenced the late 1940s and early 1950s when personality theorists and psychology practitioners rejected the reductionism of both behaviorism and psychoanalytic theory. In the 1960s, along with the human potential movement, it affected both the academic community and society at large (Royce & Mos, 1981). To some extent, humanistic psychology incorporates the perspectives of both behaviorists and psychoanalytic theorists (Maslow, 1982), the first two forces most prototypically represented by the works of Sigmund Freud and B. F. Skinner (Kirschenbaum, 1979). Behaviorists' work is usually based upon the belief that human behavior is controlled by external environmental factors. For example, according to Skinner, an individual is solely a product of environmental conditioning. Psychoanalytic theorists' work is usually based upon the idea that human behavior is controlled by internal unconscious forces. For example, according to Freudian mechanism, the existence of the basic irrational, fixed motives or biological drives in the id exclusively determined one's behavior. Humanists disagree with the idea that human behavior is controlled wholly by either internal or external forces; instead, they suggest that human behavior is controlled by both, each individual possessing a capacity for self-direction and the ability to make choices and take responsibility to control over his/her own destiny (DeCarvalho, 1991).

From a humanistic perspective, people create because creativity is a feature of human thought that differentiates us from other forms of life and makes us more fully human (Isenberg & Jalongo, 2001).

Abraham Maslow has long been known as “third force” and recognized as the father of humanistic psychology. Maslow's work has helped in the understanding of the motivation of human behavior. He presented a hierarchy of needs composed of basic needs and growth needs. According to him, every individual is capable of and has the desire to move up the hierarchy towards the highest level of growth needs, called self-actualization, but one must satisfy lower level basic needs before progressing to meet higher level growth needs (DeCarvalho, 1991; Norwood, 1996). Maslow (1982) believed that creativity is the result of a person’s self-actualization and people create because they want to meet their need of self-actualization. He suggested that in order to be creative, one needs some measure of freedom from stereotypes and clichés. The need for freedom from stereotypes and clichés is lower-level than the need to create. According to the sequence of the hierarchy of needs the need for freedom from stereotypes and clichés must be met before one is able to create.

Maslow (1970) suggested that, in order to understand what one needs, special conditions must be set up to foster the expression of his/her needs and the capacities that encourage and make those needs possible. Providing free choices is the best way to set up such conditions. He suggested that self-actualizing individuals are more able to make choices and exercise free-will than average people. Maslow (1982) also believed that children have the unique ability to “perceive more freely, without a priori expectations about what ought to be there, what must be there, or what has always been there” (p. 138). In open-ended activities, schedules are not rigid and tasks are not predetermined. Each child has the capacity and is allowed to make choices;

thus, he/she has the opportunities to solve problems in multiple and original ways. In this regard, open-ended activities can be viewed as "a good environment that offers all necessary raw materials and then gets out of the way and stands aside to let the organism itself utter its wishes and demands and make its choices" (Maslow, 1970, p. 277); therefore, they can promote children's creative self-actualization.

Carl Rogers, another founder of humanistic psychology, contributed to the fields of education, counseling, psychotherapy, and social and national conflict resolution by developing an educational philosophy that emphasizes the importance of interpersonal relationship in the facilitation of learning. As Rogers (1990) once wrote, "The facilitation of significant learning rests upon certain attitudinal qualities that exist in the personal relationship between facilitator and learner" (p. 305).

Rogers (1961) suggested that creativity is a healthy state in which an individual is fully functioning. He discussed human motivation for creativity, stating that man creates because of "man's tendency to actualize himself, to become his potentialities" (p. 351), and this tendency is "the directional trend which is evident in all organic and human life — the urge to expand, extend, develop, mature — the tendency to express and activate all the capacities of the organism, or the self" (p. 351). He suggested that motivation for creativity is closely associated with an individual's inner conditions: (1) openness to experience, (2) an inner locus of evaluation, and (3) the ability to toy with elements and concepts. He further suggested, "From the very nature of the inner conditions of creativity it is clear that they cannot be forced, but must be permitted to emerge" (Rogers, 1961, p. 356). According to Rogers, the internal conditions described above can be fostered and nourished by external conditions: psychological safety and psychological freedom. Isenberg and Jalongo (2001) interpreted the meaning of psychological safety and

psychological freedom within the context of early childhood education. They stated that a child feels psychologically safe "when significant others accept the child as having unconditional worth, avoid external evaluation, and identify and empathize with the child" (p. 30-31), whereas psychological freedom emanates from the child's internal world "when children feels free to play with symbols and to use these symbols for self-expression" (p. 31). Open-ended activities involve a continuum of free choices presented to the students in content, process, and product (Hertzog, 1997). In open-ended activities, young children's needs for psychological safety and psychological freedom can be met simultaneously, thereby permitting their inner conditions, closely related to the motivation for creativity, to emerge.

Summary

Although a huge amount of studies have been conducted on creativity, it still remains enigmatic (Runco et al., 1998). The definition of creativity is one of the most controversial issues in creativity theories. Overall, creativity has been defined and studied as the four "Ps" (Rhodes, 1961; Torrance, 1966; Simonton, 1988; Isaksen, 1992). Sometimes, as a general creative relevant skill, divergent thinking is viewed as the synonym of creativity and used to predict creative potentiality. For young children, creativity should be labeled "creative potential," the basis of which is creative process (Tegano et al., 1991). Young children's creative process can be viewed as the ways in which they use their creative thinking abilities. The most important ways in which young children use their creative thinking abilities include: (1) moving in alternative ways; (2) imagining, empathizing, fantasizing, and assuming unaccustomed roles; (3) exploring alternative and unusual solutions to problems; and (4) improvising with common objects in the environment and using them for something other than the intended purposes (Torrance, 1981).

Open-ended activities are defined as a continuum of free choices provided for children in domains of content, process, and product (Hertzog, 1997). Traditionally, open-ended activities are used in gifted education as a differentiated instructional strategy for gifted students to work in their own interest areas, in their own learning styles, and at their own ability level (Hertzog, 1997). Hertzog (1995) found that open-ended activities have six characteristics: (1) they have boundaries in the provision of freedom of choice; (2) they are teacher-dependent in design; (3) they involve risk-taking; (4) they involve acts of negotiation; (5) they have extended time frames; and (6) they reveal patterns of students' abilities, interests, and preferences. Because of these characteristics, open-ended activities can also be implemented in regular early childhood education as a means to address young children's individual developmental needs. Hertzog (1997) suggested that the open-endedness of activities is determined by the number of choices allowed by the psychological and physical environments set by the teacher. According to Hertzog's suggestion, open-endedness of activities can be predicted through examining the psychological and physical environments in which the activities take place.

This review of literature provides insights on investigating the relationship between the degree of the open-endedness of activities and the creative thinking ability level of the young children engaged in these activities, assisting in the task of determining the value of using of open-ended activities as an instructional strategy for increasing children's creative experiences and enhancing their creativity. From the humanistic point of view, creative behavior is controlled by both external stimulating environments and internal motivating factors. According to Maslow (1982; 1970) and Rogers (1961), the internal motivation for creativity can be affected by external environments, because only when the environmental needs (e.g., need for freedom from stereotypes and clichés; need for psychological freedom and psychological safety) are met can

one self-actualize or fully function. As an external environmental factor, open-ended activities can develop, encourage, enhance, and maintain children's inner motivation for creativity so that young children will engage in a large variety of creative activities. The more creative activities the children experience, the more creative thinking ability they gain, and the more creative potential they have.

CHAPTER III: METHODOLOGY

The purpose of this study was to investigate the relationship between the open-endedness of activities and the creativity of young children. Quantitative methodology of data collection and analysis was utilized to determine whether and to what extent an association exists between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. As a researcher-developed instrument, the Open-endedness of Activities Rating Scale (OARS), was used in the study, quantitative data collection and data analysis were also adopted to examine its reliability.

This chapter discusses the research question, the research design, the sample, the instrumentation, the data collection, the data analysis, the subject recruitment, and the subject consent. A discussion of the confidentiality and anonymity is also included in this chapter.

Research Question

The following research question was investigated in this study: What is the relationship between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities?

The null hypothesis stated that there is no relationship between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities.

The alternative hypothesis stated that there is a positive relationship between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. The higher degree of open-endedness of activities is related to the higher level of creative thinking ability of young children.

Research Design

This study adopted what Cresswell (2002) referred to as the "explanatory design" (p. 363) to explain the association between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. According to Cresswell, "An explanatory research design is a correlational design in which the researcher is interested in the extent to which two variables (or more) co-vary—where variance or changes in one variable is reflected in variance or changes in the other" (p. 363). In this study, the researcher was interested in the extent to which the degree of open-endness of activities and the level of creative thinking ability of the young children engaged in these activities co-vary. Therefore, the study was to determine whether the variance in the degree of open-endedness of activities is reflected in the variance of the level of creative thinking ability of the young children engaged in these activities.

Initial Sample

The initial sample for the study consisted of 11 pre-kindergarten (Pre-K) classes in an urban school district and a suburban school district that are located in the southeastern United States. These 11 Pre-K classes were selected from seven private, catholic, or public schools. Eight classrooms were established as part of a non-public Pre-K program, and three were part of a public Pre-K program. Both the non-public Pre-K program and the public Pre-K program were state-funded and targeted children from low-income families. More than 90% of the students in these 11 classes were considered to be "at-risk" by the state because they were from low-income households and eligible to receive free and reduced price meals, and approximately 95% of them were Africa-American. Pre-K classes were provided for these "at-risk" students at no cost. The

initial sample represented about 20% of the Pre-K classes in these two school districts, which were state-funded and targeted children from low-income families.

The initial sample was selected because of the number of low socioeconomic students in these classes. The researcher chose to involve an "at-risk" student population in this study, because there is evidence that the effect of childcare on developmental outcome is stronger for preschool children from less advantaged circumstances (Baydar & Brooks-Gunn, 1991; Burchinal, Ramey, Reid, & Jaccard, 1995; Caughy, Dipietro, & Strobino, 1994; Vandell & Corasaniti, 1990). The researcher expected that this investigation would discover a more significant association between the open-endedness of activities and the creativity of young children through correlating the degree of open-endedness of activities and the level of creative thinking ability of the "at-risk" students engaged in these activities. The initial sample was selected also because the teachers and teacher-assistants were available and willing to participate in the study.

The maximum size of the classes was 20 students. The students were four years old on or before September 30th, 2004. Each of these 11 classes had a teacher and a teacher assistant. Among these 22 teachers and teacher-assistants, five were Caucasian American, one was Hispanic American, and 16 were African-American.

Instrumentation

This study was conducted using two instruments. The OARS was utilized to rate classes' open-endedness of activities. Torrance's (1981) Thinking Creatively in Action and Movement (TCAM) was used to measure students' creativity.

The OARS

The OARS was modified by the researcher from the Early Childhood Environment Rating Scale—Revised (ECERS-R) (Harms, Clifford, & Cryer, 1998). It was developed to rate the physical and psychological environments that are related to the provision of freedom of choice. The OARS can be used in preschools, kindergartens, and childcare classrooms serving children 2.5 through 5 years of age. It consists of 20 items arranged in three categories: (1) general physical environment, (2) general psychological environment, and (3) physical and psychological environments for specific activities. Each of the 20 items is expressed as a 7-point scale ranging from inadequate to excellent. Notes for clarification and questions are included for selected items. Full instructions for the administration and scoring of the test as well as a score sheet are included with the scale.

The Conceptual Framework of the OARS

The development of the OARS was conceptually based on the premise that the degree of open-endedness of activities is reflected in the number of choices with which children are provided, and the number of choices is determined by the physical and psychological environment in which activities take place (Hertzog, 1995; 1997). The conceptual framework of the OARS is presented in Figure 2.

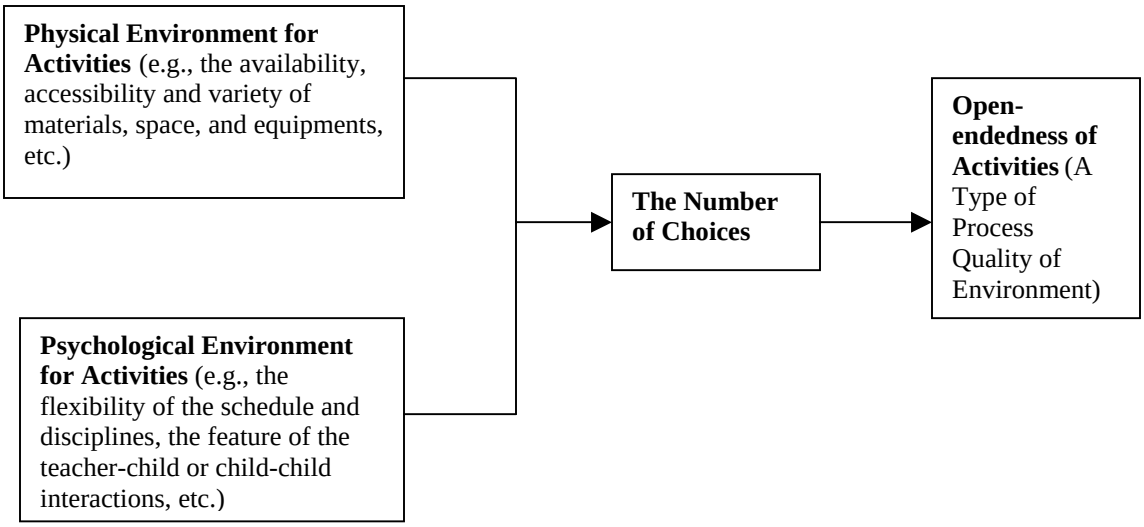


Figure 2: Conceptual Framework of the OARS

The Development of the OARS

Selection of model. The OARS was modified from the ECERS-R. The ECERS-R is a thorough revision of the widely used program quality assessment tool, the Early Childhood Environment Rating Scale (ECERS). The ECERS was developed by Harms, Clifford, and Cryer in 1980 to assess the quality of early childhood education environments from a broad perspective. It has been widely used in child development research in the United States (e.g., Bryant, Maxwell, Burchinal, & Lowman, 1997; Culkin, Morris, & Helburn, 1991; Phillips, 1987), Singapore (e.g., Kwan & Sylva, 1996), Sweden (e.g., Ogefelt, 1995), Bahrain (e.g., Hadeed & Sylva, 1995), and Portgual (e.g., Nabuco & Sylva, 1995). It has also been used in teacher training programs (e.g., Sheridan, 1995) and to increase the quality of child-care service (e.g., Haskell, 1994).

The selection of the ECERS-R as the model for developing the OARS was based on its wide use in assessing the process quality of early childhood education environments. The

ECERS assesses certain processes as well as the classroom features that allow these processes to occur (Tietze, Cryer, Bairrao, Palacios, & Wetzel, 1996). It is always used as a measure of the process quality of early childhood education environments. Process quality refers to a child's experiences in care, particularly the teacher's provision of developmentally appropriate or inappropriate activities and the dynamic interactions between teacher, child, and physical environment (Howes & Hamilton, 1993). The OARS was developed to assess open-ended activities and the environmental features that affect the occurrence of open-ended activities. Open-ended activities in nature are a particular type of child-care experience provided by teachers. They involve open-ended dynamic interactions between the teacher, child, and the physical environment. Therefore, open-ended activities can be viewed as a particular type of process quality of educational environment, and the ECERS-R is an appropriate model for developing an instrument to measure the open-endedness of activities for foundational purposes.

The selection of the ECERS-R as the model for developing the OARS was also based on its predictive validity and inter-rater reliability. The reliability and validity of the ECERS have been examined with positive results both in the U.S. (e.g., Harms & Clifford, 1983; McCartney, Scarr, Phillips, Grajek, & Schwarz, 1982; Whitebook, Howes, & Phillips, 1990) and in other countries (Goelman & Pence, 1987; Karrby & Giota, 1994; Rossbach, 1990). Although, the ECERS-R is a revision of the ECERS, it maintains the conceptual framework as well as the basic scoring approach and administration. The revised version is expected to maintain the same form of validity (Harms, Clifford, & Cryer, 1998). The inter-rater reliability of the ECERS-R was studied with positive results by Harms, Clifford, and Cryer (1998). Approximately 98% of the structure and approximately 45% of the content in the ECERS have been maintained in the OARS. Using an instrument that is valid and reliable as the model to develop another instrument

can strengthen the validity and reliability of the instrument to be developed. The researcher expected to strengthen the reliability and validity of the OARS by using the ECERS-R as the model.

Modification. The indicators in the ECERS-R that are relevant to open-endedness of activities, namely, the provision of freedom of choice (e.g., the availability, accessibility, and variety of materials, space and equipments; the flexibility of the schedule, rules, and disciplines; the feature of teacher-child or child-child interactions; etc.), were all selected and included in OARS with the exception of modest word changes. The ECERS-R consists of 43 items that represent various aspects of early childhood education environments. Each item includes corresponding indicators for raters to determine the quality of some particular aspect of early childhood education environments. Some items of the ECERS-R are irrelevant to the open-endedness of activities because their quality cannot affect the provision of choices. The irrelevant items are: Furnishing for Relaxation and Comfort, Space for Privacy, Greeting/Departing, Meal/Snacks, Nap/Rest, Toileting/Diapering, Health practices, Safety Practices, Provisions for Parents, Provisions for Personal Needs of Staff, Provisions for Professional Needs of Staff, Staff Interaction and Cooperation, Supervision and Evaluation of Staff, and Opportunities for Professional Growth. These items were not selected for developing the OARS and their indicators were excluded from the OARS. Some other items of the ECERS-R include one or more indicators that are relevant to the open-endedness, although the majority of their indicators are irrelevant. For these items, the researcher selected only the relevant indicators and integrated them into some selected items of the OARS. For example, the indicators 5.3 and 7.1 of the item "Child-Related Display" of the ECERS-R were combined into a single indicator "Individualized children's work displayed on child's eye level." This indicator was included in the item "Visual

Arts" of the OARS (See Appendix A). All of the content that is related to the provisions for children with disabilities (e.g., all the indicators of the item "Provisions for Children with Disabilities" and some indicators of the items "Indoor Space," "Furniture for Routine Care, Play, and Learning," and "Room Arrangement for Play") was excluded from the OARS because the student population upon whom this study focused was "at-risk" children who had no identified disabilities or delays.

Although the OARS only consists of 20 items, the format for the presentation of these items is the same as the ECERS-R: a 7-point scale with quality indicators anchoring 4 points: 1, inadequate; 3 minimal; 5, good; and 7, excellent. The scoring of the OARS is also the same as the ECERS-R, based primarily on a 2- to 3- hour observation.

Jury Validation. The structural design of the OARS was reviewed by a methodologist who is experienced in the field of program evaluation. Its content was reviewed by a 5-content-specialist jury to assure the content validity. This five-content-specialist jury consisted of two early intervention teachers, two regular early childhood education teachers, and one regular early childhood education faculty member. All five people are experienced in the field of early childhood education and have knowledge about open-ended activities. Knowing the intention of the study (in the variables under review), they reviewed the instrument and made suggestions for content changes or modifications. After summarizing and reviewing their suggestions for possible inclusion in the instrument, the researcher edited the OARS based on the following principle: when more than one jury member offers the same suggestion, the instrument developer should consider editing it accordingly; and for suggestions made by one jury member, the instrument developer should consider the suggestion carefully but need not to feel obligated to make a change. As the result of editing, some modifications were made. For instance, some

indicators that are relevant to the ope-endedness of activities but not included in the ECERS-R were added to the OARS, such as “Integrated indoor and outdoor space (Ex. free flow of play)” (Item “Indoor Space”, See Appendix A) and “Books are accessible in most interest centers (Ex. books to read to “babies” in the dramatic play center; books about building in block area; ABC/dictionary books in writing area, etc)” (Item “Literacy Development”, See Appendix A).

The TCAM

The TCAM was chosen to measure students’ creativity not only because it is an instrument designed to measure the creativity of 3- to 8-year-old children, but also because its rationale is consistent with this study’s operational definition of young children’s creativity. In this study, young children’s creativity refers to the potentiality to produce ideas or objects that are novel to the child, and the child’s creative process is the best indicator of creative potentiality (Tegano et al., 1991; Isenberg & Jalongo, 2001). The TCAM measures three aspects of creative thinking: fluency, originality, and imagination. It samples “some of the most important ways that young children use their creative thinking abilities” (Torrance, 1981, p. 5): (1) moving in alternative ways; (2) imagining, empathizing, fantasizing, and assuming unaccustomed roles; (3) exploring alternative and unusual solutions to problems; and (4) improvising with common objects in the environment and using them for something other than the intended purposes. In this regard, the TCAM measures young children’s creative potentiality: fluency, originality, and imagination by examining the methods (process) in which children use their creative thinking abilities. Given the definition of young children’s creativity in this study, the measurement of this creative process logically serves as an appropriate indicator of young children’s creative potentiality.

The TCAM consists of four subtests: (1) How Many Ways?, which samples the child's ability to move in alternate ways; (2) Can You Move Like?, which requires the child to assume roles related to animals or objects; (3) What Other Ways?, which requires the child to invent unusual ways to place a juice cup in a wastebasket; and (4) What Might It Be?, which requires the child to come up with unusual uses of paper cups. According to the scoring guide of the TCAM, the first, third, and fourth subtests are conducted to measure fluency and originality. Fluency scores are given based on the number of non-repetitious response given. Originality scores for each response are given by consulting the TCAM manual for a list of possible responses and scores. The scores on the subtests are summed to create total fluency and total originality scores and then converted to standard scores. Scores on each item of the second subtest are summed to produce the total imagination scores and then converted to standard scores. Renzulli (1985) stated that these subtests do not require verbal responses and can be administered in an atmosphere that is more play oriented or game-like than the more formal approach usually employed in paper-and-pencil tests. According to Renzulli (1985), the scoring procedures can be mastered easily with a small amount of practice. The TCAM should be administered individually and requires about 15 minutes.

According to Torrance (1981), sufficient empirical findings have been accumulated to warrant continued experimentation. Inter-scorer reliability coefficients reported by Torrance and other researchers range from .90 to .99. An overall test-retest reliability coefficient of .84 was reported for a sample of twenty 3- to 5-year-old children who were tested over an interval of two weeks. Test-retest reliability for the four separate activities ranged from .58 to .79. Torrance suggested that both inter-scorer reliability and test-retest reliability are easy to attain if a rater studies and follows the scoring guide carefully. A considerable accumulation of indirect validity

evidence of the TCAM has been reported by researchers. By reviewing validity studies on the TCAM, Torrance stated:

> "Scores on TCAM correlate positively and significantly with measures of "Knock-Knock," Teasing/Sarcastic, and Prescribed Format humor, the socioemotional objectives of Developmental Therapy, and Self-Concepts. Scores on the TCAM are relatively unrelated to measures of intelligence, cooperation, race, sex, previous preschool attendance, or socioeconomic status. Scores on TCAM are associated with learning experiences calculated to produce creative growth such as creative movement, a creative curriculum developed around farm experiences and resources, and problem-solving sociodrama" (Torrance, 1981, p .11).

Data Collection

The data collection procedure of the study included two phases. In Phase 1 the researcher collected data related to the degree of the open-endedness of activities using the OARS. In Phase 2 she collected data related to the level of creative thinking ability of the young children engaged in these activities utilizing the TCAM.

Phase 1

In each of the 11 classes, the researcher observed and rated the physical setting of the classroom and staff's interactions with children one time utilizing the OARS. Then the researcher ranked the 11 classes based on the result of their cumulative ratings.

Since the OARS is a researcher-developed instrument, its reliability needed to be examined. "Reliability of an instrument" refers to the consistency with which the instrument assesses whatever it is measuring (Popham, 1993). "A measurement procedure is considered

reliable to the extent that it produces stable, consistent measurements" (Cravetter & Wallnau, 2000, p. 530). The OARS's reliability was examined by studying the stability of examinee performance over an interval of a week as well as determining its inter-rater reliability. In order to examine the stability of the classes' performance on the OARS over a period of time, each class was observed and rated again a week after the first observation by either the researcher or a colleague of hers. By correlating the 11 classes' cumulative ratings in the first observation (CROBS1) with their cumulative ratings in the second observation (CROBS2), the study would find whether the classes' cumulative ratings of open-endedness of activities on the OARS were stable over a period of time. In order to examine the OARS's inter-rater reliability, the researcher enlisted the colleague to conduct the second observation and rate the first four of the 11 classes. By comparing the researcher's rating on each item of the OARS of the four classes with the colleague's, the study would find whether the OARS is inter-rater reliable for research purposes.

Each observation was conducted in the morning and took approximately 2 to 2.5 hours. Prior to observing and rating these classes, both the researcher and the colleague underwent a five-hour training course on the use of the OARS. This five-hour training course included a 3-hour observation both in a classroom and on a playground of four years old preschoolers, and a 2-hour discussion between the researcher and the colleague on how to interpret or reword the indicators that might have different meanings.

Phase 2

After the classes' CROBS1 were ranked, the class with the lowest degree of open-endedness (CLSL), the class with a medium degree of open-endedness (CLSM), and the class with the highest degree of open-endedness (CLSH) were selected for the correlational analysis. Fifty-two students in these three classes were tested on an individual basis using the TCAM. To

test the hypothesis of the study, the students' TCAM scores would be correlated with the respective classes' CROBS1. The TCAM scores included: fluency score (FLUE), originality score (ORIG), imagination score (IMAG), and total score on the TCAM (TTCAM). The TTCAM equals to FLUE plus ORIG plus IMAG.

Since the researcher is not a native English speaker and suspected that an accent would impact the students' performance in the TCAM, the colleague of the researcher was also enlisted to administer the test with the researcher. During the test, the colleague gave oral directions to the students, and the researcher recorded and scored their responses. The time that the students used to complete the test varied from 15 minutes to 30 minutes.

Some wording of the TCAM's directions is inappropriate and may decrease the overall validity of this test (Cooper, 1991). For instance, the direction of the first subtest is "I want you to think up as many ways as you can to walk or run" (Torrance, 1981, p. 13), but the highest scores are given to such responses as splitting, bouncing, hopping, rocking, dancing and hoola hooping. When administering the test, the researcher and the colleague adapted this direction for use by taking Cooper's (1991) suggestion, using open-ended direction, "I want you to think up as many ways as you can to move across the room. Be imaginative" (p. 201).

Research Sample

The students in the CLSL, CLSM, and CLSH, who were considered to be "at-risk" by the state, were selected to give the TCAM test to determine their level of creative thinking ability. Two students who had identified communication delay were eliminated from the study, because a disability or delay could affect children's performance in the TCAM test. One student whose parent refused to allow him to participate in the study was also eliminated. The students (n = 52) tested using the TCAM included 24 boys and 28 girls, and they all had been enrolled in these

classes and taught by their current teachers and teacher-assistants for at least six months by the time they were administered the test. The average age of these students was 4.89 years with a standard deviation of .30. The youngest subject was 4.50 years, and the oldest was 5.46 years. These 52 students were the research sample for the study.

Data Analysis

The data analysis of the study consisted of the examination of the OARS's reliability, the descriptive statistics on the instruments, and the hypothesis testing.

In Phase 1 of the data collection, the 11 classes were observed and rated twice using the OARS instrument. The first time, the 11 classes were all observed and rated by the researcher. The second time, seven classes were observed and rated by the researcher, and four were observed and rated by the colleague. Prior to Phase 2 of the data collection, the following data analyses were conducted: (1) in order to study the stability of the classes' cumulative ratings on the OARS over a period of time, a Pearson correlation coefficient was calculated to reflect the relationship between the 11 classes' CROBS1 and CROBS2; (2) in order to determine the inter-rater reliability of the OARS, the researcher 's rating on each item of the OARS for the four classes was compared with the colleague's; (3) the classes' CROBS1 and CROBS2 were examined for ranges, means, and standard deviations using descriptive statistics; and (4) the classes' CROBS1 were ranked to select the CLSL, CLSM, and CLSH for the remainder of the data collection efforts.

The technique of studying the stability of examinee performance on an instrument over a period of time is referred to as a test-retest estimate of reliability by Popham (1993). According to Cravetter and Wallnau (2000), using correlations to determine the relationship between two sets of measurement is a method that evaluates reliability; when the correlation between two

measurements is positive, the reliability is high. The Pearson correlation is an appropriate measure to evaluate reliability because it helps the researcher determine the degree and direction of the linear relationship between the CROBS1 and the CROBS2.

In Phase 2, after the CLSL, CLSM, and CLSH were selected for the purpose of correaltional analysis, the students in the 3 classes were administered the TCAM test. Then the following analyses were conducted: (1) all students' TCAM scores were examined for ranges, means, and standard deviations using descriptive statistics; (2) the intercorrelations among all students' TCAM scores were examined using the Pearson correlation; (3) each class's ranges, means, and standard deviations of the TCAM scores were calculated using descriptive statistics; (4) the three class's respective ranks of mean TCAM scores were correlated with their ranks of CROBS1 using the Spearman correlation to test the hypothesis of the study; (5) since the Spearman correlation showed a significant positive correlation between the three classes' CROBS1 and their respective mean TCAM scores, the technique of one-way ANOVA was used to evaluate the mean differences among the three classes' TCAM scores; and (6) the technique of simple linear regression was used to predict students' TCAM scores based on the classes' CROBS1.

According to Gravetter and Wallnau (2000), "the Spearman correlation is designed to measure the relationship between variables measured on an ordinal scale of measurement" (p. 545). The researcher used it to measure the consistency of the relationship between the three selected class's ranks of CROBS1 and their respective ranks of mean TCAM scores.

According to Cronk (1999), the one-way ANOVA is a technique used to compare the means of two or more groups of students that vary on a single independent variable. The one-way ANOVA conducted in this study consisted of two tests. The first was the ANOVA, and the

second was the Fishers' LSD (Least Significant Different) test. According to Aspelmeier (2002), the ANOVA can tell us that two or more groups of sample are significantly different from one another, but not which groups they are. In order to determine which means are significantly different, different pairs of means should be compared (e.g. X1 vs. X2, X1 vs. X3, and X2 vs. X3). This technique is referred to as "multiple comparison" by Aspelmeier (2002). Fisher's LSD is appropriate for use when there are three means to compare, and it is the most liberal of all multiple comparison tests because the critical *t* for significance is unaffected by the number of groups (Aspelmeier, 2002). For these reasons, it was conducted in the study to compare different pairs of mean TCAM scores of the three classes.

According to Cronk (1999), "simple linear regression allows the prediction of one variable from another" (p. 43). By using simple linear regression, the researcher expected to find significant regression equations to express the relationship between the classes' CROBS1 and the students' FLUE, ORIG, IMAG, as well as TTCAM.

In this study, the descriptive statistics, Pearson correlation, Spearman correlation, one-way ANOVA, and simple linear regression were conducted using the SPSS 11.5 for Windows software. A statistical significance level .01 was adopted for both Pearson and Spearman correlation analyses. A statistical significance level of .05 was adopted for the ANOVA and the Fisher's LSD test.

Subject Recruitment

In order to gain access to the 11 Pre-K classes, the researcher contacted and obtained letters of agreement from the director of the non-public Pre-K program to which eight private Pre-K classes belong, the assistant superintendent of the public school system to which three public Pre-K classes belong, and the principals of the seven schools to which the 11 Pre-K

classes belong. In the letters of agreement, the director of the non-public Pre-K program, the assistant superintendent of the public school system, and the principals stated that they had reviewed and approved of the research procedures proposed by the researcher, and they agreed to grant the researcher access to the staff, students, and classrooms for the study. Before conducting the study, preliminary meetings were arranged with the teachers and teacher-assistants to discuss details, such as scheduling observations and the creative thinking test and getting consent from the guardians of students.

Subject Consent

Various levels of consent were obtained for this study. First of all, the teachers and teacher-assistants in the 11 classes signed an informed consent form clearly describing the study's purpose, procedures, potential risks, and potential benefits. Once written consent of the teachers and teacher-assistants were obtained, the guardians of the students were sent a letter describing exactly what would happen on the day of the observation. After the CLSL, CLSM, and CLSH were selected, the guardians of the students in the three classes were asked to sign an informed consent form that clearly describes the purpose of the study, the potential risks and benefits of the study, and the activities that the researcher would ask their children to complete in the creativity test.

Discussion of the Confidentiality and Anonymity

The names of the schools, the classes, the teachers, and the teacher-assistants never appeared in the scoring sheet of the OARS. Neither the names of the students appeared on the scoring sheet of the TCAM. The researcher used ID numbers to link the classes or students with the corresponding scoring sheet. Only ID numbers were put on the scoring sheet. The signed consent forms and the identifying information (e.g., names of students, schools, classes, teachers,

or teacher-assistants) were stored in a locked file cabinet in the office of the researcher's major professor while the hard copies of the scoring sheet and the SPSS output tables were stored in a locked file cabinet at the researcher's home. Once the original data were input into computer, the researcher destroyed the hard copies of the scoring sheets with a shredding machine.

Summary

In an effort to contribute to the reform of curriculum orientations and instructional methods in early childhood education for enhancing young children's development of creativity, the researcher felt the need to study the relationship between the open-endedness of activities and the creativity of young children. By using a quantitative methodology to collect and analyze data, the researcher determined whether and to what extent an association exists between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. Combined with the outcomes of other studies that are related to open-ended activities and young children's creativity, the results of this study can be used to determine the value of using open-ended activities as an instructional strategy to increase young children's creative experiences and enhancing their creativity.

After acknowledging the importance of creativity, more and more teachers have dedicated themselves to helping young children develop their creative capacity as fully as possible. This study can support these teachers' efforts by giving them critical insights into creativity education. As the OARS was developed and validated, this study can provide early childhood teachers with valuable information to create developmentally appropriate and educationally appropriate classrooms for their students' creativity to flourish. The development of the OARS also allows teachers and supervisors of early childhood education programs to assess the levels of their implementation of open-ended activities.

CHAPTER IV: PRESENTATION OF RESULTS

This study was designed to investigate the relationship between the open-endedness of activities and the creativity of young children. Statistical analyses were performed on data collected by means of two instruments, the Open-endedness of Activities Rating Scale (OARS) and the Thinking Creatively in Action and Movement (TCAM), to determine whether and to what extent an association exists between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. Since the OARS is a researcher-developed instrument, preliminary statistical analyses were also conducted to examine its reliability.

This chapter presents the results obtained by statistical analyses of the data relative to the examination of the reliability of the OARS and the investigation of the guiding research question of the study. It includes the introduction of sample, the data analysis, and a summary of the results.

Introduction of Sample

The initial sample for this study consisted of 11 pre-kindergarten (Pre-K) classes in an urban school district and a suburban school district that are located in the southeastern United States. It represents about 20% of the Pre-K classes in these two school districts, which are state-funded and target children from low-income families. The initial sample was selected because of the number of low socioeconomic students in those classes and because the teachers and teacher assistants were available and willing to participate in the study.

Sites for correlational analysis were selected due to their degree of open-endedness of activities. Three classes: the class with the lowest degree of open-endedness of activities (CLSL),

the class with a medium degree of open-endedness of activities (CLSM), and the class with the highest degree of open-endedness of activities (CLSH), were selected from the 11 based on their cumulative ratings on the OARS. The students in these three classes, who were considered to be "at-risk" by the state, were selected to give Torrance's (1981) Thinking Creatively in Action and Movement (TCAM) test. Two students who had identified communication delay were eliminated from the study, because a disability or delay could affect children's performance in the TCAM. One student whose parent refused to allow him to participate in the study was also eliminated. The students (n = 52) tested using the TCAM included 24 boys and 28 girls. They are the research sample of the study. These students all had been enrolled in these classes and taught by their current teachers and teacher-assistants for at least six months by the time they were administered the test. The average age of them was 4.89 years (SD = .30). The youngest student was 4.50 years, and the oldest was 5.46 years.

Data Analysis

In this study statistical analyses were performed to examine the reliability of the OARS, obtain descriptive data on the instruments, and test the hypothesis.

Examination of the OARS's Reliability

Since the OARS is researcher-developed, its reliability needed to be examined. Prior to analyzing the data that was generated by its use, the researchers examined the reliability of the instrument to see whether the instrument could be accepted as reliable for research purposes.

The OARS's reliability was examined by: (1) studying the stability of the classes' cumulative ratings of open-endedness of activities on the OARS over a period of time; and (2) determining the inter-rater reliability of the OARS.

(1) Stability of the Classes' Cumulative Ratings of Open-endedness of Activities on the OARS

In Phase 1 of the data collection, the 11 classes were observed and rated twice with an interval of a week using the OARS. The first time, the 11 classes were all observed and rated by the researcher. The second time, seven of them were observed and rated by the researcher, and four of them were observed and rated by a colleague of the researcher. The classes' cumulative ratings of open-endedness of activities in the first observation (CROBS1) were correlated to the ones in the second observation (CROBS2) to study the stability of the classes' cumulative ratings of open-endedness of activities on the OARS over a period of time.

Table 1 displays the Pearson correlation matrix for 11 Pre-K classes' CROBS1 and CROBS2.

Table 1
Intercorrelation between CROBS1 and CROBS2

Cumulative Ratings		CROBS2
	Classes (n = 11)	
CROBS1	Pearson Correlation	.992
	Sig. (2-tailed)	.000*

Note. CROBS1 = The Cumulative Rating in the First Observation; CROBS2 = The Cumulative Rating in the Second Observation.
*$p < 0.01$.

A Pearson correlation coefficient was calculated for the relationship between the CROBS1 and the CROBS2. A strong positive correlation was found ($r(11) = .992$, $p < .001$), indicating a significant relationship between the two variables. The strong and positive

correlation indicates a high reliability of the OARS instrument. The classes' cumulative ratings of open-endedness of activities on the OARS are considered to be stable over a period of time.

(2) Inter-rater Reliability of the OARS

In Phase 1 of the data collection, after the 11 classes were observed and rated utilizing the OARS by the researcher one time, the first four of them were observed and rated again by the colleague utilizing the same instrument. The colleague's rating on each item was compared with the researcher's to determine the inter-rater reliability of the OARS.

Table 2 displays the rating structure of the OARS.

Table 2
Rating Structure of the OARS

Categories	Items	Indicators
General Physical Environment	4	38
General Psychological Environment	5	51
Physical and Psychological Environments for Specific Activities	11	117

The investigation of inter-rater reliability was conducted using four classrooms. Therefore, the itemized ratings totaled 80 while a total of 824 indicator ratings were included. Of the itemized scores, the raters were in total agreement for 66 scores which represent 82.5% of the possible scores. Of the 20 individual items, the raters were in absolute agreement across 10 of the items. Seven of the items resulted in one classroom of inconsistent ratings, two classrooms resulted in two inconsistent ratings, and one classroom yielded three inconsistent ratings. Six of the 14 inconsistent ratings involved a 1-point difference on the 7-point scales. None of the

inconsistent rating differences impacted the overall ratings to the extent that the categorization of the level of open-endedness of activities within a classroom would be affected.

From the examination of the stability of the classes' cumulative ratings on the OARS over a period of time and the inter-rater reliability of the OARS, the instrument can be accepted as reliable for research purposes.

Descriptive Data on the Instruments

Data relative to the investigation of the guiding research question were collected by means of two instruments: the OARS and the TCAM. Tables 3 through 8 present summaries for the descriptive data for all variables constituting the instruments.

(1) Descriptive Data on the OARS

Table 3 displays the summaries for the ranges, means, and standard deviations of the 11 classes' CROBS1 and CROBS2.

Table 3
Descriptive Statistics of the 11 Classes' CROBS1 and CROBS2

Cumulative Ratings	N	Minimum	Maximum	Mean	Std. Deviation
CROBS1	11	63.00	129.00	101.3636	21.90558
CROBS2	11	75.00	129.00	104.0909	19.51130

Note. CROBS1 = The Cumulative Rating in the First Observation; CROBS2 = The Cumulative Rating in the Second Observation.

The lowest CROBS1 is 63, and the highest is 129. The lowest CROBS2 is 75, and the highest is 129. The possible range of the cumulative rating on the OARS was 20 to 140. The 11

classes have a mean CROBS1 of 101.36 with a standard deviation of 21.91, and they have a mean CROBS2 of 104.09 with a standard deviation of 19.51.

(2) Descriptive Data on the TCAM

In Phase 1 of the data collection, after the classes' CROBS1 were ranked, the CLSL, CLSM, and CLSH, were selected for the remainder of the data collection efforts. In Phase 2 of the data collection, the students in the three classes were tested to determine their level of creative thinking ability using the TCAM.

Table 4 displays the summaries for the ranges, means, and standard deviations of all students' TCAM scores. The TCAM scores included: fluency score (FLUE), originality score (ORIG), imagination score (IMAG), and total score on the TCAM (TTCAM). The TTCAM equals to FLUE plus ORIG plus IMAG.

Table 4
Descriptive Statistics of TCAM Scores of All Students

	Minimum	Maximum	Mean	Std. Deviation
		Students (n = 52)		
FLUE	63.00	185.00	103.5962	32.14261
ORIG	74.00	193.00	112.9423	32.62707
IMAG	52.00	129.00	105.9615	18.60103
TTCAM	192.00	507.00	322.5000	77.08806

Note. FLUE = Fluency Score; ORIG = Originality Score; IMAG = Imagination Score; TTCAM = Total Score on the TCAM; TTCAM = FLUE + ORIG + IMAG.

The lowest FLUE in the three classes is 63, and the highest is 185. The possible range of the FLUE was 63 to 200. The students have a mean FLUE of 103.60 with a standard deviation of

32.14. The lowest ORIG in the three classes is 74, and the highest is 193. The possible range of the ORIG was 74 to 193. The students have a mean ORIG of 112.94 with a standard deviation of 32.63. The lowest IMAG in the three classes is 52, and the highest is 129. The possible range of the IMAG was 52 to 129. The students have a mean IMAG of 105.96 with a standard deviation of 18.60. The lowest TTCAM in the three classes is 192, and the highest is 507. The possible range of the TTCAM was 192 to 522. The students have a mean TTCAM of 322.50 with a standard deviation of 77.09.

Table 5 displays a correlation matrix for all students' TCAM scores.

Table 5
Intercorrelations among the TCAM Scores of All Students

Variable	FLUE	ORIG	IMAG	TTCAM
		Students (n = 52)		
FLUE	1	.969*	.637*	.981*
ORIG	.969*	1	.581*	.967*
IMAG	.637*	.581*	1	.753*
TTCAM	.981*	.967*	.753*	1

Note. FLUE = Fluency Score; ORIG = Originality Score; IMAG = Imagination Score; TTCAM = Total Score On the TCAM; TTCAM = FLUE + ORIG + IMAG.
*$p < 0.01$.

Pearson correlation coefficients were calculated for the relationship among the TCAM scores of all students. A statistical significance level .01 was adopted for the analysis. The following results were obtained: (1) a strong positive correlation was found between FLUE and ORIG ($r(52) = .969$, $p < .01$), indicating a significant linear relationship between the two

variables (i.e., students with higher fluency scores tend to have higher originality scores, and vice versa); (2) a strong positive correlation was found between FLUE and IMAG ($r(52) = .637$, $p < .01$), indicating a significant linear relationship between the two variables (i.e., students with higher fluency scores tend to have higher imagination scores, and vice versa); (3) a strong positive correlation was found between FLUE and TTCAM ($r(52) = .981$, $p < .01$), indicating a significant linear relationship between the two variables (i.e., students with higher fluency scores tend to have higher total scores on the TCAM, and vice versa); (4) a strong positive correlation was found between ORIG and IMAG ($r(52) = .581$, $p < .01$), indicating a significant linear relationship between the two variables (i.e., students with higher originality scores tend to have higher imagination scores, and vice versa); (5) a strong positive correlation was found between ORIG and TTCAM ($r(52) = .967$, $p < .01$), indicating a significant linear relationship between the two variables (i.e., students with higher originality scores tend to have higher total scores on the TCAM, and vice versa); (6) a strong positive correlation was found between IMAG and TTCAM ($r(52) = .753$, $p < .01$), indicating a significant linear relationship between the two variables (i.e., students with higher imagination scores tend to have higher total scores on the TCAM, and vice versa).

Table 6 displays the summaries for the range, means, and standard deviations of the TCAM scores of the students in each of the three classes: CLSL, CLSM, and CLSH.

Table 6

Descriptive Statistics of the TCAM Scores of Each Selected Class

Score	Class	N	Mean	Std. Deviation	Minimum	Maximum
FLUE	CLSL	19	81.1579	10.01257	63.00	97.00
	CLSM	18	110.2222	32.54057	67.00	185.00
	CLSH	15	124.0667	34.06185	69.00	184.00
ORIG	CLSL	19	90.6842	11.24995	74.00	113.00
	CLSM	18	121.2778	35.35834	77.00	193.00
	CLSH	15	131.1333	32.87610	76.00	193.00
IMAG	CLSL	19	95.6842	17.54693	52.00	129.00
	CLSM	18	104.7778	18.16770	52.00	129.00
	CLSH	15	120.4000	9.75998	97.00	129.00
TTCAM	CLSL	19	267.5263	33.65077	192.00	318.00
	CLSM	18	336.2778	79.38203	199.00	507.00
	CLSH	15	375.6000	71.92834	242.00	504.00

Note. FLUE = Fluency Score; ORIG = Originality Score; IMAG = Imagination Score; TTCAM = Total Score on the TCAM; TTCAM = FLUE + ORIG + IMAG; CLSL = The Class with the Lowest Degree of Open-endedness; CLSM = The Class with a Medium Degree of Open-endedness; CLSH = The Class with the Highest Degree of Open-endedness.

The lowest FLUE in the CLSL is 63 and the highest is 97. The students in the CLSL have a mean FLUE of 81.16 with a standard deviation of 10.01. The lowest ORIG in the CLSL is 74 and the highest is 113. The students in the CLSL have a mean ORIG of 90.68 with a standard deviation of 11.25. The lowest IMAG in the CLSL is 52 and the highest is 129. The students in the CLSL have a mean IMAG of 95.68 with a standard deviation of 17.55. The lowest TTCAM

in the CLSL is 192 and the highest is 318. The students in the CLSL have a mean TTCAM of 267.53 with a standard deviation of 33.65.

The lowest FLUE in the CLSM is 67 and the highest is 185. The students in the CLSM have a mean FLUE of 110.22 with a standard deviation of 32.54. The lowest ORIG in the CLSM is 77 and the highest is 193. The students in the CLSM have a mean ORIG of 121.28 with a standard deviation of 35.36. The lowest IMAG in the CLSM is 52 and the highest is 129. The students in the CLSM have a mean IMAG of 104.78 with a standard deviation of 18.17. The lowest TTCAM in the CLSM is 199 and the highest is 507. The students in the CLSM have a mean TTCAM of 336.28 with a standard deviation of 79.38.

The lowest FLUE in the CLSH is 69 and the highest is 184. The students in the CLSH have a mean FLUE of 124.07 with a standard deviation of 34.06. The lowest ORIG in the CLSH is 76 and the highest is 193. The students in the CLSH have a mean ORIG of 131.13 with a standard deviation of 32.88. The lowest IMAG in the CLSH is 97 and the highest is 129. The students in the CLSH have a mean IMAG of 120.40 with a standard deviation of 9.76. The lowest TTCAM in the CLSH is 242 and the highest is 504. The students in the CLSH have a mean TTCAM of 375.60 with a standard deviation of 71.93.

Results of Hypothesis Testing

The primary focus of this study was to determine whether and to what extent an association exists between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. The study involved the testing of the null hypothesis: there is no relationship between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities.

Correlations

In order to test the null hypothesis, the researcher first examined Table 6 to compare the means of FLUE, ORIG, IMAG, as well as TTCAM in the CLSL, CLSM, and CLSH. From this examination, the following results were found: (1) the students in the CLSL have lower mean FLUE, ORIG, IMAG, as well as TTCAM than the students in the CLSM; and (2) the students in the CLSM have lower mean FLUE, ORIG, IMAG, as well as TTCAM than the students in the CLSH. These results indicate that the students' mean TCAM scores are positive correlated with the respective classes' CROBS1.

This hypothesis was also tested using correlational matrixes (Table 7). Since the three classes: CLSL, CLSM, and CLSH, were selected based on their ranks of the CROBS1, Spearman *rho* correlation coefficients were calculated for the relationship between the rank of the selected classes' CROBS1 and the rank of their students' mean TCAM scores. A statistical significance level .01 was adopted for the analysis. Table 7 summarizes the correlation coefficients.

Table 7
Intercorrelation between 3 Classes' CROBS1 and their TCAM Scores

Variable	FLUE	ORIG	IMAG	TTCAM
		Class (n = 3)		
CROBS1	1.000*	1.000*	1.000*	1.000*

Note. CROBS1= The Cumulative Rating in the First Observation; FLUE = Fluency Score; ORIG = Originality Score; IMAG = Imagination Score; TTCAM = Total Score on the TCAM; TTCAM = FLUE + ORIG + IMAG.
*$p <$ 0.01.

A strong positive correlation was found ($rho(3) = 1.000$, $p < .001$) between the students' FLUE and the respective classes' CROBS1, indicating a significant relationship between the two

variables. A strong positive correlation was found (*rho*(3) = 1.000, $p < .001$) between the students' ORIG and the respective classes' CROBS1, indicating a significant relationship between the two variables. A strong positive correlation was found (*rho*(3) = 1.000, $p < .001$) between the students' IMAG and the respective classes' CROBS1, indicating a significant relationship between the two variables. A strong positive correlation was found (*rho*(3) = 1.000, $p < .001$) between the students' TTCAM and the respective classes' CROBS1, indicating a significant relationship between the two variables.

The hypothesis testing discovered a statistically significant positive correlation between the CROBS1 and the TCAM scores, which indicates that the degree of open-endedness of activities is significantly positively associated with the level of creative thinking ability of the young children engaged in these activities. Therefore, the null hypothesis that there is no relationship between the degree of open-endedness of activities and the level of the creative thinking ability of the young children engaged in these activities was rejected.

One-way ANOVA

After a significant positive relationship between the students' TCAM scores and the respective classes' CROBS1 was found, the technique of one-way ANOVA was used to evaluate the mean difference among the three classes' TCAM scores. The one-way ANOVA conducted in the study consisted of two tests: the ANOVA and the Fisher's LSD (Least Significant Different) test.

ANOVA. Table 8 summarizes the results of the analysis of variance of the three classes' TCAM scores.

Table 8
Analysis of Variance of the 3 Classes' TCAM Scores

Source	Sum of Square	df	Mean Square	F	Sig.
		Between Groups			
FLUE	16641.948	2	8320.974	11.311	.000*
ORIG	15627.377	2	7813.689	9.903	.000*
IMAG	5159.107	2	2579.553	10.123	.000*
TTCAM	103131.052	2	51565.526	12.637	.000*
		Within Groups			
FLUE	36048.571	49	735.685		
ORIG	38663.450	49	789.050		
IMAG	12486.816	49	254.833		
TTCAM	199939.948	49	4080.407		

Note. FLUE = Fluency Score; ORIG = Originality Score; IMAG = Imagination Score; TTCAM = Total Score on the TCAM; TTCAM = FLUE + ORIG + IMAG.
*$p < .05$.

A one-way ANOVA was computed to compare the TCAM scores of the students in the three classes. A statistical significance level .05 was adopted for the analysis. Significant differences were found among the classes' respective FLUE ($F(2,49) = 11.31$, $p < .05$), ORIG ($F(2,49) = 9.90$, $p < .05$), IMAG ($F(2,49) = 10.12$, $p < .05$), and TTCAM ($F(2,49) = 12.64$, $p < .05$).

Fisher's LSD. Table 9 displays the summaries for the results of multiple comparisons of the mean difference of the three classes' TCAM scores.

Table 9
Multiple Comparisons of the Mean Difference of the 3 Classes' TCAM Scores

Fisher's LSD

Dependent Variable	Class	Class	Mean Difference	Std. Error	Sig.
FLUE	CLSM	CLSL	29.0643*	8.92142	.002
	CLSH	CLSL	42.9088*	9.36835	.000
	CLSH	CLSM	13.8444	9.48246	.151
ORIG	CLSM	CLSL	30.5936*	9.23932	.002
	CLSH	CLSL	40.4491*	9.70218	.000
	CLSH	CLSM	9.8556	9.82036	.321
IMAG	CLSM	CLSL	9.0936	5.25068	.090
	CLSH	CLSL	24.7158*	5.51372	.000
	CLSH	CLSM	15.6222*	5.58088	.007
TTCAM	CLSM	CLSL	68.7515*	21.01065	.002
	CLSH	CLSL	108.0737*	22.06321	.000
	CLSH	CLSM	39.3222	22.33196	.085

Note. FLUE = Fluency Score; ORIG = Originality Score; IMAG = Imagination Score; TTCAM = Total Score on the TCAM; TTCAM = FLUE + ORIG + IMAG; CLSL = The Class with the Lowest Degree of Open-endedness; CLSM = The Class with a Medium Degree of Open-endedness; CLSH = The Class with the Highest Degree of Open-endedness.
*$p < .05$.

The Fisher's LSD test was used to compare different pairs of means of the three classes' TCAM scores to determine which ones were significantly different (e.g. CLSH vs. CLSM, CLSH vs. CLSL, and CLSM vs. CLSL). A statistical significance level .05 was adopted for each comparison. The multiple comparison revealed that: (1) the students in the CLSH scored significantly higher (m = 124.07, sd = 34.06) than the students in the CLSL (m = 81.16, sd = 10.01) for the FLUE; (2) the students in the CLSM scored significantly higher (m = 110.22, sd = 32.54) than the students in the CLSL (m = 81.16, sd = 10.01) for the FLUE; (3) the students in the CLSH scored significantly higher (m = 131.13, sd = 32.88) than the students in the CLSL (m = 90.68, sd = 11.25) for the ORIG; (4) the students in the CLSM scored significantly higher (m = 121.28, sd = 35.36) than the students in the CLSL (m = 90.68, sd = 11.25) for the ORIG; (5) the students in the CLSH scored significantly higher (m = 120.40, sd = 9.76) than the students in the CLSL (m = 95.68, sd = 17.55) for the IMAG; (6) the students in the CLSH scored significantly higher (m = 120.40, sd = 9.76) than the students in the CLSM (m = 104.78, sd = 18.17) for the IMAG; (7) the students in the CLSH scored significantly higher (m = 375.60, sd = 71.93) than the students in the CLSL (m = 267.53, sd = 33.65) for the TTCAM; (8) the students in the CLSM scored significantly higher (m = 336.28, sd = 79.38) than students in the CLSL (m = 267.53, sd = 33.65) for the TTCAM; (9) the students in the CLSH were not significantly different from the students in the CLSM for the FLUE, ORIG, and TCAM; and (10) the students in the CLSM were not significantly different from the students in the CLSL for the IMAG.

Simple Linear Regression

The technique of simple linear regression was used to predict students' TCAM scores based on the classes' CROBS1. Table 10 displays the summaries for the results of the simple linear regression analysis.

Table 10
Simple Linear Regression Analysis for Predicting TCAM Scores Based on the CROBS1

Dependent Variable	R Square	df (Regression)	df (Residual)	F Ratio	B (Constant)	B (CROBS1)	Sig.
FLUE	.301	1	50	21.494	42.346	.658	.000*
ORIG	.262	1	50	17.730	54.928	.623	.000*
IMAG	.287	1	50	20.108	71.341	.372	.000*
TTCAM	.330	1	50	24.619	168.615	1.653	.000*

Note. FLUE = Fluency Score; ORIG = Originality Score; IMAG = Imagination Score; TTCAM = Total Score on the TCAM; TTCAM = FLUE + ORIG + IMAG.
*$p < .01$.

The results of the simple linear regressions calculated predicting the students' FLUE, ORIG, IMAG, and TTCAM based on the classes' CROBS1 are presented as the follows:

(1) FLUE. A simple linear regression was calculated predicting the students' FLUE based on the classes' CROBS1. From an examination of Table 10, a significant regression equation was found ($F(1,50) = 21.494$, $p < 0.01$), with an R^2 of .301. The students' predicted FLUE is equal to 42.35+0.66(CROBS1) when fluency is tested on the TCAM. The students' average FLUE increased 0.66 point for each point of the CROBS1.

(2) ORIG. A simple linear regression was calculated predicting the students' ORIG based on the classes' CROBS1. From an examination of Table 10, a significant regression equation was found ($F(1,50) = 17.730$, $p < 0.01$), with an R^2 of .262. The students' predicted ORIG is equal to 54.93+0.62(CROBS1) when originality is tested on the TCAM. The students' average ORIG increased 0.62 point for each point of the CROBS1.

(3) IMAG. A simple linear regression was calculated predicting the students' IMAG based on the classes' CROBS1. From an examination of Table 10, a significant regression

equation was found ($F(1,50) = 20.108$, $p < 0.01$), with an R^2 of .287. The students' predicted IMAG is equal to 71.34+0.37(CROBS1) when imagination is tested on the TCAM. The students' average IMAG increased 0.37 point for each point of the CROBS1.

(4) TTCAM. A simple linear regression was calculated predicting the students' TTCAM based on the classes' CROBS1. From an examination of Table 10, a significant regression equation was found ($F(1,50) = 24.619$, $p < 0.01$), with an R^2 of .330. The students' predicted TTCAM is equal to 168.62+1.65(CROBS1) when creative thinking ability is tested on the TCAM. The students' average TTCAM increased 1.65 points for each point of the CROBS1.

Summary of Results

The results of the statistical analyses related to the examination of the reliability of the OARS indicated that the researcher-developed instrument, the OARS, can be accepted as reliable for research purposes.

The Spearman correlation conducted to investigate the guiding research question of the study indicated that there is a statistically significant positive correlation between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities; therefore, the null hypothesis of the study was rejected.

By using the technique of one-way ANOVA, the researcher found statistically significant differences among the three classes' TCAM scores. Comparing different pairs of classes, the Fisher's LSD test discovered that: (1) the students in the CLSH scored significantly higher than the students in the CLSL for all TCAM scores; (2) the students in the CLSM scored significantly higher than the students in the CLSL for the FLUE, ORIG, and TTCAM but were not significantly different from the students in the CLSL for the IMAG; and (3) the students in the

CLSH scored significantly higher than the students in the CLSM for IMAG but were not significantly different from the students in the CLSM for the FLUE, ORIG, and TTCAM.

By using the technique of simple linear regression, the researcher found significant regression equations to express the relationship between the classes' CROBS1 and the students' TCAM scores.

CHAPTER V: DISCUSSION

The purpose of the study was to determine whether and to what extent an association exists between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. This study was guided by the research question: What is the relationship between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities?

The conceptual framework of the study was discussed in Chapter I. This study was conducted based on the humanistic point of view about creativity. This includes Maslow (1970, 1982) and Rogers's (1961) theories on how humans develop creativity. Chapter II consisted of a thorough review of the related literature and research from previous studies. The literature review focused on prior studies related to creativity, young children's creativity, open-ended activities, and the humanistic perspective on creativity. Chapter III described the research methods and procedures. The research methods and procedures are as follows: (1) eleven state-funded Pre-K classes were observed and rated twice using a researcher-developed instrument, the Open-endedness of Activities Rating Scale (OARS); (2) three classes were selected from the 11 based on their cumulative ratings on the OARS in the first observation (CROBS1): the class with the lowest degree of open-endedness of activities (CLSL), the class with a medium degree of open-endedness of activities (CLSM), and the class with the highest degree of open-endedness of activities (CLSH); (3) a creative thinking test, Torrance's (1981) Thinking Creatively in Action and Movement (TCAM), was given to 52 "at-risk" students in these three classes, who had no identified disabilities or delays, to determine their level of creative thinking ability; and (4) a correlation was drawn between the three classes' ranks of CROBS1 and their respective ranks

of mean TCAM scores: fluency scores (FLUE), originality scores (ORIG), imagination scores (IMAG), and total scores (TTCAM). Chapter IV presented the findings of the examination of the reliability of the OARS, the descriptive data on the instruments, and the hypothesis testing. The hypothesis testing discovered a statistically significant positive correlation between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. Therefore, the null hypothesis that there is no relationship between the degree of open-endedness of activities and the level of the creative thinking ability of the young children engaged in these activities was rejected.

This chapter discusses the findings, the implications, the recommendations, and the conclusion of the study based on the review of literature and the results of the data analysis.

Findings

A statistically significant positive correlation was found between the three classes' ranks of CROBS1 and their respective ranks of mean TCAM scores. It indicates that the degree of open-endedness of activities is significantly positively related to the level of creative thinking ability of the young children engaged in these activities. This finding was consistent with the humanistic perspectives on the motivation of creativity (Maslow, 1970, 1982; Rogers, 1961).

According to Maslow (1982), creativity is the result of a person's self-actualization, and people create because they want to meet their need of self-actualization. In order to be creative, one needs some measure of freedom from stereotypes and clichés. Maslow (1970) suggested that self-actualizing individuals are more capable of making choices and exercising free-will than average people. In open-ended activities, schedules are flexible, tasks are not predetermined, and each child has the capacity and freedom to make choices. Open-ended activities can be viewed as environments that provide children with opportunities to solve problems in multiple and original

ways; consequently, they promote children's creative self-actualization. According to Rogers (1961), creativity is a healthy state in which an individual is fully functioning, and motivation for creativity is closely associated with an individual's inner conditions: (1) openness to experience, (2) an inner locus of evaluation, and (3) the ability to toy with elements and concepts. Rogers believed that the internal conditions described above can be fostered and nourished by external conditions: psychological safety and psychological freedom. Defined as the activities in which children are provided with a continuum of free choices in content, process, and product (Hertzog, 1997), open-ended activities provide young children with the opportunities to have their needs met for psychological safety and psychological freedom to be met simultaneously, thereby permitting their inner conditions, closely related to the motivation for creativity, to emerge.

From the humanistic point of view, both external environmental factors and internal unconscious forces can control human behavior, and the internal unconscious forces of humans are influenced by external environmental factors. As an external environmental factor, the open-endedness of activities can develop, encourage, enhance, and maintain children's inner motivation for creativity by increasing their opportunities to engage in creative activities. The more creative activities children experience, the more creative thinking ability they gain, and the more creative potential they have.

The data analysis of the study also discovered results that were not expected. By using the Fisher's LSD (Least Significant Different) test, the study found that: (1) the students in the CLSH scored significantly higher than the students in the students in the CLSL for all TCAM scores; (2) the students in the CLSM scored significantly higher than the students in the CLSL for the FLUE, ORIG, and TTCAM but were not significantly different from the students in the CLSL for the IMAG; and (3) the students in the CLSH scored significantly higher than the

students in the CLSM for IMAG but were not significantly different from the students in the CLSM for the FLUE, ORIG, and TTCAM.

Significant regression equations were found to express the relationship between the classes' CROBS1 and the students' TCAM scores. These results indicated that, by knowing the degree of open-endedness of activities of a class, we can predict the students' level of creative thinking ability. This finding is consistent with previous research, which indicated that open-ended questions encourage independent thoughts as well as creativity (Pollack, 1988).

This study reviewed much of the current literature about open-ended activities and instruments evaluating early childhood environment, and it developed the OARS by modifying the Early Childhood Environment Rating Scale (ECERS) to measure open-endedness of activities in early childhood settings. The OARS's reliability was examined by studying the stability of examinee performance over a period of time as well as determining its inter-rater reliability. A strong positive Pearson correlation coefficient was found between the classes' cumulative ratings on the OARS across two observations, which indicated that the classes' cumulative ratings on the OARS were stable over a period of time. A comparison between two different raters' ratings of four classes determined that the OARS is inter-rater reliable. The total results of the examination of the OARS's reliability indicated that the OARS can be accepted as reliable for research purposes.

Implications

This study found a significant positive relationship between the open-endedness of activities and the creativity of young children. This finding indicates that students in the class with a higher degree of open-endedness of activities have higher a level of creative thinking ability. This finding is a contribution to educational reform, and when combined with the

outcomes of other studies that are related to open-ended activities and young children's creativity, it has many implications for preschool administrators and teachers. It can be used by preschool administrators and teachers to determine whether or not to increase the open-endedness of activities to promote students' development of creativity.

In this study, the CLSL had a cumulative rating of 63, the CLSM had a cumulative rating of 95, and the CLSH had a cumulative rating of 129 on the OARS in the first observation. The results of the Fisher's LSD test imply that, when a class with a degree of open-endedness of activities comparable to a rating of 62 on the OARS increases its open-endedness to a rating comparable to 129, the students in it will exhibit a significant improvement in their fluency, originality, imagination, and total creative thinking ability as measured using the TCAM. When this class increases its open-endedness to a rating comparable to 95, the students in it will have a significant improvement in their fluency, originality, and total creative thinking ability, but not imagination. The results also imply that, when a class with a degree of open-endedness of activities comparable to a rating of 95 on the OARS increases its open-endedness to a rating comparable to 129, the students in it will have a significant improvement in their imagination. In this regard, increasing the open-endedness of activities is most beneficial for a class with a relatively low degree of open-endedness, because a moderate increase in its open-endedness can result in a noticeable improvement in the fluency, originality, and total creative thinking ability of its students. Increasing the open-endedness of activities is also beneficial for a class with a relatively medium degree of open-endedness, because a moderate increase in its open-endedness can result in a noticeable improvement in its students' imagination.

From a review of the examination of the OARS's reliability, the OARS can be accepted as a reliable research instrument to assess the physical and psychological environments where

activities take place, thereby determining the degree of open-endedness in those activities. Using the OARS, teachers and monitors of early childhood education programs can assess the levels of implementation of open-ended activities. The OARS can also be used as a tool in staff development programs because it provides precise indicators of highly open-ended activities. By reading the OARS teachers will be able to learn what open-ended activities are and how to design highly open-ended activities.

Recommendations for Further Research

The present study established a correlation between the degree of open-endedness of activities and the level of creative thinking ability of the young children engaged in these activities. It used a convenience and extreme sample consisting of 52 “at-risk” four- to five- year old children who had no identified disabilities or delays; therefore, its findings have a limited generalizability to all young children. Replication of the study is necessary before any attempts at generalization are made, especially in light of the danger of sample specificity in significance testing of the hypothesis. Since variables that can affect young children’s scores on the TCAM were not controlled in the data analysis, replication of the study with a control of these variables is recommended. Replication of the study using a larger sample size is also recommended before any attempts at generalization are made.

In the study the data collected using the TCAM showed a good picture of the young children’s creativity in a particular time. Future research should consider a longitudinal study to show a picture of young children’s development of creativity over time.

A positive relationship between the open-endedness of activities and young children’s creativity does not guarantee that open-ended activities have an effect on young children’s development of creativity. The results of this study revealed a need for further research on the

effects of open-ended activities on young children's creativity. Combined with the outcomes of other studies, the results of this study can provide a basis for researchers to investigate the effect of open-ended activities on young children's development of creativity. The researcher-developed instrument, the OARS, can be used as the standard to design the treatment for an experimental group.

Conclusion

Classroom environments can either cultivate or stifle young children's creativity and their likelihood to achieve innovation (Cobb, 1977; Olwig, 1991; Wilson, 1996). Teachers are responsible to provide young children with educational environments that promote their development of creativity. This study supports teachers' efforts to help young children fully develop their creative capacity by providing critical insights in designing developmentally and educationally appropriate learning environments.

Based on the findings of this study, the researcher suggests that, in order to enhance young children's development of creativity, teachers should increase the open-endedness of activities to meet their need for freedom from stereotypes and clichés, helping them arrive at the conditions of psychological safety and psychological freedom simultaneously. In other words, classrooms should be designed to maximize the availability, accessibility, and variety of space, materials, and equipment. Additionally, classes' schedule, discipline, and rules should be designed to allow the most flexibility, and the social interaction between teacher and child or child and child should be warm, nurturing, and individualized.

Teachers can use various learning centers to increase the open-endedness of activities. Learning centers refer to areas where the schedule, space, equipment, and materials are organized to facilitate learning through exploration and play (Kieff & Casbergue, 2000).

According to Kieff and Casbergue, they provide young children with the opportunities to engage in activities that are both self-chosen and self-directed. These self-chosen and self-directed activities are usually open-ended because they have two characteristics: first, they don't have a definitive beginning, middle, or end; second, they are not prescribed by the teacher, and neither the child nor the teacher knows the outcome at the activities' outset.

The key of using learning centers to increase the open-endedness of activities is to conveniently equip centers for independent use by children. Learning centers that are not conveniently equipped will limit the availability, accessibility, and variety of space, materials, and equipment. In the CLSL, although more than five centers were labeled, they were not organized for independent use by children (ex., containers were not open and labeled, shelves were over-crowed and insufficient, play space was far away from toy storage). In these centers, children's freedom to choose particular materials for use or particular toys to play was limited by the physical setting even though the center might be selected as a free choice. Learning centers can be set both indoor and outdoor. The teacher in the CLSH used outdoor centers to extend children's various learning opportunities from classroom to playground. The learning experiences provided by the playground were different from the ones provided by indoor environments. By using outdoor centers, the teacher in the CLSH generated more choices for children in terms of space, materials, and equipment that children could use for their play.

To increase the open-endedness of activities in learning centers, teachers should have a lot of warm, nurturing, and individualized social interaction with children. In the CLSL and CLSM, the teachers did not seem to enjoy being with the children, their responses to the children were not usually in a warm and supportive manner, and individualized conversations between them and the children were insufficient. On the contrary, the teacher of the CLSH was interacted

frequently with the children. She asked many open-ended questions in both group activities and individual conversations to inspire her students to think divergently and give multiple responses. She also valued and appreciated her students' effort and accomplishments. The atmosphere in her classroom was always pleasant: cheerful voices were often heard, and the children smiled frequently.

An effective utilization of learning centers needs flexibility in schedule, discipline, and rules. In an arts center, variation of the schedule should be made to meet the individual needs of children; for example, a time extension should be provided to a slow painter for him/her to finish at own pace, and a child working on project should be allowed to continue past scheduled time. Teachers should always be prepared to adjust their schedules, disciplines, and rules for each child's individual needs so that learning centers can be organized to promote active and child-centered learning. Using project approach is a good method for teachers to increase the flexibility of schedule, discipline, and rules. A project is defined by Katz and Chard (1989) as an in-depth study of a topic by an individual child, a group of children, or a whole class. By using project approach, teachers are able to provide children with opportunities to learn in own paces. Learning in own paces, children can focus on a topic and conduct in-depth studies. According to Kieff & Casbergue (2000), children's investigation in projects is usually voluntary and intrinsically motivated. When young children are voluntary and intrinsically motivated to conduct in-depth studies on a topic, they are very likely to engage in creative activities and make creative products. The teachers of the CLSL, CLSM, and CLSH all provided time extension to slow painters or children working on project, but none of them knew what project approach is. Professional training related to project approach can help them increase the flexibility of schedule, discipline, and rules naturally and easily.

REFERENCES

Amabile, T. M. (1982). Social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology, 43 (5),* 997-1013.

Amabile, T. M. (1983). Social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology, 45 (2),* 357-376.

Anderson, L. W., & Burns, R. B. (1989). *Research in classrooms: The study of teachers, teaching and instruction.* Oxford, England: Pergamon Press.

Aspelmeier, J. (2002). *Multiple comparison handout.* Retrieved April 6th, 2005, from http://www.radford.edu/~jaspelme/611/Multiple%20Comparisons%20Handout.doc

Barron, F. & Harrington, D. M. (1981). Creativity, intelligence, and responsibility. *Annual Review of Psychology, 32,* 439-476.

Bartz, W. (1982). *The role of foreign language education for the gifted and talented student.* Washington, DC: National Council of State Supervisors. (ERIC Document Reproduction Services No. ED 216515)

Baydar, N., & Brooks-Gunn, J. (1991). Effects of maternal employment and child-care arrangements on preschoolers' cognitive and behavioral outcomes: Evidence from the children of the National Longitudinal Survey of Youth. *Developmental Psychology, 27,* 932-945.

Beetlestone, F. (1998). *Creative children, imaginative teaching.* Philadelphia: Open University Press.

Boaler, J. (1998). Open and closed mathematics: Student experiences and understandings. *Journal of Research in Mathematics Education, 29(1),* 41-62.

Bredekamp, S. & Copple, C. (Ed.) (1997). *Developmentally appropriate practice in early childhood programs—Revised edition.* Washington, DC: National Association for the Education of Young Children.

Bryant, D., Maxwell, K., Burchinal, P., & Lowman, B. (1997). The effects of Smart Start on the quality of preschool child care. Report to the department of human resources. (ERIC Document Reproduction Services No. ED 423974).

Burchinal, M. R., Ramey, S. L., Reid, M. K., & Jaccard, J. (1995). Early child care experiences and their association with family and child characteristics during middle childhood. *Early Childhood Research Quarterly, 10,* 33-61.

Carton, H. A. (1980). *Contemporary art: Humanities thematic unit (An example unit for gifted students).* Doylestown, PA: Bucks Country Intermediate Unit 22.

Caughy, M. O., Dipietro, J. A., & Strobino, D. M. (1994). Day-care participation as a protective factor in the cognitive development of low-income children. *Child Development, 65,* 457-471.

Cecil, L. M., & Gray, M. M., Thornburg, K. R. and Ispa, J. (1985). Curiosity-exploration-play: the early childhood mosaic. *Early Childhood Development and Care, 19,* 199-217.

Church, E. (2002). When to challenge children. *Early Childhood Today, 16(5),* 32-39.

Clark, B (1988). Who are the gifted individuals. In B. Clark (Ed.), *Growing up gifted* (pp. 25-63). Columbus, OH: Merrill.

Cobb, E. (1977). *The ecology of imagination in childhood.* New York: Columbia University Press.

Cofman, J. (1983). Mathematical activities for motivated pupils. *Gifted Education International, 2,* 42-44.

Colburn, A. (2000). Constructivism: Science education's "Grand Unifying Theory". *Clearing House, 74(1),* 9-12.

Cordell, A., & Cannon, T. (1985). Gifted kids can't always spell. *Academic Therapy, 21*, 143-152.

Cooper, E. (1991). A critique of six measures for assessing creativity. *Journal of Creative Behavior, 25(3),* 194-204.

Costa, P. T. & McCrae, R. R. (1991). *Neo Five-Factor Inventory.* Odessa, FL: Psychological Assessment Resources.

Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* Upper Saddle River, NJ: Prentice Hall.

Cronk, B. C. (1999). *How to use SPSS: A step-by-step guide to analysis and interpretation.* Los Angeles, CA: Pyrczak Publishing.

Csikszentmihalyi, M. (1996). *Creativity: flow and the psychology of discovery and invention.* New York: Harper Collins.

Culkin, M., Morris, J., & Helburn, S. (1991). Quality and the true cost of child care. *Journal of Social Issues, 47(2),* 71-86.

Dacey, J. S. (1989). *Fundamentals of creative thinking*. Lexington, MA: D. C. Health.

Davis, G. A. (1989). Testing for creative potential. *Contemporary Educational Psychology, 14,* 257-274.

Davis, G. A. (1992). *Creativity is forever.* Dubuque, IA: Kendall Hunt Publishing Company.

DeCarvalho, R. J. (1991). *The founders of Humanistic psychology.* New York: Pager Publisher.

Diakidoy, I. N. & Spanoudis, G. (2002). Domain specificity in creativity testing: A comparison of performance on a general divergent-thinking test and a parallel, content-specific test. *Journal of Creative Behavior. 36 (1),* 41-61.

Drake, L. (1993). The necessity of error. *Journal of College Science Teaching, 23(2),* 113-116.

Dudek, S. (1974). Creativity in young children: Attitude or ability? *Journal of Creative Behavior, 8,* 282-292.

Feist, G. J. (1999). Autonomy and independence. *Encyclopedia of Creativity.* Vol. 1 (pp. 157-163). San Deiego, CA: Academic Press.

Feldman, D. H., Csikszentmihalyi, M. & Gardner, H. (1994). A framework for the study of creativity. In D. H. Feldman, M. Csikszentmihalyi & H. Gardner (Eds.), *Changing the world: A framework for the study of creativity*. Westport, CN: Praeger Publishers.

Fishkin, A. S. (1998). Issues in studying creativity in youth. In A. S. Fishkin, B. Cramond, & P. Olszewski-Kubilius (Eds.). *Investigating creativity in youth: Research and methods.* Cresskill, NJ: Hampton Press.

Gardner, H. (1993). *Frames of mind: The theory of multiple intelligences* (10th anniversary ed.). New York: Basic Books.

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century.* New York: Basic Books.

Goelman, H. & Pence, A. (1987). Effects of child care, family, and individual characteristics on children's language development: The Victoria day care research project. In D. Phillips (Ed.), *Quality in child care: What does the research tell us?* (pp. 89-104). Washington, DC: National Association for the Education of Young Children.

Gough, H. G. (1960). The Adjective Check List as a personality assessment research technique. *Psychological Reports, 6,* 107-122.

Gravetter, F. & Wallnau, L. (2000). *Statistics for the Behavioral Sciences.* Belmont, CA: Wadsworth.

Guilford, J. P. (1956). The structure of intellect. *Psychological Bulletin, 53,* 267-293.

Guilford, J. P. (1957). Creative abilities in the arts. *Psychological Review, 64,* 110-118.

Guilford, J. P. (1967). *The nature of human intelligence.* New York: McGraw-Hill.

Gulbenkian, C. (1982). *The Arts in School.* London: Calouste Gulbenkian Foundation.

Hadeed, J. & Sylva, K. (1995). Does quality make a difference in the preschool experience in Bahrain? Paper presented at the European Conference on the Quality of Early Childhood Education (5th, Paris, France, September 7-9, 1995). (ERIC Document Reproduction Services No. ED 394634).

Harlan, J. (1993). Yes we can: Overcoming obstacles to creativity. Paper presented at the Annual Meeting of the American Association on Mental Retardation (117th, Washington. DC, June 3, 1993). (ERIC Document Reproduction Services No. ED 360761).

Harms, T. & Clifford, R. M. (1983). Assessing preschool environments with the Early Childhood Environment Rating Scale. *Studies in Educational Evaluation, 8,* 261-269.

Harms, T., Clifford, M., & Cryer, C. (1998). *Early environment rating scale—Revised edition.* New York: Teachers College Press.

Haskell, M. (1994). *Using training as a means to improve the level of quality in child care facilities.* (ERIC Document Reproduction Services No. ED388429).

Hertzog, N. (1995). *Investigating the nature of open-ended activities.* Unpublished doctoral dissertation, University of Illinois, Champaign-Urbana.

Hertzog, N. (1997). Open-ended activities and their role in maintaining challenge. *Journal for the Education of the Gifted, 21*, 54-81.

Hocevar, D. (1981). Measurement of creativity: Review and critique. *Journal of Personality Assessment, 45,* 450-464.

Holden, C. (1987). Creativity and the troubled mind. *Psychology Today, 21(4),* 9-10.

Howes, C. & Hamilton, C. E. (1993). Child care for young children. In B. Spodek (Ed.), *Handbook of research on the education of young children* (pp. 322-336). New York: Macmillan.

Isaksen, S. G. (1987). Introduction: An orientation to the frontiers of creativity research. In S. G. Isaksen (Ed.), *Frontiers of creativity research: Beyond the basics* (pp. 1-26). Buffalo, NY: Bearly Limited.

Isaksen, S. G. (1992). *Nurturing creative talents: Lessons from industry about needed work-life skills.* Buffalo, NY: The Creative Solving Group.

Isenberg, J. P. & Jalongo, M. R. (2001). *Creative expression and play in early childhood* (3rd ed.). Upper Saddle River, New Jersey: Merrill Prentice Hall.

Kabiri, M. & Smith, N. (2003). Turning traditional textbook problems into open-ended problems. *Mathematics Teaching in the Middle School, 9(3),* 186-192.

Karrby, G. & Giota, J. (1994). Dimensions of quality in Swedish day care centers: An analysis of the Early Childhood Environment Rating Scale. *Early Child Development and Care, 104,* 1-22.

Katz, L. G. & Chard, S. (1989). *Engaging children's minds: The project approach.* Norwood, NJ: Ablex.

Kerr, B. & Gagliardi, C. (2003). *Measuring creativity in research and practice.* Retrieved March 3rd, 2004, from http://courses.ed.asu.edu/kerr/measuring_creativity.rtf

Khatena, J. (1982). Myth: Creativity is too difficult to measure! *Gifted Child Quarterly, 26,* 21-23.

Kieff, J. & Casbergue, R. (2000). *Playful learning and teaching.* Needham Heights, MA: Allyn & Bacon.

King, B. J. & Pope, B. (1999). Creativity as a factor in psychological assessment and healthy psychological functioning. *Journal of Personality Assessment, 72,* 200-207.

Kirschenbaum, H. (1979). *On becoming Carl Rogers: The life and work of America's distinguished psychologist, educator and author of On Becoming a Person.* New York: Delacorte Press.

Kohn, A. (1993). Choices for children. *Phi Delta Kappan, 75(1),* 8-20.

Kwan, C. & Sylva, K.(1996). Effects of day care environment in Singapore. Paper presented at the Biennial Meetings of the International Society for the Study of Behavioral Development (14th, Quebec City, Quebec, Canada, August 12-16, 1996). (ERIC Document Reproduction Services No. ED 400109).

Maker, C. J. (1982a). *Curriculum development for the gifted.* Rockville, MD: Aspen System Corporation.

Maker, C. J. (1982b). The curriculum for gifted students. In C. J. Maker (Ed.), *Teaching models in education of the gifted* (pp. 3-8). Austin, TX: Pro-Ed.

Maslow, A. H. (1970). *Motivation and personality* (2nd ed.). New York: Harper & Row, Publishers, Inc.

Maslow, A. H. (1971). *The father reaches of human nature.* Harmondsworth, England: Penguin.

Maslow, A. H. (1982). *Toward a psychology of being* (2nd ed.), New York: Van Nostrand Reinhold.

McCartney, K., Scarr, S., Phillips, D., Grajek, S., & Schwarz, C. (1982). Environmental differences among day care centers and their effects on children's development. In E. G. Zigler & E. W. Gordon (Eds.), *Day care: Scientific and social policy issues.* Boston: Auburn House.

Meador, K. S. (1992). Emerging rainbows: A review of the literature on creativity. *Journal for the Education of the Gifted, 15(2),* 163-181.

Mellou, E. (1996). The two-conditions view of creativity. *Journal of Creative Behavior, 30(2),* 126-143.

Moran, J. D., Milgram, R., Sawyers, J. K., & Fu, V. R. (1983). Original thinking in preschool children. *Child Development, 54,* 921-926.

Murdock, M. C. & Puccio, G. J. (1993). A contextual organizer for conducting creativity research. In S. G. Isaksen, M. C. Murdock, R. L. Firestein & D. J. Treffinger (Eds.), *Understanding and recognizing creativity: The emergence of a discipline,* (pp. 249-280). Norwood, NJ: Ablex.

Nabuco, M. & Sylva, K. (1995). Comparisons between ECERS ratings of individual pre-school centers and the results of target child observations: Do they match or do they differ? Paper presented at the European Conference on the Quality of Early Childhood Education (5th, Paris, France, September 7-9, 1995). (ERIC Document Reproduction Services No. ED 393541).

Norwood, G. (1996). *Maslow's Hierarchy of Needs*. Retrieved August 1st, 2004, from http://www.connect.net/georgen/maslow.htm

Ogefelt, A. D. (1995). The ECERS as a base for research and development of quality in day care centers in Sweden. Paper presented at the European Conference on the Quality of Early Childhood Education (5th, Paris, France, September 7-9, 1995). (ERIC Document Reproduction Services No. ED 395654).

Olwig, K. R. (1991). Childhood, artistic creation, and the educated sense of place. *Children's Environments Quarterly, 8(2),* 4-18.

Parkhurst, H. B. (1999). Confusion, lack of consensus, and the definition of creativity as a construct. *Journal of Creative Behavior, 33,* 1-21.

Parnes, S. (1963). Creativity. In C. W. Taylor & T. Barron (Eds.), *The identification of creativity and scientific talent* (pp. 225-255). New York: John Wiley.

Phillips, D. (Ed.). (1987). *Quality in child care: What does the research tell us?* Washington, DC: National Association for the Education of Young Children.

Pickard, E. (1990). Toward a theory of creative potential. *The Journal of Creative Behavior, 24(1),* 1-9.

Pollack, H. L. (1988). Questioning strategies to encourage critical thinking. *Insights into Open Education, 21,* 3-8.

Popham, W. J. (1993). *Educational evaluation* (3rd. ed.). Needham Heights, MA: Allyn and Bacon.

Prentice, R. (2000). Creativity: A reaffirmation of its place in early childhood education. *The Curriculum journal, 11(2),* 145-158.

Qualifications and Curriculum Authority (1999). *Early learning goals.* London: QCA

Renzulli, J. (1986). The three-ring conception of giftedness. In J. Renzulli & S. Reis (eds.), *The triad reader* (pp. 2 - 19). Mansfield Center, CT: Creative Learning Press.

Renzulli, J. S. (1985). Review of Thinking Creatively in Action and Movement by Joseph S. Renzulli. In Mitchell, J.V. (Ed.), *09 Mental Measurements Yearbook* (pp. 1290). Lincoln, NE: Buros Institute.

Rhodes, M. (1961). An analysis of creativity. *Phi Delta Kappan, 42*, 305-310.

Rhodes, M. (1987). An analysis of creativity. In S. G. Isaksen (Ed.), *Frontiers of creativity research: Beyond the basics* (pp. 216-222). Buffalo, NY: Bearly Limited.

Robinson Report. Great Britain. Department for Education and Employment. Department for Culture. Media and Sport. National Advisory Committee on Creative and Cultural Education (1999). *All our futures: Creativity, culture & education.* London: DfEE.

Rogers, C. (1961). *On becoming a person: A distinguished guide to personal growth and creativity.* Boston: Houghton Mifflin Company.

Rogers, C. (1969). *Freedom to learn.* Columbus, Ohio: Merrill Publishing Company.

Rossbach, H. G. (1990). Assessing the quality of kindergarten environments with the Early Childhood Environment Rating Scale. In J. Pieters, K. Breuer, & P. Simons (Eds.), *Learning environments: Contributions from Dutch and German research* (pp. 77-90). Berlin, Germany: Springer.

Royce, J. R. & Mos, L. P. (Eds.) (1981). *Humanistic psychology: Concepts and criticisms.* New York: Plenum Press.

Runco, M. A. (1991). *Divergent thinking.* Norwood, NJ: Ablex Press.

Runco, M. A. (1999). Divergent thinking. *In Encyclopedia of Creativity,* Vol. (1) (pp. 577-582). San Diego, CA: Academic Press.

Runco, M. A., Nemiro, J., & Walberg, H. J. (1998). Personal explicit theories of creativity. *The Journal of Creative Behavior, 32(1),* 2-17.

Saracho, O. N. (2002). Young children's creativity and pretend play. *Early Child Development and Care, 172(5),* 41-438.

School Curriculum and Assessment Authority (1997). *Looking at children's learning: Desirable outcomes for children's learning on entering compulsory education.* London: SCAA.

Sheridan, S. (1995). Application of quality ratings in pre-schools in community developmental work: The Lerum competence development project. Paper presented at the European Conference on the Quality of Early Childhood Education (5th, Paris, France, September 7-9, 1995). (ERIC Document Reproduction Services No. ED 392527).

Simonton, D. (1988). Creativity, ledership, and chance. In R. Sternberg (Ed.), *The nature of creativity* (pp. 386-426). New York: Cambridge University Press.

Stark, R. (1987). *Creative ventures: Ancient Civilizations.* (ERIC Document Reproduction Services No. ED 408208).

Sternberg, R. (1991) A triarchic view of giftedness. In N. Collangelo & G. Davis (Eds.), *Handbook of gifted education* (pp. 27 - 42). Boston: Allyn & Bacon.

Sternberg, R. J. (1988). A three-facet model of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 125-147). Cambridge, England: Cambridge University Press.

Tannenbaum, A. (1991). The meaning and making of giftedness. In N. Collangelo and G. Davis (Eds). *Handbook of gifted education*. Boston: Allyn & Bacon (pp. 27 - 42.)

Tegano, D. & Moran, J. D. (1989). Developmental study of the effects of dimensionality and presentation mode on original thinking of young children. *Perceptual and Motor Skills, 68,* 1275-1281.

Tegano, D. W., Moran, J. D., & Sawyer, J. K. (1991). *Creativity in early childhood classrooms.* NEA (National Education Association) Early Childhood Education Series.

Tietze, W., Cryer, D., Bairrao, J., Palacios, J., & Wetzel, G. (1996). Comparisons of observed process quality in early child care and education in five countries. *Early Childhood Research Quarterly, 11(4),* 447-475.

Torrance, E. (1981). *Thinking creatively in action and movement.* Bensenville, IL: Scholastic Testing Service, Inc.

Torrance, E. P. & Myers, R. E. (1970). *Creative learning and teaching.* New York: Harper and Row.

Torrance, E. P. (1965). *Rewarding creative behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Torrance, E. P. (1966). *The Torrance Tests of Creative Thinking - Norms-Technical Manual Research Edition - Verbal Tests, Forms A and B - Figural Tests, Forms A and B.* Princeton NJ: Personnel Press.

Torrance, E. P. (1977). *Creativity in the classroom.* Washington D. C.: National Education Association Publication.

Torrance, E. P. (1987). Teaching for creativity. In S. G. Isaksen (Ed.), *Frontiers of creativity research: Beyond the basis* (pp. 189-215). Buffalo, NY: Bearly Limited.

Triffinger, D. J., Renzulli, J. S., & Feldhusen, J. F. (1971). Problems in the assessment of creative thinking. *The Journal of Creative Behavior, 5 (2),* 104-112.

Vandell, D. L., & Corasaniti, M. A. (1990). Child care and the family: Complex contributors to child development. In K. McCartney (Ed.), *Child care and maternal employment: New directions in child development.* San Francisco: Jossey-Bass.

Vygotsky, L. (1966). Play and its role in the mental development of the child. *Voprosy psikhologii, 6.* Retrieved April 3rd, 2003, from http://www.marxists.org/archive/vygotsky/works/1933/play.htm

Wallach, M. A. (1970). Creativity. In P. H. Mussen (Ed.), *Carmichael's manual of child psychology,* Vol. 1 (pp. 1211).New York: Wiley Inc.

Wallas, G. (1926). *The art of thought.* London: C. A. Watts.

Whitebook, M., Howes, C., & Phillips, D. (1990). *Who cares? Child care teachers and the quality of care in America: Final report, National Child Care Staffing Study.* Oakland, CA: Child Care Employee Project.

Wilson, R. A. (1996). The earth—A "value of soul making." *Early Childhood Education Journal, 23(3),* 169-171.

Woodbury, V. G. (1979). *Humanities thematic units: Four examples units for gifted students in Grade 6.* Doylestown, PA: Bucks Country Intermediate Unit 22.

Zavitkovsky, D. (2001). Docia Zavitkovsky on creativity and young Children (An interview). *Early Childhood Today, 15 (5),* 41.

APPENDICES

Appendix A

Open-endedness of Activities Rating Scale (OARS)

OPEN-ENDEDNESS OF ACTIVITIES RATING SCALE (OARS)

Modified from the Early Childhood Environment Rating Scale—Revised (Harms, Richard, & Cryer, 1998)

GENERAL PHYSICAL ENVIRONMENT

1. Indoor space

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Insufficient indoor space for children,* adults, and furnishings. 1.2 Space lacks adequate lighting, ventilation, temperature control, or sound-absorbing materials. 1.3 Space in poor repair (Ex. peeling paint on walls and ceiling; rough, damaged floors). 1.4 Space poorly maintained (Ex. floors left sticky or dirty; trash cans overflowing).	3.1 Sufficient indoor space for children, adults, and furnishings. 3.2 Adequate lighting, ventilation, temperature control**, and sound-absorbing materials. 3.3 Space in good repair. 3.4 Space reasonably clean*** and well maintained.	5.1 Ample indoor space that allows children and adults to move around freely (Ex. furnishings do not limit children's movement). 5.2 Natural light can be controlled (Ex. adjustable blinds or curtains). 5.3 Ventilation can be controlled**** (Ex. windows can open; ventilating fan used by staff).	7.1 Integrated indoor and outdoor space (Ex. free flow of play).

Notes for Clarification

*Base space needs on largest number of children attending at one time.

**Temperature control means air conditioning in summer and heating system in winter.

***It is expected that there will be some messiness from the regular activities of the day. "Reasonably clean" means that there is evidence of daily maintenance, such as floors being swept and mopped, and those big messes, such as a juice spill, are cleaned up promptly.

****Doors to outside count as ventilation control only if they can be left open without posing a safety threat (for example, if they have a locking screen door or safety gate to keep children from leaving the room unattended).

2. Furniture for routine play and learning

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Insufficient basic furniture* for routine play and learning (Ex. not enough chairs for all children to use at the same time; very few open shelves for toys). 1.2 Furniture is generally in such poor repair that children could be injured (Ex. splinters or exposed nails, wobbly legs on chairs).	3.1 Sufficient furniture for routine play and learning. 3.2 Most furniture is sturdy and in good repair.	5.1 Most furniture is child-size** to encourage children's self-help. 5.2 All furniture is sturdy and in good repair.	7.1 Sand/water table, or easel used.

Notes for Clarification

* Basic furniture: tables and chairs used for activities; low open shelves for play/learning materials. To be given credit for low open shelves, they must be used for toys and materials that children can reach by themselves.

**Since children are different sizes at different ages, the intent here is that furniture should be the right size for a 6- or 7- year old, but not small enough for a 2- or 3- year-old. For chairs to be considered child-size, the children's feet must rest on the floor when seated. Table height should allow children's knees to fit under the table and elbows to be above the table.

3. Room arrangement for play

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 No interest centers* defined.	3.1 At least three interest centers defined. 3.2 Sufficient space for several activities to go on at once (Ex. floor space for blocks, table space for manipulatives, easel for art.)	5.1 At least five interest centers defined and conveniently equipped (Ex. water provided near art area; shelving adequate for blocks and manipulatives). 5.2 Quiet and active centers placed to not to interfere with one another (Ex. reading or listening area separated from blocks or housekeeping). 5.3 Space is arranged so most activities are not interrupted (Ex. shelves placed so children walk around, not through, activities; placement of furniture discourages rough play or running).	7.1 At least seven different interest centers provide a variety of learning experiences. 7.2 Centers are organized for independent use by children (Ex. labeled open shelves; labeled containers for toys; open shelves are not over-crowed; play space near toy storage). 7.3 Additional materials available to add to or change centers.

Note for Clarification

*An interest center is an area where materials, organized by type, are stored so that they are accessible to children, and appropriately furnished play space is provided for children to participate in a particular kind of play. Examples of interest centers are art activities, blocks, dramatic play, music/movement, reading and writing, nature/science, math/number, and manipulative/fine motor.

Question

(7.3) Are there any additional materials available that you add to the interest centers?

4. Space for gross motor play*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 No outdoor or indoor space for gross motor/physical play. 1.2 Gross motor space is very dangerous (Ex. access requires long walk on busy street; same space used for play and parking lot; unfenced area for preschoolers).	3.1 Some space outdoors or indoors used for gross motor/physical play. 3.2 Gross motor space is generally safe** (Ex. sufficient cushioning under climbing equipment; fenced in outdoor area).	5.1 Adequate space outdoors and some space indoors.*** 5.2 Space is easily accessible for children in group (Ex. on same level and near classroom). 5.3 Space is organized so that different types of activities do not interfere with one another (Ex. play with wheel toys separated from climbing equipment and ball play).	7.1 Outdoor gross motor space has a variety of surfaces permitting different types of play (Ex. sand, black top, wood chips; grass). 7.2 Outdoor area has some protection from the elements (Ex. shade in summer, sun in winter, wind break, good drainage). 7.3 Space has convenient features (Ex. close to toilets and drinking water, accessible storage for equipment; class has direct access to outdoor).

Notes for Clarification

*In assessing space for gross motor play, include both outdoor and indoor areas, except where only one is specified in an indicator. All areas regularly available for gross motor play should be considered, even if children are not observed in the area.

**Although no gross motor area that challenges children can ever be completely safe, the intent of this indicator is that the major causes of serious injury are minimized, such as injury from falls, entrapment, pinching of body parts, and protrusions from equipment.

***For a rating of 5, space must be adequate for the size of the group using the area. Find out if class groups rotate or if several groups use the space at the same time. Some indoor space must be available for use for gross motor play, especially in bad weather. This space may usually be used for other activities. When required by environmental conditions (Ex. extreme weather or pollution; dangerous social conditions), facilities may be given a 5 if there have adequate space indoors and some space outdoors.

Questions

(5.1) Is there any indoor space that you use for gross motor play, especially in bad weather?

GENERAL PSYCHOLOGICAL ENVIRONMENT

5. Staff-child interactions*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Staff members are not responsive to or not involved with children (Ex. ignore children, staff seem distant or cold). 1.2 Most interactions are unpleasant (Ex. voices sound strained and irritable). 1.3 Physical contact used principally for control (Ex. hurrying children along).	3.1 Staff usually respond to children in a warm, supportive manner (Ex. staff and children seem relaxed, voices cheerful, frequently smiling). 3.2 Few, if any, unpleasant interactions.	5.1 Staff show warmth through appropriate physical contact (Ex. pat children on the back, return child's hug). 5.2 Staff show respect for children through listening attentively, making eye contact, treating children fairly, or not discriminating. 5.3 Staff respond empathetically to help children who are upset, hurt, or angry.	7.1 Staff seem to enjoy being with the children.

Note for Clarification

*While the indicators for quality in this item generally hold true across a diversity of cultures and individuals, the ways in which they are expressed may differ. For example, direct eye contact in some cultures is a sign of respect; in others, a sign of disrespect. Similarly, some individuals are more likely to smile and be demonstrative than others. However, the requirements of the indicators must be met, although there can be some variation in the way this is done.

6. Informal use of language*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Staff talk to children only to control their behavior and manage routines. 1.2 Staff rarely respond to children's talk. 1.3 Children's talk is discouraged much of the day.	3.1 Some staff-child conversation** (Ex. ask "yes/no" or short answer questions; give short answers to children's questions). 3.2 Children allowed to talk much of the day.	5.1 Many staff-child conversations during free play and routines. 5.2 Staff add information to expand on ideas presented by children.*** 5.3 Language is primarily used by staff to exchange information with children and for social interaction. 5.4 Staff encourage communication among children (remind children to listen to one another).	7.1 Staff have individual conversations with most of the children.*** 7.2 Children are asked open-ended questions**** to encourage them to give longer and more complex answers.*** (young children is asked "what" or "where" questions; older child is asked "why" or "how" questions). 7.3 Opportunities provided for children to interact with other classes, either same age or older/younger.

Note for Clarification

*When multiple staff are working with the children, base the score for this item on the overall impact of the staff's communication with the children. The intent of this item is that children's need for language stimulation is met.

**In order to be given credit for "conversation", there should be some mutual listening and talking/responding from both the staff and child. This is different from one-way communication such as giving directions or commands. For children with less verbal ability, the response may not be in words but many involve gestures, sign language, or communication devices.

***To give credit for these indicators several instances must be observed.

*****Open-ended questions refer to the questions with no single right answer.

7. General supervision of children (other than gross motor) and disciplines

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Most supervision is punitive or overly controlling (Ex. yelling, belittling child, constant "No's). 1.2 Children are controlled with severe methods (Ex. spanking, shouting, confining children for long periods, or withholding food). 1.3 Expectations for behavior are largely inappropriate for age and developmental level of children (Ex. everyone must be quiet at meals; children must wait quietly for long periods of time).	3.1 Most supervision is non punitive, and control is exercised in a reasonable way. 3.2 Staff do not use physical punishment or severe methods. 3.3 Expectations for behavior are largely appropriate for age and developmental level of children.	5.1 Staff assist children and give them encouragement for their independent behaviors when needed (Ex. help children lift a heavy storage box; refer children to relevant reference books when they are solving a problem) 5.2 Staff show appreciation of children's efforts and accomplishments. 5.3 Staff use non-punitive discipline methods effectively (Ex. giving attention for positive behaviors; redirecting child from unacceptable to acceptable activity).	7.1 Staff talk with children about ideas related to their play (Ex. ask them to talk about what they are doing), asking open-ended questions to extend children's thinking. 7.2 A balance is maintained between the child's need to explore independently and staff input into learning (Ex. child allowed to complete painting before being asked to talk about it; child allowed to discover that her block building is unbalanced when it falls). 7.3 Staff actively involve children in solving their conflicts and problems (Ex. help children talk out problems and think of solutions; sensitize children to feelings of others).

Questions

(1.2) Do you ever find it necessary to use strict discipline? Please describe the methods you use?

(7.3) What do you do if children have conflicts and problems?

8. Schedule

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Schedule is too rigid, leaving no time for individual interests. 1.2 No alternative activity is allowed while TV is being used (Ex. all children must watch video program at same time). ***NA permitted***	3.1 Free play occurs at least once daily indoors and outdoors, weather permitting). 3.2 Both gross motor and less active play occur daily. 3.3 Alternative activities accessible while TV is being used. ***NA permitted***	5.1 Free play occurs for a substantial portion of the day both indoors and outdoors (Ex. several free play periods scheduled daily) 5.2 A variety of play activities occur each day, some teacher directed and some child initiated.	7.1 Variations made in schedule to meet individual needs (Ex. shorter story time for child with short attention span; child working on project allowed to continue past scheduled time, slow painter may finish at own pace).

Question

(1.2) & (3.3) Do you use TV in the classroom? If you do, are other activities available to children while TV is used?

9. Group time

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Children kept together as whole group most of the day (Ex. all do same art project, have story read to them, listen to records, use bathroom at the same time). 1.2 Very few opportunities for staff to interact with individual children or small groups.	3.1 Some play activities done in small groups* or individually. 3.2 Some opportunity for children to be part of self-selected small groups.	5.1 Whole-group gatherings** limited to short periods, suited to age and individual needs of children. 5.2 Many play activities done in small groups or individually. 5.3 Some routines done in small groups or individually.	7.1 Different groupings provide a change of pace throughout the day. 7.2 Staff engage in educational interaction with small groups and individual children as well as with the whole group (Ex. read story, help small group with cooking or science activity). 7.3 Many opportunities for children to be a part of self-selected small groups.

Note for Clarification

* The definition of small groups may change with the age and individual needs of the children. For typically developing 2- and 3-year-olds, a suitable small group might be three-to-five children, whereas for 4- and 5-year-olds, five-to-eight children might be manageable.

** Whole-group gatherings may not be suitable for children under 3.5 years of age or some children with special needs. If this is the case, no group gatherings are required for a 5, and credit should be given for this indicator. One way to determine whether the whole-group gathering is suitable is whether the children remain interested and involved.

10. Fine motor

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Very few developmentally appropriate fine motor materials accessible for children's daily use. 1.2 Fine motor materials generally in poor repair or incomplete (Ex. puzzles have missing pieces, few pegs for pegboard).	3.1 Some developmentally appropriate fine motor materials of each type* accessible for children. 3.2 Most of the materials are in good repair and complete. 3.3 Materials are well organized (Ex. pegs and pegboards stored together, building toy sets stored separately).	5.1 Many developmentally appropriate fine motor materials of each type accessible for children for a substantial portion of the day. 5.2 Materials on different levels of difficulty (Ex. both regular and knobbed puzzles for children with varying fine motor skills) or of different sizes (Ex. small, medium, and large plastic animals) accessible for children.	7.1 Materials rotated to maintain children's interest (Ex. materials that are no longer of interest put away, different materials brought out). 7.2 Containers and accessible storage shelves have labels to encourage children's self-help (Ex. pictures or shapes used as labels on containers and shelves; word labels added for older children).

Note for Clarification

*There are several different types of fine motor materials, including small building toys such as interlocking blocks and Lincoln logs; plastic animals that are from farm or wild; art materials such as crayons and scissors; manipulatives such as beads of different sizes for stringing, pegs and pegboards, sewing cards; and puzzles.

Questions

(5.1) When are the manipulatives and other fine motor materials accessible for children to use?

(7.1) Do you use any other fine motor materials with children? How is this handled?

11. Gross motor

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Very little gross motor equipment* accessible for children. 1.2 Equipment is generally in poor repair. 1.3 Most of the equipment is not appropriate for the age and ability of the children (Ex. 6-foot tall open slide for preschoolers; adult-sized basketball hoop). 1.4 Most supervision is negative (Ex. staff seem angry; punitive and overly controlling atmosphere).	3.1 Some gross motor equipment accessible to all children for at least one hour daily.** 3.2 Equipment is generally in good repair. 3.3 Most of the equipment is appropriate for the age and ability of the children. 3.4 Some positive supervision (Ex. comfort child who is upset or hurt; show appreciation of new skill; pleasant tone of voice).	5.1 There is enough gross motor equipment so that children have access without a long wait. 5.2 Equipment stimulates a variety of skills (Ex. balancing, climbing, ball play, steering and pedaling wheel toys). 5.3 Most supervision is pleasant and helpful.	7.1 Both stationary and portable gross motor equipment are used. 7.2 Gross motor equipment stimulates skills on different levels (Ex. tricycles with and without pedals; different sizes of balls; both ramp and ladder access to climbing structure). 7.3 Staff talk with children about ideas related to their play (ask children to talk about what they are playing). 7.4 Staff help with resources to enhance play (Ex. help set up obstacle course for tricycles).

Note for Clarification

* Examples of gross motor equipment: stationary equipment such as swings, slides, climbing equipment, overhead ladders; portable equipment such as balls and sports equipment, wheel toys, tumbling mats, jump ropes, bean bags, and ring toss game. When rating gross motor equipment, consider equipment both indoors and outdoors.

**For programs of 4 hours or less, at least half an hour of access is required.

Question

(7.4) What happens when children have difficulty using equipment?

12. Nature/science*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 No games, materials, or activities for nature/science accessible for children.	3.1 Some developmentally appropriate** games, materials, or activities from two nature/science categories accessible for children. 3.2 Materials accessible for children daily. 3.3 Children allowed to bring in natural things to share with others or add to collections (Ex. bring fall leaves in from playground; bring in pet if there is no allergy issue).	5.1 Many developmentally appropriate games, materials, and activities from three categories accessible for children. 5.2 Materials accessible for children for a substantial portion of the day. 5.3 Nature/science materials are well organized and in good condition (Ex. collections stored in separate containers, animals' cages clean). 5.4 Everyday events used as a basis for learning about nature/science (Ex. talking about the weather, observing insects or birds, discussing the change of seasons, blowing bubbles or flying kites on a windy day, watching snow melt and freeze).	7.1 Nature/science activities requiring more input from staff are offered at least once every 2 weeks (Ex. cooking, simple experiments like measuring rainfall, field trips). 7.2 Books pictures, and/or audio/visual materials used to add information and extend children's hands-on experiences.

Notes for Clarification

*Nature/science includes categories of materials such as collections of natural objects (e.g., rocks, insects, seed pods), living things to care for and observe (e.g., house plants, gardens, pets), nature/science books, games, or toys (E.g. nature matching cards, nature sequence cards), and nature/science activities such as cooking and simple experiments (E.g., with magnets, magnifying glasses, sink-and-float).

**Open-ended nature/science materials that children can explore in their own way are usually developmentally appropriate for a wide range of ages and abilities. Materials that require skills beyond the ability of individual children or that do not challenge children sufficiently are not developmentally appropriate. For example, having children fill in the height of the red line in a thermometer to tell hot from cold may be appropriate for kindergarteners but not for a 2-year-olds.

Questions

(3.3) Do children bring in nature or science things to share? How do you handle this?

(7.1) Can you give me some examples of nature/science activities you do with the children in addition to what I've seen? About how often are these activities done?

(7.2) Do you use nature/science books or audio/visual materials with the children? Please describe.

13. Math/number*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Math/number taught primarily through rote counting or worksheets.	3.1 Some developmentally appropriate* math/number materials accessible for children**. 3.2 Materials accessible for children daily.	5.1 Many developmentally appropriate materials of various types accessible (Ex. materials for counting, measuring, learning shape and size) for children. 5.2 Materials are accessible for children for a substantial portion of the day. 5.3 Materials are well organized and in good condition (Ex. sorted by type, all pieces needed for games stored together. 5.4 Daily activities used to promote math/number learning (Ex. setting table, counting while climbing steps, using timers to take turns).	7.1 Math/number activities requiring more input from staff are offered at least every 2 weeks (Ex. making a chart to compare children's height, counting and recording number of birds at bird feeder). 7.2 Materials are rotated to maintain interest (Ex. teddy bear counters replaced by dinosaur counters, different objects to weight).

Notes for Clarification

* Developmentally appropriate math/number materials allow children to use concrete objects to experiment with quantity, size, and shape as they develop the concepts they need for the more abstract tasks required in later school, such as adding, subtracting, and completing paper and pencil math problems. Whether a material or activity is appropriate is based on the abilities and interests of the children. An occasional math worksheet offered to kindergartners who have many other concrete materials to manipulate may be developmentally appropriate for them, but not for a 2- and 3-year-olds.

**Materials for math/number help children to experience counting, measuring, comparing quantities, and recognizing shapes, and to become familiar with written numbers. Examples of math/number materials are small objects to count, balance scales, rulers, number puzzles, magnetic numbers, number games such as dominoes or number lotto, and geometric shapes such as parquetry blocks.

Questions

(1.1) How do you teach math/numbers?

(7.1) Could you give me some examples of math activities you do with the children in addition to what I've seen?

(7.2) Are there any other math materials used with the children? How is this handled?

14. Visual arts*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Visual art activities are rarely available to the children. 1.2 No individual expression** permitted in visual art activities (Ex. coloring work sheets; teacher-directed projects where children are asked to copy an example.	3.1 Some visual art materials*** accessible for children for at least 1 hour a day. 3.2 Individual expression permitted with visual art materials (Ex. children allowed to decorate pre-cut shapes in their own way; in addition to teacher-directed projects, some individualized work is permitted).	5.1 Many and varied art materials accessible for children a substantial portion of the day. 5.2 Much individual expression permitted in use of art materials (Ex. projects that follow an example are rarely used; children's work is varied and individual). 5.3 Individualized children's work**** displayed on child's eye level.	7.1 Three-dimensional art materials included at least monthly (Ex. clay, play dough, wood gluing, carpentry). 7.2 Children are encouraged to relate visual art activities to other classroom experiences (Ex. paints in fall colors when learning about seasons; children invited to do picture following field trip). 7.3 Provisions made for children four and older to extend art activity over several days (Ex. project stored so work can continue; work on multi step projects encouraged). ***NA permitted.***

Note for Clarification

* Art work, such as painting, photography, or sculpture, that appeals primarily to the visual sense and typically exists in permanent form.

**"Individual expression" means that each child may select the subject matter and/or art medium, and carry out the work in his or her own way. A number of paintings, each of which is different because the children have not been asked to imitate a model or assigned a subject to paint, is considered "individual expression".

***Examples of visual art materials: drawing materials such as paper, crayons, nontoxic felt pens, thick pencils; paints; three-dimensional materials such as play dough, clay, wood gluing, or carpentry; collage materials; tools such as safe scissors, stapler, hole punches, tape dispensers.

****Individualized work means that each child has selected the subject and/or media and has carried out the work in his or her own creative way. Thus, individualized products look quite different from one another. Projects where children follow a teacher's example and little creativity is allowed are not considered individualized work.

Questions

(7.1) Are three-dimensional art materials such as clay or wood for gluing, ever used? If so, how often?

(7.2) Are visual arts integrated with other subject areas of curriculum?

(7.3) Do you offer art activities that children can work on over several days? Please describe some examples.

15. Blocks*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Few blocks are accessible for children's play.	3.1 Enough blocks and accessories** are accessible for at least two children to build independent structures at the same time. 3.2 Some clear floor space designated for block play when portable container is brought out. 3.3 Blocks and accessories are accessible for children for daily use. 3.4 Blocks and accessories are organized according to type.	5.1 Enough space, blocks, and accessories are accessible for three or more children to build at the same time. 5.2 Special block area set aside out of traffic, with storage and suitable building surface (Ex. flat rug or other steady surface). 5.3 Block area accessible for children for a substantial portion of the day.	7.1 At least two types of blocks and a variety of accessories accessible daily (Ex. large and small; homemade and commercial) for children. 7.2 Blocks and accessories are stored on open, labeled shelves (Ex. labeled with picture or outline of blocks) to encourage children's self-help. 7.3 Some block play available outdoors. 7.4 Children are allowed to relate block activities to other classroom experiences (Ex. Building house for a character just read about in a book).

Notes for Clarification

*Blocks are materials suitable for building sizable structures. Type of blocks are unit blocks (wooden or plastic, including shapes such as rectangles, squares, triangles, and cylinders); large hollow blocks (wooden, plastic, or cardboard); homemade blocks (materials such as food boxes and plastic containers). Note that small blocks, including interlocking blocks such as Lego, are considered under Fine Motor, item 11.

**Accessories enrich block play. Examples are toy people, animals, vehicles, and road signs.

Questions

(3.3) & (5.3) How often is block play available? About how long are the blocks available for play?

(7.3) Do the children play with blocks outdoors?

(7.4) Are block activities integrated with other subject areas of curriculum?

16. Music/movement*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 No music/movement experiences accessible for children. 1.2 Loud background music is on much of the day and interferes with ongoing activities (Ex. constant background music makes conversation in normal tones difficult; music raises noise level).	3.1 Some music materials accessible for children's use (Ex. simple instruments, music toys; tape player with tapes). 3.2 At least one music activity available for children daily. 3.3 Some movement/dance activity available for children at least weekly.	5.1 Many music/movement materials accessible for children's use (Ex. music center with instruments, tape player, dance props). 5.2 Various types of music are used with the children (Ex. classical and popular music; music characteristic of different cultures; some songs sung in different languages). 5.3 Some music/movement activity accessible for children as free choice.	7.1 Music/movement materials rotated to maintain interest and variety. 7.2 Creativity is encouraged with music/movement activities (Ex. children asked to make up new words to songs; children asked to make musical instruments; individual dance encouraged).

Note for Clarification

*Examples of music activities are singing songs in small or large groups; soft music put on at nap time, playing music for dancing. Examples of movement activities are marching or moving to music; acting out movements to songs or rhymes; dancing to music.

Questions

(3.2) & (3.3) How often do the children do music/movement activity?

(5.2) What kinds of music do you use with the children?

(7.1) Are there any other music/movement materials available for children's use? How is it handled?

(7.2) Are there any opportunities for children to do music/movement activities in their own way?

17. Dramatic play*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 No materials or equipment accessible for children for dress up or dramatic play.	3.1 Some dramatic materials and furniture accessible, so children can act out family roles themselves (Ex. dress-up clothes, housekeeping props, dolls). 3.2 Materials are accessible for children for at least 1 hour daily. 3.3 Separate storage for dramatic materials.	5.1 Many dramatic play materials accessible for children, including dress-up clothes.** 5.2 Materials accessible for children for a substantial portion of the day. 5.3 Props for at least two different themes accessible for children daily (Ex. housekeeping and work). 5.4 Dramatic play area clearly defined, with space to play and organized storage.	7.1 Materials rotated for a variety of themes (Ex. prop boxes for work, fantasy, and leisure themes). 7.2 Props provided to represent diversity (Ex. props representing various cultures and people's abilities). 7.3 Props provided for active dramatic play outdoors.*** 7.4 Pictures, stories, and trips used to enrich dramatic play.

Note for Clarification

*Dramatic play is pretending or make-believe. This type of play occurs when children act out roles themselves and when they manipulate figures such as small toy people in a small doll house. Dramatic play is enhanced by props that encourage a variety of themes including housekeeping (Ex. dolls, child-sized furniture, dress-up, kitchen utensils); different kinds of work (Ex. office, construction, farm, store, fire fighting, transportation); fantasy (Ex. animals, dinosaurs, storybook characters); and leisure (Ex. camping, sports).

**Dress-up clothes should include more than the high-heeled shoes, dresses, purses, and women's hats commonly found in a playhouse area. Clothing worn by both men and women at work such as hard hats, transportation worker caps, and cowboy hats, as well as running shoes, clip-on ties, and jackets should be included.

***The intent of this indicator is that children are provided a large enough space when needed so that their dramatic play can be very active and noisy without disrupting other activities. A large indoor space such as a gymnasium or multi-purpose room may be substituted for the outdoor space. Structures (such as small houses, cars, or boats) and props for camping, cooking, work, transportation, or dress-up clothes may be available to the children.

Questions

(7.1) Are there any other dramatic play props children can choose to use? Please describe them.

(7.3) Can props for dramatic play ever be used outside or in larger indoor space?

(7.4) Is there anything used to extend children's dramatic play?

18. Literacy development

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Very few books accessible for children. 1.2 Staff rarely read books to children (Ex. no daily story time, little individual reading to children).	3.1 Some books accessible for children (Ex. books are enough to avoid conflict between children). 3.2 Staff read books or tell stories to children in story time*. 3.3 Books and reading for children are appropriate** for children in group.	5.1 A wide selection of books*** are accessible for children for a substantial portion of the day. 5.2 Books organized in reading center. 5.3 Staff read books to children informally when children ask (Ex. during free play, at naptime, as an extension of an activity).	7.1 Books and language materials are rotated to maintain variety and children's interest. 7.2 Books are accessible in most interest centers (Ex. books to read to "babies" in the dramatic play center; books about building in block area; ABC/dictionary books in writing area, etc). 7.3 Pencils and paper are accessible in most centers (Ex. in dramatic center for writing grocery list; in block center for drawing graph of buildings; in nature/science center for recording discovery).

Notes for Clarification

*Reading may be done in small groups or in larger groups depending on the ability of the children to attend to the story.

**Examples of appropriate books and activities include simpler books read with younger children; books in children's primary language (s); rhyming games for older children.

***A wide selection of books include: variety of topics; fantasy and factual information; stories about people, animals, and science; books that reflect different cultures and abilities.

Questions

(5.1) How do you select books?

(7.1) Are there any other books used with the children? How is this handled?

19. Sand/water*

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 No provision** for sand or water play, outdoors or in doors. 1.2 No toy accessible for children to use for sand or water play.	3.1 Some provision*** for sand or water play accessible, either outdoors or indoors, for children. 3.2 Some sand/water toys accessible for children.	5.1 Variety of toys accessible for children for sand/water play (Ex. containers, spoons, funnels, scoops, shovels, pots and pans, molds, toy people, animals, and trucks). 5.2 Sand or water play available to children for at least 1 hour daily.	7.1 Provision for sand and water play, both indoors and outdoors (weather permitting), for children. 7.2 Different activities done with sand and water (Ex. bubbles added to water, materials in sand table changed, i.e. rice substituted for sand).

Notes for Clarification

*Materials that can easily be poured, such as rice, lentils, bird seed, and cornmeal may be substituted for sand. Sand or sand substitute must be available in sufficient quantity so children can dig in it, fill containers, and pour.

**"Provision" for sand and water requires action on the part of staff to provide appropriate materials for such play. Allowing children to play in puddles or dig in the dirt on the playground does not meet the requirements of this item.

***Each room does not have to have its own sand and water table, but must be able to use a sand and water table regularly if it is shared with another room.

Questions

(1.1), (3.1), & (7.1) Do you use sand or water with the children? How is this handled? About how often? Where is that available?

(1.2), (3.2), & (5.1) Are there any toys for children to use with sand or water play? Please describe them.

(7.2) Can you describe the activities children do with sand and water?

20. Promoting acceptance of diversity

Inadequate 1	Minimal 3	Good 5	Excellent 7
1.1 Racial or cultural diversity invisible in materials (Ex. all toys and pictures are of one race, all print materials are about one culture, all print and audio materials are in one language where bilingualism is prevalent). 1.2 Materials present only stereotypes of ages, abilities, careers, and gender. 1.3 Staff demonstrate prejudice against others (Ex. against child or other adult from different race or cultural group, against person with disability).	3.1 Some racial and cultural diversity visible in materials (Ex. multi-racial or multi-cultural dolls, books, or bulletin board pictures, music tapes from many cultures; in bilingual areas some materials accessible in children's primary language). 3.2 Materials show diversity (Ex. different ages, abilities, careers, or gender) in a positive way. 3.3 Staff intervene appropriately to counteract prejudice shown by children or other adults (Ex. discuss similarities and differences; establish rules for fair treatment of others), or no prejudice is shown.	5.1 Many books, pictures and materials accessible showing people of different races, cultures, ages, abilities, careers, and gender in non-stereotyping roles (Ex. both historical and current images; males and females shown doing many different types of work including traditional and nontraditional roles). 5.2 Some props representing various cultures included for use in dramatic play (Ex. dolls of different races, ethnic clothing, cooking and eating utensils from various cultural groups).	7.1 Inclusion of diversity is part of daily routines and play activities (Ex. ethnic foods are a regular part of meals/snacks; music tapes and songs from different cultures included at music time). 7.2 Activities included to promote understanding and acceptance of diversity (Ex. parents encouraged to share family customs with children; many cultures represented in holiday celebration).

Note for Clarification

*When assessing diversity in materials, consider all areas and materials used by children, including pictures and photos displayed, books, puzzles, games, dolls, play people in the block area, puppets, music tapes, videos, and computer software.

Questions

(3.1) Could you give me examples of the types of music you use with the children?

(3.3) What do you do if a child or adult shows prejudice?

(7.2) Are there any activities used to help children understand the variety of people in our country and in the world? Please give some examples.

INSTRUCTIONS FOR RATINGS

1. A rating of 1 must be given if any indicator under 1 is scored T (True).
2. A rating of 2 is given when all indicators under 1 are scored F (False) and at least half of the indicators under 3 are scored T (True).
3. A rating of 3 is given when all indicators under 1 are scored F (False) and all indicators under 3 are scored T (True).
4. A rating of 4 is given when all indicators under 3 are met and at least half of the indicators under 5 are scored T (True).
5. A rating of 5 is given when all indicators under 5 are scored T (True).
6. A rating of 6 is given when all indicators under 5 are met and at least half of the indicators under 7 are scored T (True).
7. A rating of 7 is given when all indicators under 7 are scored T (True).
8. A score of NA (Not Applicable) may only be given for indicators or for entire items when “NA permitted” is shown on the scale and on the Score sheet. Indicators that are scored NA are not counted when determining the rating for an item, and items scored NA are not counted when calculating subscale and total scale scores.

SCORE SHEET

OPEN-ENDEDNESS OF ACTIVITIES RATING SCALE

Observer: _____ Date of observation: _ _ / _ _ / _ _ (mm/dd/yy)

Center/School: _____ Classroom: _____

Teacher(s): _____ Number of staff present: _____

Number of children enrolled in class: ____

Number of children present: ___

Birthdates of children enrolled: Youngest _ _/_ _/_ _(mm/dd/yy)

Oldest _ _/_ _/_ _(mm/dd/yy)

Time observation began: _ _ : _ _ _ AM _ PM

Time observation ended: _ _ : _ _ _ AM _ PM

GENERAL PHYSICAL ENVIRONMENT	
1. Indoor space 1 2 3 4 5 6 7 Notes T F T F T F T F 1.1 __ __ 3.1 __ __ 5.1 __ __ 7.1 __ __ 1.2 __ __ 3.2 __ __ 5.2 __ __ 1.3 __ __ 3.3 __ __ 5.3 __ __ 1.4 __ __ 3.4 __ __	**2. Furniture for routine play and learning 1 2 3 4 5 6 7 Notes** T F T F T F T F 1.1 __ __ 3.1 __ __ 5.1 __ __ 7.1 __ __ 1.2 __ __ 3.2 __ __ 5.2 __ __
3. Room arrangement for play 1 2 3 4 5 6 7 Notes T F T F T F T F 1.1 __ __ 3.1 __ __ 5.1 __ __ 7.1 __ __ 3.2 __ __ 5.2 __ __ 7.2 __ __ 5.3 __ __ 7.3 __ __	**4. Space for gross motor play 1 2 3 4 5 6 7 Notes** T F T F T F T F 1.1 __ __ 3.1 __ __ 5.1 __ __ 7.1 __ __ 1.2 __ __ 3.2 __ __ 5.2 __ __ 7.2 __ __ 5.3 __ __ 7.3 __ __
Subscale (Item 1-4) Score __ __ Number of items scored: __ __ **GENERAL PHYSICAL ENVIRONMENT** **Average Score (A / B) __.__ __**	

GENREAL PSYCHOLOGICAL ENVIRONMENT

5. Staff-child interactions **1 2 3 4 5 6 7** **Notes**

T F	T F	T F	T F
1.1 __ __	3.1 __ __	5.1 __ __	7.1 __ __
1.2 __ __	3.2 __ __	5.2 __ __	
1.3 __ __		5.3 __ __	

6. Informal use of language **1 2 3 4 5 6 7** **Notes**

T F	T F	T F	T F
1.1 __ __	3.1 __ __	5.1 __ __	7.1 __ __
1.2 __ __	3.2 __ __	5.2 __ __	7.2 __ __
1.3 __ __		5.3 __ __	7.3 __ __
		5.4 __ __	

7.General supervision of children (other than gross motor) and disciplines **1 2 3 4 5 6 7** **Notes**

T F	T F	T F	T F
1.1 __ __	3.1 __ __	5.1 __ __	7.1 __ __
1.2 __ __	3.2 __ __	5.2 __ __	7.2 __ __
1.3 __ __	3.3 __ __	5.3 __ __	7.3 __ __

8. Schedule **1 2 3 4 5 6 7** **Notes**

T F NA	T F NA	T F	T F
1.1 __ __ __	3.1 __ __ __	5.1 __ __	7.1 __ __
1.2 __ __ __	3.2 __ __ __	5.2 __ __	
	3.3 __ __ __		

9. Group time **1 2 3 4 5 6 7** **Notes**

T F	T F	T F	T F
1.1 __ __	3.1 __ __	5.1 __ __	7.1 __ __
1.2 __ __	3.2 __ __	5.2 __ __	7.2 __ __
		5.3 __ __	7.3 __ __

A. Subscale (Item 5-9) Score ____ ____

B. Number of items scored: ____ ____

GENERAL PSYCHOLOGICAL ENVIRONMENT

Average Score (A / B) ____.____ ____

PHYSICAL AND PSYCHOLOGICAL ENVIRONMENTS FOR SPECIFIC ACTIVITIES

10. Fine motor **1 2 3 4 5 6 7** **Notes**

T F	T F	T F	T F
1.1 __ __	3.1 __ __	5.1 __ __	7.1 __ __
1.2 __ __	3.2 __ __	5.2 __ __	7.2 __ __
	3.3 __ __		

11. Gross Motor **1 2 3 4 5 6 7** **Notes**

T F	T F	T F	T F
1.1 __ __	3.1 __ __	5.1 __ __	7.1 __ __
1.2 __ __	3.2 __ __	5.2 __ __	7.2 __ __
1.3 __ __	3.3 __ __	5.3 __ __	7.3 __ __
1.4 __ __	3.4 __ __		7.4 __ __

12. Nature/science **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
		3.2 __	__	5.2 __	__	7.2 __	__
		3.3 __	__	5.3 __	__		
				5.4 __	__		

13. Math/number **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
		3.2 __	__	5.2 __	__	7.2 __	__
				5.3 __	__		
				5.4 __	__		

14. Visual arts **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
1.2 __	__	3.2 __	__	5.2 __	__	7.2 __	__
				5.3 __	__	7.3 __	__

15. Blocks **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
		3.2 __	__	5.2 __	__	7.2 __	__
		3.3 __	__	5.3 __	__	7.3 __	__
		3.4 __	__			7.4 __	__

16. Music/movement **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
1.2 __	__	3.2 __	__	5.2 __	__	7.2 __	__
		3.3 __	__	5.3 __	__		

17. Dramatic play **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
		3.2 __	__	5.2 __	__	7.2 __	__
		3.3 __	__	5.3 __	__	7.3 __	__
				5.4 __	__	7.4 __	__

18. Literacy development **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
1.2 __	__	3.2 __	__	5.2 __	__	7.2 __	__
		3.3 __	__	5.3 __	__	7.3 __	__

19. Sand/water **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
1.2 __	__	3.2 __	__	5.2 __	__	7.2 __	__

20. Promoting acceptance of diversity **1 2 3 4 5 6 7** **Notes**

T	F	T	F	T	F	T	F
1.1 __	__	3.1 __	__	5.1 __	__	7.1 __	__
1.2 __	__	3.2 __	__	5.2 __	__	7.2 __	__
1.3 __	__	3.3 __	__				

Subscale (Item 10-20) Score __ __

Number of items scored: __ __

PHYSICAL AND PSYCHOLOGICAL ENVIRONMENTS FOR SPECIFIC ACTIVITIES

Average Score (A / B) __.__ __

Total and Average Scores

	Total Score	# of Items Scored	Average Score
General Physical Environment	_____	_____	_____
General Psychological Environment	_____	_____	_____
Physical and Psychological Environments for Specific Activities	_____	_____	_____
Total	_____	_____	_____

Appendix B

Human Subjects Approval

University Committee for the Protection of Human Subjects in Research
University of New Orleans

Campus Correspondence

Len Yan
Judith Kieff
Curriculum and Instruction Department
College of Education

February 4, 2005

RE: An investigation of the relationship between open-endedness of activities and young children's creativity

IRB# 03oct04

The IRB has deemed that the research and procedures are compliant with the University of New Orleans and federal guidelines. Should you need to change any approved procedure or add additional procedures/measuere, please submit these changes to me prior to implementation.

Please remember that approval is only valid for one year from the approval date. Any changes to the procedures or protocols must be reviewed and approved by the IRB prior to implementation.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best of luck with your project!
Sincerely,

Laura Scaramella, Ph.D.
Chair, University Committee for the Protection of Human Subjects in Research

University Committee for the Protection of Human Subjects in Research
University of New Orleans

Form Number: 03OCT04
(please refer to this number in all future correspondence concerning this protocol)

Principal Investigator Leng Yan **Title:** Doctorate Candidate
Faculty Supervisor: Judith Kieff *(if PI is a student)*
Department: Curriculum and Instruction **College:** Education
Project Title: An investigation of the relationship between open-endedness of activities
Date Reviewed:

Dates of Proposed Project Period From 10/15/2004 to 09/14/2005
approval is for one year from approval date only and may be renewed yearly.

Note: Consent forms and related materials are to be kept by the PI for a period of three years following the completion of the study.

Approval Status	Date
☐ Full Committee Approval	approved on 11/17/04
☐ Expedited Approval	
☐ Continuation	
☒ Rejected	

☒ **The protocol will be approved following receipt of satisfactory response(s) to the following question(s) within 15 days:**

Committee Signatures:

Laura Scaramella, Ph.D. (Chair)
Pamela Jenkins, Ph.D.
Anthony Kontos, Ph.D.
Betty ~~Lo~~, M.D. Kari Walsh
Richard B. Speaker, Ph.D.
Gary Talarchek, Ph.D.
L. Allen Witt, Ph.D.

☐

University Committee for the Protection of Human Subjects in Research
University of New Orleans

Campus Correspondence

Len Yan
Judith Kieff
Curriculum and Instruction Department
College of Education

March 14, 2005

RE: An investigation of the relationship between open-endedness of activities and young children's creativity

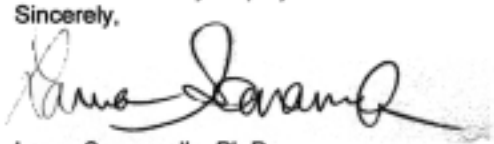
IRB# 03oct04

Your request to add additional schools has been approved. Thank you for notifying me of these changes.

Please remember that approval is only valid for one year from the approval date. Any changes to the procedures or protocols must be reviewed and approved by the IRB prior to implementation.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best of luck with your project!
Sincerely,



Laura Scaramella, Ph.D.
Chair, University Committee for the Protection of Human Subjects in Research

Appendix C

Consent Forms

UNIVERSITY OF
NEW ORLEANS

DEPARTMENT OF
CURRICULUM AND INSTRUCTION

CONSENT FORM
(For Teachers)

Title of Research Study: An Investigation of the Relationship between Open-endedness of Activities and Young Children's Creativity

Project Director: Leng Yan, Doctorate Candidate in the Department of Curriculum & Instruction at the University of New Orleans

Telephone Number: (504) 280-6527

In partial fulfillment of dissertation requirements under the supervision of my major professor, Judith Kieff, Associate Professor, Department of Curriculum and Instruction, University of New Orleans, New Orleans, LA 70148, Tel: (504) 280-6527.

Purpose of This Research: This study is conducted to investigate the relationship between open-endedness of activities and young children's creativity.

Procedures: The researcher will conduct two observations in your classroom and rate the open-endedness of your outdoor and indoor activities using a researcher-developed instrument, the Open-endedness of Activities Rating Scale (OARS). Each observation will take approximately 1 to 1.5 hour. After the observations are finished, your class may be selected as a site for further study. If your class is selected, the students in your class will be administered the Thinking Creatively in Action and Movement (TCAM), an instrument developed to examine the creative thinking abilities of children age 3-8.

Potential Risks or Discomforts: The teachers, teacher assistants, and students may be uncomfortable having people observing them in their classrooms and the students may become bored or frustrated completing the task in the TCAM test.

Potential Benefits to You or Others: Your participation in the study will be supporting research valuable to the well being of all young children.

Alternative Procedures: Your participation is entirely voluntary, and you may withdraw your consent and terminate your participation at any time without consequence.

Protection of Confidentiality: The data collected will be used for my doctorate dissertation. After the study is accomplished, the collective data and the results of the study will be reported to my dissertation committee. The results of the study may be

342 Bicentennial Education Ctr. *Lakefront Campus*
2000 Lakeshore Drive
New Orleans, Louisiana 70148
504.280.6605 *fax* 504.280.1120

UNIVERSITY OF
NEW ORLEANS

DEPARTMENT OF
CURRICULUM AND INSTRUCTION

published in some educational research journal. Several procedures are in place to ensure that all information obtained from your class is kept completely confidential or private. First, the access to the data and identifying information of your class will be restricted. Only approved research staff (Leng Yan, Leng Yan's major professor, Judith Kieff, and a colleague who will help Leng Yan collect data) will have access to the identifying information of your class. All people working on the project will sign a confidentiality pledge in which they agree that any violation of confidentiality is cause for immediate dismissal. Second, no names or other identifying information will appear on any of the scoring sheet. After completing an assessment, all identifying information will be removed from the scoring sheet and replaced with an identification number. Third, all completed scoring sheet will be stored in a locked file cabinet located at the researcher's home. All scoring sheet will be destroyed once the data is entered the statistic computer program. Finally, names or other identifying information will never be reported in any publication or report of the findings.

Signatures and Consent to Participate: I have been fully informed of the above-described procedure with its possible benefits and risks, and I have given my permission to participate in this study.

Signature of Participant	**Name of Participant (print)**	**Date**
Signature of Project Director	**Name of Project Director (print)**	**Date**

UNIVERSITY OF
NEW ORLEANS

DEPARTMENT OF
CURRICULUM AND INSTRUCTION

CONSENT FORM
(For Guardians of Young Children)

Title of Research Study: An Investigation of the Relationship between Open-endedness of Activities and Young Children's Creativity

Project Director: Leng Yan, Doctorate Candidate in the Department of Curriculum & Instruction at the University of New Orleans

Telephone Number: (504) 280-6527

In partial fulfillment of dissertation requirements under the supervision of my major professor, Judith Kieff, Associate Professor, Department of Curriculum and Instruction, University of New Orleans, New Orleans, LA 70148, Tel: (504) 280-6527.

Purpose of This Research: This study is conducted to investigate the relationship between open-endedness of activities and young children's creativity. In this study "open-endedness of activities" refers to the availability, accessibility and variety of materials, space, and equipments in the classroom, the flexibility of the schedule and disciplines that the teachers made, and the feature of the teacher-child or child-child interactions taking place in the classroom.

Procedures: I have selected your child's class for conducting this educational study. Your child's school, _____, teacher, _____, and teacher assistant, _____, have already agreed to participate in the study. Your child's participation is also very important to the study because in order to investigate the relationship between open-endedness of activities and young children's creativity, your child's creativity must be tested. In the study your child will be given a creativity test named Thinking Creatively in Action and Movement (TCAM). The TCAM was developed to examine the creative thinking abilities of children age 3-8. In this test your child will be asked to do four activities: (1) walk and run; (2) pretend to be animals or objects; (3) place a juice cup in a wastebasket; and (4) come up with different things that he/she can do with a juice cup. This test will last approximately 15 minutes.

Potential Risks or Discomforts: Your child may become bored or frustrated completing the task in the TCAM test. The boredom or frustration is expected to be short lived and minimal.

UNIVERSITY OF NEW ORLEANS

DEPARTMENT OF
CURRICULUM AND INSTRUCTION

Potential Benefits to You or Others: Your child's participation in the study will be supporting research valuable to the well being of all young children.

Alternative Procedures: Your child's participation is entirely voluntary, and you may withdraw your consent and terminate your child's participation at any time without consequence.

Protection of Confidentiality: The data collected will be used for my doctorate dissertation. After the study is accomplished, the collective data and the results of the study will be reported to my dissertation committee. The results of the study may be published in some educational research journal. Several procedures are in place to ensure that all information obtained from your child is kept completely confidential or private. First, the access to the data and identifying information of your child will be restricted. Only approved research staff (Leng Yan, Leng Yan's major professor, Judith Kieff, and a colleague who will help Leng Yan administer the TCAM) will have access to your child's name and other identifying information. All people working on the project will sign a confidentiality pledge in which they agree that any violation of confidentiality is cause for immediate dismissal. Second, no names or other identifying information will appear on any of the scoring sheet. After completing an assessment, all identifying information will be removed from the scoring sheet and replaced with an identification number. Third, all completed scoring sheet will be stored in a locked file cabinet located at the researcher's home. All scoring sheet will be destroyed once the data is entered the statistic computer program. Finally, names or other identifying information will never be reported in any publication or report of the findings.

Signatures and Consent to Participate: I have been fully informed of the above-described procedure with its possible benefits and risks, and I have given my permission for my child to participate in this study.

Signature of Guardian	**Name of Guardian (print)**	**Date**
Signature of Project Director	**Name of Project Director (print)**	**Date**

Appendix D

A Letter to Parent

UNIVERSITY OF
NEW ORLEANS

DEPARTMENT OF
CURRICULUM AND INSTRUCTION

Dear parent:

I am a Doctorate Candidate in the Department of Curriculum & Instruction at the University of New Orleans. I am conducting an investigation of the relationship between open-endedness of activities and young children's creativity in partial fulfillment of dissertation requirements under the supervision of my major professor, Judith Kieff, Associate Professor, Department of Curriculum and Instruction, University of New Orleans. In this study "open-endedness of activities" refers to the availability, accessibility and variety of materials, space, and equipments in the classroom, the flexibility of the schedule and disciplines that the teachers made, and the feature of the teacher-child or child-child interactions taking place in the classroom.

I have selected your child's class for conducting this educational study. Your child's school, _____, teacher, _____, and teacher assistant, _____, have already agreed to participate in the study. For conducting this research, an observer (me or a colleague of mine) will observe the behaviors of the teacher and teacher assistant and the physical setting of the classroom on _____, 2005 and _____, 2005. Each observation will last for 1- to 1.5- hour. During the observations your child will participate in all sorts of activities such as arts, blocks, music/movement, dramatic play, math/science, fine motor/gross motor, sand/water, and so on as they usually do in the school. The researcher is not going to give any intervention to them. If you are concerned about this procedure or have any questions about this procedure, please contact me at (504) 280-6527 or contact my dissertation advisor, Judith Kieff, at (504) 280-6527.

342 Bicentennial Education Ctr. *Lakefront Campus*
2000 Lakeshore Drive
New Orleans, Louisiana 70148
504.280.6605 *fax* 504.280.1120

UNIVERSITY OF NEW ORLEANS

DEPARTMENT OF
CURRICULUM AND INSTRUCTION

Sincerely Yours

Leng Yan

Project Director of the Study: An Investigation of the Relationship between Open-endedness of Activities and Young Children's Creativity

Date:

342 Bicentennial Education Ctr. *Lakefront Campus*
2000 Lakeshore Drive
New Orleans, Louisiana 70148
504.280.6605 *fax* 504.280.1120

Vita

Leng Yan was born in Shaoyang, Hunan, P. R. China and received her B.A. from the Shenzhen University in China, in 1998 and M.S. from the University of New Orleans in 2003. Leng Yan is submitting this dissertation as part of the requirement for the Doctor of Philosophy Degree in Curriculum and Instruction from the University of New Orleans with a concentration in Early Childhood Education. Upon completion of degree and graduation from the University of New Orleans, Ms. Yan will go back to China to conduct research and teach Early Childhood Education in a university.